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ICT COMPETENCY OF LIBRARY AND INFORMATION SCIENCE UNDERGRADUATES: EXAMINING WORKPLACE REQUIREMENTS AND CURRICULUM RESPONSE TO THE SKILLS GAP IN A NIGERIAN UNIVERSITY OF EDUCATION

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Abstract
In this study, ICT Competency of Library and Information Science Undergraduates: Examining Workplace Requirements and Curriculum Response to the Skills Gap in a Nigerian University of Education were investigated. A descriptive ex-post-facto survey research design was used. The study population comprises 360 students in 300L in the Department of library and information science, Tai Solarin University of Education (TASUED). Using convenience sampling and simple random sampling techniquea total of 72 (20%) undergraduates were selected for the study. All questionnaires administered were returned and found useful for the study. The findings revealed that the undergraduates had very high competency in basic computing such as word processing (100%) but low competency in web content creation and the use of statistical tools such as SPSS and Excel. The undergraduates affirmed that the ICT competencies much needed to fit into the labour market after graduation are online book selection and acquisition, use of library software, and word processing ability. On the other hand, the majority affirmed that ICT competency in using social media tools wasn't needed. The study concludes that the workplace requirements for information professionals will continue to evolve. Hence, recommends that, beyond teaching research methodology, undergraduates should be exposed to practical sessions on the use of various statistical packages for research. The undergraduates should be taught the practicality of library service delivery using social media platforms to provide relevant and up-to-date information to users.

Keywords- ICT Competency, LIS Undergraduates, LIS Curriculum, Tai Solarin University of Education

Introduction

The changing research and academic environment brought about by the adoption of Information Communication Technology (ICT) into library service delivery has created new competency expectations for information professionals. Consequently, undergraduates are through its curriculum trained to function in "the library of the future" that is technology driven. Technology has favourably impacted human existence, bringing about more effective ways of living and carrying out tasks (Awodoyin, Adetoro, & Osisanwo, 2016), including library service delivery. Information professionals have had to adopt technology globally to give accurate and current information on the go to meet the ever-changing user information needs. Its availability has also "broken the middle wall," as it were, between the informed and the uninformed. As a result of important contributions from discoveries such as artificial intelligence, the Internet of Things, 3D printers, nanotechnology, biotechnology, energy storage, and quantum computing, among others, the internet has also provided a platform for billions of people to be online, access limitless knowledge, process, and store information (Prisecaru, 2016).

Information and Communication Technology (ICT) is also triggering a change from an industrialized civilization to an information- or knowledge-driven society.This technological drive in today's library has brought about changes both in the information needs of the user and service delivery on the part of the librarian. There is also a growing demand for information professionals to develop their ICT competency to reskill and retool themselves to meet current job demands. However, to connect students and faculty to the constantly evolving world of information, librarians must even though they are not required to be experts in every developing technology, have a fundamental awareness of emerging technologies. According to research, ICT knowledge and skills should be emphasized in library and information science curricula to better prepare students for the job market (Arif and Mahmood, 2012, cited in Hossain and Sormunen 2019; Hundu & Anaele, 2014; Raju, 2019; Finlay, 2017, p. 17 cited in Raju, 2019).

The reality is that technology is not static; hence new technologies will continue to emerge to redefine and refine how we do things. Consequently, these 21st-century competencies will continue to change the trends in LIS job advertisements (Wise, Henninger & Kennan, 2011; Shongwe, 2014, cited in Ocholla, 2019). This is because the collections are evolving from print to digital, electronic resources, and now web resources. Technology is expected to be a major driver by 2030, coupled with the requirement for individual inter-social traits associated with team- and project-based work, as well as technology-enabled training options (Rossignoli & Amonoo-Kuofi, 2019).

