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## INFLUENCE OF INFORMATION COMMUNICATION TECHNOLOGY SKILLS ON RESEARCH OUTPUT OF ACADEMIC LIBRARIANS IN PUBLIC UNIVERSITIES IN SOUTH-WEST NIGERIA

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# INFLUENCE OF INFORMATION COMMUNICATION TECHNOLOGY SKILLS ON RESEARCH OUTPUT OF ACADEMIC LIBRARIANS IN PUBLIC UNIVERSITIES IN SOUTH-WEST NIGERIA

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## Abstract

*This paper investigated the influence of ICT skills on the research output of academic librarians in public universities in the South-West, Nigeria. The study was guided by three objectives and three corresponding research questions. A survey research design method was adopted for the study. The total population for the study was two hundred and twenty (220) librarians in the South-West Nigerian universities. Hence, the total population was adopted. A questionnaire was the main instrument used for data collection. Two hundred and three (203) copies of the questionnaire were returned and used for the analysis. Data were analysed using descriptive (frequency count, tables, percentages, mean, and standard deviation) and inferential (simple linear regression) statistics. The results of the analysis revealed that academic librarians' level of research output was moderate in quality and quantity. The result also showed that the level of ICT skills among academic librarians in public universities in South-West Nigeria was high. ICT skills*

*have a positive and significant influence on research output among academic librarians in public universities in South-West, Nigeria. Based on the findings, it was recommended that academic librarians should endeavour to publish more textbooks, journal articles, conference proceedings, monographs, book chapters, and technical reports, in high rated journals for more visibility.*

**Key Words:** *Academic, ICT skills, Librarian, Public universities, Research output*

## **Introduction**

Application of information and communication technology to carry out tasks has become more popular in practically all areas of human endeavour. In the area of research, application of ICT is also gathering momentum as people have come to understand that using ICT tools to carry out research has led to positive understanding and made the research experience more attractive (Afolabi & Ipadelola 2017). For research to be carried out effectively and with ease, librarians must possess knowledge of ICT. According to Gui and Argentin (2011), academic librarians are expected to be knowledgeable in a wide range of ICT, including the basic principles underlying computing devices, network proficiency, the capacity to connect with social networks and online communities while abiding by behavioural protocols, the capacity to locate, capture, and evaluate information, the comprehension of societal issues raised by digital technologies, and the capacity to think critically. Agbo, Ngwuchukwu, Ihekwoasa, and Okwo (2020) stated that word processing, database, and internet skills are among the ICT skills academic librarians require to function in the digital age because the development of ICT skills is essential to the relevance and competency of academic librarians in the current world. Simisaye and Popoola (2019) opined that for academic librarians to be more productive in research activities, they need to possess a high level of ICT skills to effectively utilise the different forms of information resources available in cyberspace.

The effectiveness of academic librarians' use of ICT for research work is highly dependent on their competence and skills; ICT cannot be separated from research output. Fewer than ten years ago, most academics, including academic librarians in Nigeria, relied mainly on manual and traditional approaches to sourcing research materials and publications like bibliographies, abstracts, and printed sources (Agbo, Ngwuchukwu, Ihekwoasa, & Okwo 2020). In the 21st century, the incorporation of technologies into research activities has been critical because it enables researchers to work more efficiently, quickly, and comfortably.

Librarians must possess certain skills to utilise ICT effectively and efficiently. Skills are the capacity to respond appropriately to the diverse conditions and challenges presented by our situations and jobs to accomplish a goal or purpose. The Council of European Professional Informatics Societies (CEPIS, 2005) defined skills as the knowledge and experience required to carry out a particular task or job, or the capabilities of a person that are subject-specific and can be acquired and activated through related professional training. The term "information and communications technology (ICT) skills" refers to an individual's ability to communicate with others via a variety of technologies (Doughty, 2020). The ICT skills level of Nigerian librarians is a proxy for how well they can perform their professional duties of collecting, cataloguing, searching for, and disseminating information, as outlined by Ogunche (2017). It also includes the proficiency needed to work autonomously in a digital and online environment. The focus of ICT skills is on making effective use of technology. What is at stake here is more than familiarity with a particular application or operating system; it goes beyond rudimentary skills like typing, copy-pasting, and following directions. Instead of focusing on a person's skill in doing isolated tasks, it is important to value their ability to utilise their understanding of ICT to find, generate, and display information, whether that information is textual, visual, numerical, or some combination thereof (Quadri 2017).