Similar to this, it is predicted that "47% of employment in the US will experience tremendous anxiety due to the advent of computers, and other developed and emerging countries will experience same (Prisecaru, 2016). The demand for competitive information-oriented knowledge, skills, and talents in the information economy necessitates that LIS programs investigate and capitalize on new aspects, orientations, and concepts. It is no longer news that robots are gradually creeping into our libraries in the developed and developing world to provide library services, which means that in a few years, robots may take over the routine functions in the library. Additionally, more libraries are becoming hybrid, combining physical and digital technologies to form learning hubs. Such libraries have, among other features, the following: an e-library; virtual services; mobile libraries, digital curation and preservation; online scholarly communication; and social mediation applications. Also, artificial intelligence and robot technology, new library spaces such as adjusted learning spaces, sharing communication, research commons, and maker spaces, and so on (Simisaye, Awodoyin & Osisanwo, 2022).

However, for librarians already practising, will they have to go back to school to be retrained or lose their jobs? To be relevant as information professional requires continuous professional development. This is because the present work place requirements knowledge now revolves around metadata creation and management, library ICTs and systems operations, digitization and preservation, curation of digital content and research data, e-resources management, social media skills, website development and maintenance skills, networking, and understanding of metadata standards (Raju, 2017). In practice, how many library school's curricula have adequately responded to this ICT drive in the knowledge economy?

As a result of the foregoing, it has becomes imperative for LIS schools to respond to this skills gap by continuously reviewing their curriculum to reflect the present LIS job requirements and changing information profession. No matter where LIS professionals work in the future, they must be knowledgeable about information technology and have the ability to create and gather information utilizing the internet (Hundu & Anaele 2014).The Department of Library and Information Science at the Tai Solarin University of Education responds to these job requirements and skills gaps by exposing students to courses such as computer systems and data processing, knowledge management, digital libraries and preservation, introduction to information science, web publishing, information technologies, information science, database management, IT applications to

libraries and information centres, and Internet information resources, among many others. Every five years, the curriculum is also reviewed to cater and continuously respond to skill gaps and changing job market needs.

Research Objectives

The following research objectives guided this study

1. To examine the ICT competency level of LIS undergraduates in TASUED;
2. To assess the ICT competencies needed to fit into the labour market after graduation as perceived by the undergraduates in TASUED;
3. To examine the ICT courses offered and passed by the undergraduates during LIS training in TASUED;
4. To find out the core ICT competencies required by LIS employers according to job adverts as perceived by the undergraduates

Review of Related Literature

A curriculum for LIS education often reflects what is being taught to train librarians who will gain the necessary knowledge and abilities to become qualified individuals in the field and handle difficulties in the constantly evolving information society. Librarianship, or the work of information specialists embedded in it, requires highly developed digital competencies in this era of technology. LIS schools, therefore, ought to include technology-based course units in their curricula to fulfil this need. Because of the advancement of technology, that has led to the replacement of the human workforce with automation, artificial intelligence (AI), and robotics (Tella 2020).

Therefore, library and information science undergraduates need to be exposed to the requisite skills in the curriculum that will enable them to function in the library of the future. Additionally, there will be a greater demand for professionals with a blend of traditional and digital skills of subject knowledge in this era than ever before. This was corroborated in a study by Ocholla (2019)that Free Wi-Fi in libraries, access to library resources both on and off campus, 24/7 study spaces, research commons, group study areas, maker spaces, borrowing ICTs (like laptops), e-Resources (like eBooks, databases, etc.), e-Catalogues, digital scholarship (including institutional repositories), research data services (RDS; RDM), open scholarship, information literacy, and other trends are currently prevalent in academic libraries particularly in terms of providing research support.A related study identified several knowledge and skill areas expected of today's information professionals as collection development, cataloguing and classification, electronic resources, library systems, teaching or training, report

writing, abstracting and indexing, Dspace, integrated library systems, particularly in the areas of web development (HTML, PHP, JavaScript), databases (MySQL), data warehousing, artificial intelligence, 3D printers and multimedia. A majority of the occupations demanded advanced IT competencies including SAP, management information systems, and Microsoft Solutions (Ocholla & Shongwe 2013).