To apply and make use of information and communication technologies for efficient and successful research activities and service delivery, it is essential to acquire the appropriate skills. As Iqbal and Khan (2017) noted, ICT skills provide the impetus for technological revolution and keeping up with the industry's ever-changing trends. They establish that technological advancements require academic librarians to acquire both fundamental and modern skills and knowledge to maximise the efficiency of these technologies in libraries. To perform effectively, academic librarians must also possess a breadth and variety of ICT skills. For example, word processing skills, statistical analysis skills, scanning and uploading skills, electronic presentation skills, and internet navigation skills. According to Anyaoku, Ezeani, and Osuigwe (2015), academic librarians need a high level of ICT literacy to do their jobs and conduct research effectively.

ICT skills cannot be separated from research output, as noted by Apata (2020). Research output is critical for academic success worldwide. Higher institutions of learning rely heavily on research to promote their institutions, and Nigeria is no exception. In recent years, researchers and policymakers have developed a growing interest in the concept of research output. A recent study

by Ifijeh, Ifijeh, and Ogbomo (2018) suggested that a scholar's research output, both in terms of quality and number, is the most significant element in determining his or her academic status and subsequent progression within an institution. The majority of academic institutions in China compensate faculty members for their contributions to knowledge through research output. Similarly, Jung (2012) stated that research output is a significant indicator of university academic performance and a primary factor in determining university rankings. To some extent, the output of faculty members is measured by the amount of research that is produced. This is true not just in Nigerian universities but at institutions globally. Journal articles, technical reports, publications, and book chapters are all examples of ways in which academics contribute to this process (Okpe, Simisaye, & Otuza 2013).

Henry, Ghani, and Bakar (2020) and Abubakar et al. (2021) stated that academics should engage in original research and publish the results in scholarly outlets. Academic advancement, appointments, and growth, as well as the ranking and rating of institutions of higher learning, have become increasingly dependent on research output. As pointed out by Crampsie (2020) in connection with tenure and promotion applications, research output, especially in the form of peer-reviewed works, is usually used as evidence of merit in academic contexts. As noted by Apata (2020), academics engage in research to stay current with the ever-changing world of knowledge, and universities are ranked based on the number of research projects conducted by their academic staff and the number of publications in referred journals, using various ratings and weightings specified by the various ranking bodies.

Research output has many advantages, as listed by Hahn and Jaeger (2013), including but not limited to the following: professional advancement (in the form of awards, respect, and promotions); networking with peers; exposure to cutting-edge research; development of new skills and knowledge; fulfilment from a sense of accomplishment; and mental stimulation. Institutional libraries can support their academic librarians' efforts to boost research output by creating environments that are favourable to productive, effective work. Academic librarians' research output will be low if they are not properly motivated. Several academics have pointed out that a lack of incentives in Nigeria's public universities contributed to the dismally low levels of research output (Igere 2020, Lawal & Olawale 2020, Okonedo 2018 & Simisaye 2019).

Despite numerous efforts to invigorate academic librarians' research output, there are still barriers and resistance to conducting research. There have been a lot of studies done trying to figure out what causes academic librarians to be so inefficient in their research output. Long daily working

hours, a heavy workload, and high publication fees are just a few of the major impediments to librarians' research output in Nigeria. According to Okonedo (2015), the main obstacles to academic librarians' research output include lack of time, insufficient interpretation skills, high publication prices levied by journal outfits, and selective rejection of manuscripts by journals.

### **Statement of the Problem**

The value of research output in academic institutions cannot be overstated. Academic librarians globally are expected to conduct research and communicate the findings through reputable publishing outlets. This is because research output has become an important factor in determining academic librarians' promotion, appointment, and career advancement. Academic librarians' publication output has been observed to be extremely low in recent years, as the majority of academic librarians express frustration with writing journal articles worth publishing in peer-reviewed journals. Many academic librarians have made little progress in terms of research and publication (Tsafe, Chiya, & Aminu, 2016). According to Basiru (2018) and Iroeze, Owante, and Echem (2020), academic librarians are less productive than lecturers or other academic staff, and their research frequently does not rank highly among academics. Hoffman, Berg, and Koufogiannakis (2017) reveal that academic librarians are not uniformly enthusiastic about or skilled at creating and maintaining scholarly records. Additionally, the authors argued that academic librarians lack a well-established research culture. Attesting to this is the fact that academic librarians in Nigerian universities show a low level of research output. According to Akinola and Ngeme (2021), academic librarians' historically low publication output, as compared to other academic staff, has a negative impact on their chances of advancement and career progression. This problem of low research output could be a result of a lack of ICT skills. Adequate ICT skills are key requirements for the high research output of academic librarians in public universities in South-West Nigeria. It is against this backdrop that this study seeks to investigate the influence of ICT skills on the research output of academic librarians in public universities in South-West Nigeria.