The knowledge and abilities required of LIS practitioners are evolving. In their research, Shahbazi, Fahimnia & Khoshemehr (2016) discovered that some of the basic ICT skills that any librarian should have today include troubleshooting, installing, file conversion, Microsoft Office (Word, PowerPoint, and Excel), as well as downloading and installing simple computer programs. Litsalia (2017) discovered that the LIS courses covered during LIS training of LIS professionals are Management of information systems, Database construction, Information systems development, Electronic records management, System analysis and design, Cyber café development, Web design, Operating systems, Computer architect in a study on ICT Proficiency of LIS Professionals.

In another study on the ICT proficiency of LIS students, the findings revealed that for the undergraduates to offer their clients high-quality services after graduation, they should be familiar with various library software modules, Microsoft Office, hands-on experience creating databases and websites, and the usage of social networking technologies (Fatima, Shafique, & Firdous 2012). Further findings by the authors however revealed thatthe library schools are not training their undergraduates in line with the needs of the market (Fatima, Shafique, & Firdous 2012). Findings from a similar study also showed that LIS department use traditional teaching techniques to provide ICT courses and also uses outdated LIS curriculum (Buarki, Hepworth, Murray & McKnight 2009). Similarly, library schools seem not to be pursuing equivalent educational adjustments despite academic libraries adding scholarly communication duties and responsibilities to job descriptions (Fruin, 2017 cited in Raju 2019).

For instance, Raju's (2019) research revealed that LIS programs worldwide fell short of the standards for academic library knowledge and skills in the rapidly developing field of scholarly communication. Additionally, Raju, and Johnson (2016,cited in Raju 2019), discussing research assistance in the context of South African university libraries, found out that services like Research Data Management and bibliometrics are hindered by a lack of skill capacity, which is made worse by LIS schools' general unwillingness to take on the challenge in this new skill area. Another study on the difficulties faced by new information professionals discovered that some courses were only theoretically taught with

historical overviews and without practical training and that the ICT services and skills required in the majority of electronic and digital libraries are not represented in the department's course offerings (Buarki, Hepworth, Murray & McKnight 2009).

The LIS job market, according to Ocholla (2003), demands new and extra skills such as computer literacy, word processing, spreadsheets, database creation and maintenance, online searching and retrieval, and CD-ROM services. Other skills include telecommunications, choice of software and hardware, home page design and administration, fax transmission, and archiving of audiovisual and electronic documents. Researchers Buarki, Hepworth, Murray & McKnight (2009) found that businesses required graduates to demonstrate new ICT skills, which the undergraduates may not have learned throughout (their) LIS courses. They also found that employers needed graduates who can keep up with industry trends.

Before now libraries have been the major employers of LIS graduates probably because the graduates were only trained to function in a 'library'. This was corroborated in a study by Ocholla and Shongwe (2013) that found that job postings in the public domain revealed a strong, as anticipated, monopoly by libraries in hiring LIS specialists. However due to the increasingly diverse nature of LIS, ICT-based courses are now introduced into the curriculum such that undergraduates are now being exposed to various technology-based course. The demand for information experts is demonstrating this trend in job advertisements. It is exciting to see emerging industries, like knowledge management, prominently featured as future jobs. Particularly in the library category, several new titles relating to information communication technology (ICT) were found. The new titles contain strong ICT aspects and demonstrate the impact that ICT has on the LIS job market. It also indicates an increasing demand for crucial information and knowledge management capabilities in both the public and private sectors. Different sectors are employing librarians to promote access to knowledge.

Research Methodology

The study is a survey of the ex-post facto design. The population of the study is the 300Level year LIS undergraduate student. These students have been exposed to various Information technology based courses in LIS. Convenience sampling and simple random sampling technique was adopted to capture all the 72 students out of 360. The researcher directly administered the questionnaire to all the students. The questionnaire was divided into two sections, the first section

(Section A] consisted of items which elicit the respondent's bio-data. The second section [Section B) consisted of five (5) parts on the ICT competency of LIS undergraduates. The questionnaire of Litsalia (2017) on the ICT competency of LIS professionals was adopted for this study. The research questions were analyzed using frequency count and percentages.