### **Objective of the Study**

#### **Objective of the Study**

The main objective of this study is to investigate the level of ICT skills and research output of academic librarians in public universities in the South-West, Nigeria.

The specific objectives are to:

1. examine the level of ICT skills of academic librarians in public universities in South-West, Nigeria.
2. find out the level of research output of academic librarians in public universities in South-West, Nigeria. in relation to quality and quantity
3. find out the influence of ICT skills on the research output of academic librarians in public universities in South-West, Nigeria.

### **Research Questions**

The study was guided by the following research questions:

1. what is the level of ICT skills of academic librarians in public universities in the South-West, Nigeria?
2. What is the level of research output of academic librarians in public universities in South-West, Nigeria?
3. What is the influence of ICT skills on the research output of academic librarians in public universities in South-West, Nigeria?

### **Hypotheses**

The null hypotheses formulated for this study will be tested at the 0.05 level of significance.

Ho1: ICT skills have no significant influence on the research output of academic librarians in public universities in South-West, Nigeria.

### **Review of Related Literature**

#### **Level of ICT skills**

A lot of studies have been carried out on the research output of academic librarians, but there seems to be a lack of consistency in the literature regarding the level of ICT skills and research output of academic librarians, making it difficult to gauge their level of proficiency in ICT and research output. According to earlier studies, academic librarians' passion and capacity to develop and maintain their ICT skills and research output have not been consistent, which is best characterised as an unstable position. This paper will review some of the literature.

Oyedokun, Oyewumi, Akanbi, and Laaro (2018) investigated the assessment of ICT competencies of library staff in selected universities in Kwara State. a descriptive survey design of quantitative research methods, where a sample size of one hundred and twenty-two (122) was drawn from a population of one hundred and ninety-one (191). The questionnaire served as the instrument for data collection, with one hundred and nine participants (which constitute an 89.3% return rate) fully completing and returning the instrument. The result of the findings demonstrated a high level of ICT competency on the part of library staff in selected university libraries. Bello, Emmanuel, and Busari (2013) carried out a study on the availability and accessibility of ICT facilities among librarians in some selected Nigerian universities. The study indicated a high level of ICT skills.

Contrary to the high level of ICT skills among librarians. Some studies have also confirmed low levels of ICT skills. For instance, Umeji, Ejedafiru, and Oghenetega (2013) carried out a study on information and ICT literacy levels and skills among librarians at Madonna University. The descriptive survey research design method was used, and questionnaires and oral interviews were instruments used to collect data. The instrument was analysed with a simple percent counting table. The population of this study comprised all the librarians at Madonna University Library, Okija. The results revealed a lack of information, ICT literacy, and skills.

Ayoku and Okafor (2015) surveyed the extent of information and communication technology skills possessed by librarians in the universities in Anambra State, Nigeria. The research design adopted for this study is a descriptive survey. The population consists of thirty-three (33) librarians at the five universities in Anambra State. The findings of the study revealed that librarians in the universities in Anambra State are weakly skilled in ICTs. Similarly, Adeyoyin (2006) examined the ICT literacy level of library staff in West African universities. His findings showed that the majority of librarians were poorly skilled in ICT.

### **Level of Research Output**

The quantity of publications published by librarians at any particular time is known as research output. Research results are published in journals, conference proceedings, books, book chapters, dissertations, editorial work, patent and licence applications, monograph writing, and the creation of experimental designs (Iqbal & Mahmood, 2011).

The poor web metrics rankings of Nigerian institutions in global rankings, as well as their causes, effects, and potential solutions, were the focus of a study conducted by Anyira and Idubor (2020).



The results revealed that the web metrics rankings for Nigerian institutions are relatively poor. They, however, stated that the low rankings of Nigerian higher educational institutions by Web metrics and other internationally recognised ranking agencies, if left unchecked, would spell disaster for the Nigerian educational sector and the output of these higher educational institutions at the international level.

In their study of academic librarians' research output at federal universities in Nigeria's South-South area, Orji and Anunobi (2019) looked at the number of citations as well as the h-index. Information was organised using Google Scholar for 104 academic librarians from the five local institutions. The results show an uninspiring frequency of citations and a very low degree of research impact as measured by the h-index, suggesting that academic librarians in the institutions under study produce relatively little research.