Data Analysis

Demographic Information of Respondents

Table 1: Distribution of Respondent

Demographic	Frequency	Percentage (%)
Male	31	43.1
Female	41	56.9
Age/Years		
Less than 18	3	4.2
18-25yrs	69	95.8
Total	**72**	**100.0**

Results in table 1 revealed that the majority or 41 (56.9%) of the respondents are female while the remaining 31(43.1%) of the respondents are female. Also, the majority of the respondents are between 18-25 years of age.

Research Question 1: What is the ICT competency level of LIS undergraduates in TASUED?

Table 2: ICT competency level of LIS undergraduates

	ICT competency	Very high	High	Low
	Basic ICT skills			
1	Basic computing e.g word processing	72 (100%)	-	-
2	Storing and copying data into primary and secondary storage device	60 (83.3%)	12 (16.7)	-
3	Retrieving document from storage device	50 (69.4)	10 (13.9)	12 (16.7)
4	Digitalization, e.g, scanning and Uploading	50 (69.4)	10 (13.9)	12 (16.7)
5	Presentation of using PowerPoint	20 (27.8)	12 (16.7)	40 (55.5)
6	Statistical skills, e.g SPSS, Excel	20 (27.8)	12 (16.7)	40 (55.5)
	1.Web Technologies			
7	Internet surfing/browsing	72 (100%)	-	-
8	Use of emails	72 (100%)	-	-
9	Use of social media platforms and networks (e.g your level of using Facebook, Twitter)	72 (100%)	-	-
10	Use of OPAC	72 (100%)	-	-
11	Use of search engine (Google, Devil finder, Ask)	50 (69.4)	10 (13.9)	12 (16.7)
12	Web content creation	20 (27.8)	12 (16.7)	40 (55.5)
13	Web 2.0 skills e.g blogging and instant messaging	20 (27.8)	12 (16.7)	40 (55.5)

The result in table 2 showed that students had very high competency levels in basic computing, Internet surfing/browsing, use of emails and use of social media platforms and networks. On the other hand low ICT competency was recorded for the undergraduates in web content creation, use of statistical tools such as SPSS.

Research Question 2: What are the ICT competencies needed in order to fit into the labour market after graduation as perceived by the undergraduates in TASUED?

Table 3: ICT competencies needed in order to fit into the labour market after graduation

S/N	ICT Competencies	Much needed	Needed	Not needed
1	Online Book Selection/Acquisition	72(100%)	-	-
2	Online Copy Cataloging	72(100%)	-	-
3	Use of Internet Information Search Strategy	72(100%)	-	-
4	Use of Library Software	72(100%)	-	-
5	Data Entry	72(100%)	-	-
6	Communication (Using emails)	72(100%)	-	-
7	Electronic Presentation (PowerPoint)	60 (83.3%)	12 (16.7%)	-
8	Word Processing (Microsoft word)	60 (83.3%)	12 (16.7%)	-
9	Scanning and Uploading	60 (83.3%)	12 (16.7%)	-
10	Content Management	50 (69.4%)	10 (13.9%)	12 (16.7%)
11	Document/Database Management	50 (69.4%)	10 (13.9%)	12 (16.7%)
12	Statistical Analysis	20 (27.8%)	12 (16.7%)	40 (55.5%)
13	Use of social media tools such as Twitter, Facebook, WhatsApp etc	10 (13.9%)	10 (13.9%)	52 (71.2%)

The result in the table 3 showed that all (100%) respondents affirmed that Online Book Selection/Acquisition, online Copy Cataloging, use of Internet Information Search Strategy, use of library software, etc are the much needed ICT competencies by undergraduates to fit into the labour market. On the contrary, 52 (71.2%) of the undergraduates indicated that the ability to use social media tools such as Twitter, Facebook, WhatsApp etc. are not needed ICT competency for the labour maket .