Ngene and Adesina (2021) investigated how academic librarians in Ekiti, Ondo, and Osun could increase their research output if they had better access to and made better use of electronic information resources. A survey research method was used for the investigation. As can be seen from the findings, librarians make extensive use of electronic information resources, both in terms of access and utilisation, but not in terms of actual research output. This indicates a low level of research output among academic librarians in selected states.

Babalola and Adamu (2022) examined the influence of information literacy skills on the research productivity of librarians in public universities in the North-East of Nigeria. The study adopted a survey research design. A sample size of 190 was determined using the Taro Yamane formula. A proportionate stratified sampling technique was used to select the respondents for the study. A structured and validated questionnaire was used to collect the data. Cronbach's alpha reliability coefficients for the variables ranged between 0.85 and 0.95. One hundred and ninety (190) questionnaires were administered to the respondents, out of which 165 (87%) were returned and used for the study. Data were analysed using descriptive (frequency count, tables, percentages, mean, and standard deviation) and inferential (simple linear regression) statistics. The result indicated that the level of research productivity of librarians in public universities in the North-East, Nigeria, was very low.

Okonedo-Adegbaye (2015) investigated the publication output of librarians in public universities in the south-west of Nigeria. The descriptive survey method was used for the study. 166 copies of the questionnaire were administered to librarians in both federal and state university libraries. In

response, 142 copies were retrieved, indicating a response rate of 85.5%. The data was analysed using frequency counts, percentages, the mean, and the standard deviation. Findings indicated that the publication output of librarians between 2009 and 2014 was relatively high.

Adebowale (2022) examined the influence of social media use on research output and the visibility of librarians in university libraries in South-West Nigeria. A descriptive survey research approach was utilised in the study. The population consisted of 363 librarians from all of South-West Nigeria's university libraries. The data were analysed using descriptive and inferential statistics. The findings revealed that librarians produce a high level of research output, but their research visibility is low.

### **Methodology**

The descriptive survey research design was employed for this study. The geographical location of the study was the south-west region of Nigeria, which The population of the study is 220 academic librarians; the entire sample was used due to its manageable size. The main instrument for data collection was a structured questionnaire. A total of 220 questionnaires were distributed to the study population, which included academic librarians. The study employed frequency counts, percentages, mean scores, and standard deviation as statistical measures for data analysis. The study was guided by the null hypotheses and tested at the 0.05 significant level using linear regression analyses.

### **Data Analysis and Interpretation**

**Table 1: Response Rate**

<b>S/N</b>	<b>Categories</b>	<b>Frequency</b>	<b>Percentage</b>
1.	Distributed questionnaire	220	100%
2	Duly filled and questionnaire returned	203	92.3%
3	Not returned questionnaire	17	6.7%

Source: Field work (2023)

Questionnaires were distributed to respondents in the area of study, and a response rate was calculated based on the total number of copies of the questionnaire collected. A total of 220 copies of the questionnaires were distributed to eighteen federal and state public university academic librarians in South-West Nigeria; however, 203 were duly completed and returned. This represents 92.3% of the total questionnaires distributed among the eighteen public university

libraries selected for the study. The other 17 (6.7%) questionnaires were not returned by the respondents.

### Socio-Demographic Characteristics of the Respondents

The demographic analysis is presented in Table 2.

**Table 2:** Respondents' socio-demographic information

1.	<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
	Male	84	41.4%
	Female	119	58.6%
	Total	203	100.0%
2.	<b>Age</b>	<b>Frequency</b>	<b>Percent</b>
	Below 30 years	10	4.9%
	31 – 40 years	53	26.1%
	41 – 50 years	84	41.4%
	51 – 60 years	47	23.2%
	60 years and above	9	4.4%
	Total	203	100.0%
3.	<b>Marital status</b>	<b>Frequency</b>	<b>Percent</b>
	Married	165	81.3%
	Single	37	18.2%
	Divorced	1	0.5%
	Total	203	100.0%
4.	<b>Qualification</b>	<b>Frequency</b>	<b>Percent</b>
	BLIS	8	3.9%
	MSc/MLIS	156	76.8%
	PhD	38	18.7%
	Total	203	100.0%
	<b>Designation</b>	<b>Frequency</b>	<b>Percent</b>
	Assistant librarian	13	6.4%
	Librarian I	33	16.3%
	Librarian II	36	17.7%
	Senior librarian	67	33.0%
Principal librarian	47	23.2%	
5.	Deputy university librarian	7	3.4%
	University librarian	5	2.4%
	Total	203	100.0%
	<b>Length of Service</b>	<b>Frequency</b>	<b>Percent</b>
	1-5yrs	15	7.4%
	6-10yrs	37	18.2%
	11-15yrs	64	31.5%
	16-20yrs	56	27.6%
	21-25yrs	29	14.3%
6.			

26yrs and above	2	1.0%
Total	203	100.0%

Source: Field work (2023)

The results of the study on respondents' demography are shown in Table 2. One hundred and nineteen (58.6%) respondents were males, while 84 (41.4%) were females. This result could suggest that there were more female academic librarians than males in the federal and state public libraries in South-West Nigeria. It was revealed that there were more academic librarians in the age bracket of 41–50 years than any other age group, closely followed by those in the age brackets of 31–40 years, 51–56 years (23.2%), below 30 years (4.9%), and 60 years and above (4.4%). This simply meant a larger percentage of the academic librarians in the federal and state public libraries in South-West Nigeria were relatively young, however, approaching retirement.

Also, eighty-one percent (81.3%) of the academic librarians in the federal and state public libraries in South-West Nigeria were married, followed by singles (18.2%) and divorced (0.5%). The large number of married people in this study may imply a lot of family responsibilities, which may further cause the librarians to be committed to their jobs. The finding may also suggest that the participants are responsible enough to display a sense of maturity in the workplace. One hundred and fifty-six (76.8%) of the librarians in the federal and state public libraries in South-West Nigeria possessed an MSc or MLIS. This is understandable because higher academic qualifications are needed in the library profession for productivity on the job.

The library designation shows that 33.0% of the respondents were senior librarians, followed by principal librarians (23.2%), while the least represented were university librarians at 2.4%. This result on the library designation, where the total senior and principal librarians were 56.2%, could signify that the federal and state public libraries in South-West Nigeria are possibly dominated by professional librarians. Finally, 31.5% of the respondents who participated in the study had 11 to 15 (31.5%) years of working experience, 16-20 years (27.6%), 6-10 years (18.2%), 21-25 years (14.3%), and 1-5 years (7.4%), while few had more than 25 years of working experience (1.0%), signifying that the state and federal public university libraries in South-West Nigeria are possibly dominated by a highly experienced workforce.

### **Analysis of Research Questions**

Data collected on research question one was analyzed using descriptive statistics.

**Research Question One: What is the level of research output of librarians in public universities in the South-West, Nigeria?**

Data collected on research question one was analyzed using descriptive statistics.

**Table 3** *Descriptive Statistics for Research Outputs of librarians in public universities in South-West, Nigeria*

S/N	Research Outputs	12 and above (1)	9-11 (2)	6-8 (3)	5-3 (2)	2 – 0 (1)	Mean	SD
1.	<b>Research Quality</b>						<b>2.80</b>	<b>.97</b>
	My articles are indexed by Google Scholar	50(24.6)	47(23.2)	47(23.2)	47(23.2)	12(5.9)	3.37	1.24
	My articles are indexed by JSTOR	22(10.8)	55(27.1)	48(23.6)	55(27.1)	23(11.2)	2.99	1.20
	My articles are indexed by SCOPUS	11(5.4)	4(31.5)	56(27.6)	51(25.1)	21(10.3)	2.97	1.10
	My articles are indexed by directory of Open Access Journals	17(8.4)	33(16.3)	81(39.9)	53(26.1)	19(9.4)	2.88	1.06
	My articles are indexed by ERIC	14(6.9)	53(26.1)	59(29.1)	45(22.2)	32(15.8)	2.86	1.17
	My articles are indexed by Pubmed Central	9(4.4)	44(21.7)	55(27.1)	38(18.7)	57(28.1)	2.56	1.23
	My articles are indexed by MEDLINE	11(5.4)	20(9.9)	27(13.3)	32(15.8)	113(51.7)	1.94	1.26
2.	<b>Research Quantity</b>						<b>2.66</b>	<b>.87</b>
	Total number of all types of peer reviewed publications (The total output within 3 years.)	21(10.3)	55(27.1)	67(33.0)	50(24.6)	10(4.9)	3.13	1.05
	The total number of my peer reviewed in journals publications	24(11.8)	51(25.1)	67(33.0)	48(23.6)	13(6.4)	3.12	1.09
	The total number of my peer reviewed research output produced in a year.	14(6.9)	27(13.3)	86(42.4)	53(26.1)	23(11.3)	2.78	1.03
	The total number of my peer reviewed chapters in books	10(4.9)	23(11.3)	74(36.5)	56(27.6)	40(19.7)	2.54	1.08
	The total number of my peer reviewed papers published in conference proceedings	8(3.9)	23(11.3)	74(36.5)	56(29.1)	39(19.2)	2.52	1.04
	The total number of my peer reviewed textbooks published	9(4.4)	23(11.3)	72(35.5)	53(26.1)	46(22.7)	2.49	1.09
	The total number of monographs	12(5.9)	11(5.4)	45(22.2)	44(21.7)	91(44.8)	2.06	1.19

produced	<b>Research Output (Weighted Mean = 2.73, Standard Deviation = .83)</b>
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Source: Field work (2023)

**Decision Rule:**

If mean is 1.0 to 1.79 = 0-2/Very low Level;

1.80 to 2.59 = 3-5/Low Level;

2.60 to 3.39 = 6-8/Moderate Level;

3.40 to 4.19 = 9-11/High Level;

4.20 to 5.0 = 12 and above/Very High Level.

Criterion Mean = 3.0.

Table 3 presents the results of descriptive statistics for librarians’ research output. Librarians’ research output had an overall mean of 2.73 on a scale of 5. This indicates that, generally, there is a moderate level of research output among academic librarians in the public universities in South-west of Nigeria. Librarians’ research output was measured by research quality and quantity. Additional analysis shows that research quality had a moderately high mean score of 2.80 and research quantity also had a moderately high mean score of 2.66. This implies that academic librarians in public universities in South-West Nigeria experienced a moderate level of research output in both quality and quantity.

Unsurprisingly, the level of article indexing of peer-reviewed chapters in books (x = 2.54), papers published in conference proceedings (x = 2.52), peer-reviewed textbooks (x = 2.49), monographs (x = 2.06), and article indexing by MEDLINE (x = 1.94) was low. By implication, librarians in public universities in South West Nigeria have not given serious attention to the production and publication of article indexing by MEDLINE, peer-reviewed chapters in books, conference proceedings, reviewed textbooks, and monographs.

**Research Question Two: What is the level of ICT skills of librarians in public universities in South-West, Nigeria?**

Data collected on research question three was analyzed using descriptive statistics.

**Table 4:** *Descriptive Statistics for ICT Skills of librarians in South-West, Nigeria.*

1.	ICT Skills	VHL	HL	LL	ML	VLL	Mean	SD
	<b>Research Tools and Skills</b>						<b>3.99</b>	<b>.63</b>
	Using e-mails to send out research work for editing and publication. I am	112(55.2)	56(27.6)	31(15.3)	4(2.0)		4.36	.81
	Using What Sapp to work in	83(40.9)	85(41.9)	29(14.3)	5(2.3)	1(0.5)	4.20	.81

	partnership with colleagues. I am		)						
	Using storage devices such as flash drive, CD plate, and memory card etc.to store document. I am	52(25.6)	108(53.2)	40(19.7)	3(1.5)			4.03	.72
	Using video conferencing to work in partnership with colleagues. I am	39(19.2)	105(51.7)	50(24.6)	9(4.4)	0		3.86	.77
	Using research gate to share papers, ask and answer questions, and find collaborators. I am	29(14.3)	112(55.2)	49(24.1)	12(5.9)	1(0.5)		3.77	.78
	Using online web based or internet to administer and retrieved questionnaire, e.g. Monkey survey, Google forms	29(14.3)	106(52.2)	53(26.1)	12(5.9)	3(1.5)		3.72	.84
	<b>Computing Skill</b>							<b>3.96</b>	<b>.68</b>
	Using MS Word to type documents. I am	71(35.0)	92(35.3)	36(17.0)	4(2.0)	0		4.13	.76
	Using computer to download and save documents. I am	68(33.5)	93(45.8)	41(20.2)	1(0.5)	0		4.12	.73
2.	Using Google drive to store files on the servers. I am	57(28.1)	99(48.8)	44(21.7)	2(1.0)	1(0.5)		4.02	.76
	Using Google documents to create and edit files online while collaborating with other colleagues. I am	39(19.2)	110(54.2)	43(21.2)	7(3.4)	4(2.0)		3.85	.83
	Using Google drive to synchronize files across devices. I am	33(16.3)	116(57.1)	40(19.7)	11(5.4)	3(1.5)		3.81	.82
	Using Google drive to share files for research. I am	36(17.7)	102(50.2)	57(28.1)	6(3.0)	2(1.0)		3.80	.79
	<b>Database Management Skills</b>							<b>3.57</b>	<b>0.07</b>
	Using databases to download files. I am	51(25.1)	73(36.0)	74(36.5)	5(2.5)	0			
3								3.84	.83
	Using Online Public Access Catalogue (OPAC) to access resources. I am	37(18.2)	75(36.9)	85(41.9)	6(3.0)	0		3.70	.80
	Using online databases such as EBSCOHOST, Google Scholar, Directory of open access Journals, Scopus, JSTOR, , ERIC, etc. to access resources. I am	38(18.7)	65(32.0)	85(41.9)	14(6.9)	1(0.5)		3.62	.88
	Using Boolean operators such as and, or, and NOT. I am	23(11.3)	66(32.5)	83(40.9)	23(11.3)	8(3.9)		3.35	.96
	Creation of a database. I am	22(10.8)	64(31.5)	84(41.4)	23(11.3)	10(4.9)		3.32	.98
	<b>Referencing and Citation Skills</b>							<b>3.29</b>	<b>.81</b>
4.	Using citation or reference management software to populate the reference or bibliography automatically. I am	16(7.9)	63(31.0)	99(48.8)	19(9.4)	6(3.0)		3.32	.86
	Using reference management software with word processors to	15(7.4)	63(31.0)	99(48.8)	19(9.4)	7(3.4)		3.30	.87

enable in text citation. I am Using endnote to manage bibliographies and references. I am	14(6.9)	65(32.0)	92(45.3)	25(12.3)	7(3.4)	3.27	.89
<b>ICT Skills (Weighted Mean = 3.70, Standard Deviation = 0.56)</b>							

Source: Field work (2023)

**Decision Rule:**

If mean is 1.0 to 1.79 = Very low level

1.80 to 2.59 = Moderate level

2.60 to 3.39 = Low level

3.40 to 4.19 = High level

4.20 to 5.0 = very high level.

Criterion Mean = 3.0

Table 4 presents the results of descriptive statistics for ICT skills. From Table 2, it was observed that academic librarians' levels of ICT were high in public universities in South-West Nigeria. This is due to the value of the mean score (3.70), which falls in the high-level scale concerning the ICT skills of librarians in public universities in South-West Nigeria. ICT skills were operationalized using research tools and skills, computing skills, database management skills, and referencing and citation skills. The study is in line with Oyedokun, Oyewumi, Akanbi, and Laaro (2018), who investigated the ICT Competencies of Library Staff in Selected Universities in Kwara State. Their findings revealed a high level of ICT skills. The study also agrees with the study of Bello, Emmanuel, and Busari (2013). A study on the availability and accessibility of ICT facilities by librarians in some selected Nigerian universities revealed high levels of ICT skills.

. Further analysis shows that research tools skills (3.99), computing skills (3.96), and database management skills (3.57) were at high levels, while referencing and citation skills (3.29) were at a low level. This result suggests that librarians in public universities in South-West Nigeria have a high level of research tools and skills, computing skills, and database management skills but a low level of referencing and citation skills.

**Test of Hypotheses**

The study was guided by the following null hypotheses which the researcher formulated at the beginning of the study and tested, using linear regression analyses

**Hypothesis 1: ICT skills have no significantly influence research output of academic librarians in public universities in South West, Nigeria.**



To test this hypothesis, linear regression method was adopted. The results and conclusions are explained in table 5

**Table 5**

*Simple Regression Model of Librarians ICT Skills and Research Output*

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	R <sup>2</sup>	Adj. R <sup>2</sup>	F Ratio
	B	Std. Error	Beta					
(Constant)	.998	.370		2.696	.008	0.100	0.096	22.336;
ICT Skills	.468	.099	.316	4.729	.000			p = 0.000

a. Dependent Variable: Research output. F (df) = 1/201

The result relating to hypothesis one is presented in Table 5. The result revealed that librarians ICT skills ( $R^2 = 0.316$ ,  $t(200) = 4.729$ ,  $p = 0.05$ ) have a positive and significant influence on the research output of academic librarians in public universities in South-West Nigeria. The study is in line with the study conducted by Lawal and Olawale (2020) who revealed that ICT skills have significant influence on research productivity of the librarians in Bowen University. The F-test (1, 201) of 22.306 shows that there is sufficient evidence to substantiate the model's usefulness in explaining research output. The  $R^2$  (0.100) indicates that 10.0% of the variation in research output is explained by librarians' ICT skills in public university libraries in South-West Nigeria. The finding suggests that librarians' ICT skills are a vital predictor of research output in public university libraries in South-West Nigeria. The regression model is presented as:

$$\text{Research Output} = .998 + .468 \text{ librarian ICT Skills}$$

This implies that research output increases by .468 when librarians ICT skills go up by 1 index unit. Based on the F ratio and adjusted coefficient of determination with a p-value less than the conventional probability of 0.05, the null hypothesis (H01), which states that ICT skills will not significantly influence the research output of academic librarians in public universities in South-West Nigeria, was hereby rejected. The finding suggests that ICT skills contribute positively to the research output of academic librarians in public universities in the south-west of Nigeria. The study further sought to determine the influence of ICT skills on research output.

**Table 6**

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	R <sup>2</sup>	Adj. R <sup>2</sup>	F Ratio
	B	Std. Error						
(Constant)	1.249	.385		3.249	.001			
Computing skill	-.210	.110	-.171	1.917	.057	0.150	0.133	8.714; p = 0.000
Referencing citation skills	.331	.085	.321	3.908	.000			
Database management skills	.118	.101	.099	1.169	.244			
Research tools skills	.201	.117	.151	1.716	.088			

Table 6 Analysis of ICT Skills (Dimensions) and Research Output

a. Dependent Variable: Research output. F (df) = 4/198

The result of Table 6 shows that referencing citation skills ( $Beta = .321, t(197) = 1.169, p < 0.05$ ) had a positive and significant influence on research output. The implication of this is that librarians who possessed high level of referencing citation skills such as the use of e-mails, WhatsApp, storage devices, video conferencing, research gate and online web based for research work would enhance their research output in public universities in South West, Nigeria. However, computing skills ( $Beta = -.171, t(197) = -1.917, p > 0.05$ ) had a negative and insignificant influence on research output. On the other hand, database management skills ( $Beta = .099, t(197) = 1.169, p > 0.05$ ) and research tools skills ( $Beta = 0.151, t(197) = 1.716, p > 0.05$ ) had positive and insignificant influences on research output. This signifies that computing skills, database management skills and research tools skills are not a vital predictors of research outputs of Librarians in public university libraries in South-West, Nigeria.

The model's coefficient of determination value, Adj. R<sup>2</sup> was found to be 0.133 indicating that 13.3% of research output was explained by ICT skills (dimensions) in public university libraries in South-West, Nigeria. However, the model did not explain 86.7% of the variation in research output, implying that there are other factors associated with research output which were not captured in the model. Furthermore, the  $F(4, 198) = 8.714, p = 0.05$  revealed that, ICT skills (dimensions) were considered statistically significant in predicting research output in public university libraries in South West, Nigeria. The predictor equation for research output versus

independent variable (ICT skills dimensions) is described below. The insignificant predictors were omitted from the regression model since they did not influence research output.

$$\text{Research Output} = 1.249 + .331 \text{ Referencing Citation Skills}$$

This implies that research output increases by 0.331 when ICT skills go up by 1 index unit. The study findings further indicate that referencing citation skills have influence on research output at 33.1 percent. The implication of this is that librarians who possessed high level of referencing citation skills would improve their research outputs in their universities.

### **Summary of Major Findings**

The following major findings were established after the analysis of data retrieved from the respondents in the study.

1. Librarians in public universities in South-West, Nigeria, have a moderate level of research output in terms of research quality and quantity.
2. The level of ICT skills of academic librarians in public universities in South-West, Nigeria is high.
3. ICT skills have a positive and significant influence on research output of academic librarians in public university libraries in South-West, Nigeria

### **Conclusion**

Research output is an important indicator of librarians' performance in university. Librarians conduct research and publish their findings in reputable outlets in the form of books, book chapters, co-authored books, journal articles, and conference proceedings. Literature and observation reveal a moderate level of research output by academic librarians in public universities in South-West, Nigeria. The result of this study reveals high level of ICT of librarians in public universities in South-West, Nigeria and ICT skills had positive and significant influence on the research output of academic librarians in public universities in South-West, Nigeria.

### **Recommendations**

This study has explored a wide range of theoretical and empirical issues, and in the end, the following recommendations are made for policy intervention:

1. Necessary and relevant information and communication technologies infrastructures and facilities should be provided to improve academic librarians' research output in public universities in South-West, Nigeria by the management of federal and state universities in conjunction with the federal and state universities libraries.
2. The management of academic libraries must ensure that relevant and adequate training and re-training in the use of ICTs among academic librarians in public universities in South-West, Nigeria.
3. Time management culture should be imbibed by academic librarians in public universities in South-West Nigeria in order to have ample time for research activities.
4. Academic librarians should endeavour to publish more textbooks, journal articles, conference proceedings, monographs, book chapters, and technical reports, in high rated journals for more visibility.

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