Research Question 3: What ICT Related courses were offered and passed during LIS training in TASUED?

Table 4: ICT related courses offered and passed during LIS training

S/N	ICT courses offered and passed during LIS Training	Frequency	Percentage (%)
1	Information technology	66	91.7
2	Computer System and Data processing	61	84.7
3	Database Management	60	83.3
4	Digital library and Preservation	57	79.2
5	Web Publishing	56	77.8
6	Audio Visual and Multimedia resource Management	53	73.6
7	Automation of Library Information Centres	50	69.4
8	Internet Information Resources	49	68.1
9	Introduction to library and information Resources	44	61.1

Result in Table 4 showed that all the courses examined by the study were passed (Above 60%) by the majority of the undergraduates.

Research Question 4: What are the core ICT competencies required by LIS employers according to job adverts as perceived by the undergraduates?

Table 5: Core ICT competencies required by LIS employers according to job adverts

Core ICT Competencies	Much required	Required	Not required
Scanning and Uploading	72(100%)	-	-
Data Entry	72(100%)	-	-
Communication (Using emails)	72(100%)	-	-
Electronic Presentation (PowerPoint)	72 (100%)	-	-
Document/Database Management	72 (100%)	-	-
Online Book Selection/Acquisition	60 (83.3%)	12 (16.7)	-
Online Copy Cataloging	60 (83.3%)	12 (16.7)	-
Use of Internet Information Search Strategy	60 (83.3%)	12 (16.7)	-
Use of Library Software	50 (69.4)	10 (13.9)	12 (16.7)
Word Processing (Microsoft word)	50 (69.4)	10 (13.9)	12 (16.7)
Content Management	36 (50%)	36 (50%)	
Statistical Analysis	20 (27.8)	12 (16.7)	40 (55.5)

The majority of the respondents affirmed that the core ICT competencies required by LIS employers according to job adverts are the ability for scanning and uploading, data entry, communication using emails, electronic presentation (PowerPoint), and document/database management. On the contrary, 40(55.5%) affirmed that statistical analysis is not a core ICT competency required by LIS employers according to job adverts.

Discussion of Findings

The demographic information of the respondents revealed that a good number of the undergraduates were within the expected age of undergraduates in Nigeria while a majority of the undergraduates were mostly female. This could have resulted in the acceptance of the LIS (Library and Information Science) profession by the feminine gender. The implication is that in the nearest future there will bemore female in LIS profession than male. This gender variation is supported by Adetoro's (2011) findings that the feminine gender seems to dominate the LIS profession. The ICT competency level of the undergraduates depicts that the majority of the undergraduates had very high ICT competency in basic ICT skills such as word processing. This corroborates the findings of Shahbazi, Fahimnia & Khoshemehr's (2016) study that found some of the basic ICT skills that any librarian should have today are troubleshooting and Microsoft Office (Word, PowerPoint, and Excel).

On the other hand, the undergraduates affirmed their low competency in using PowerPoint and statistical tools such as SPSS and Excel. This finding corroborates the observation that most undergraduates have little or no knowledge of the use of statistical tools. The implication of this is that upon graduation the students may not be able to provide research data services as a trend in library services today because of their deficiency in this area. Findings from the study further revealed that the students had very high competency levels in Internet surfing/browsing, use of emails and use of social media platforms and networks (e.g your level of using Facebook, Twitter). This finding is expected as it aligns with today's fast-paced world that is becoming increasingly characterized by technology-driven communication, which has transformed the world into a large global connected community.

Low competency in web content creation and web 2.0 skills was also reported by the undergraduates. This is an area that should be built upon in the

curriculum as it's a requisite skill needed in the job market as an information professional today. This was corroborated in a study by Raju (2020) that LIS graduates need a wide range of technical skills in this era to function as information professionals. According to the undergraduates, the ICT competencies needed to fit into the labour market as perceived by them after graduation are Online Book Selection/Acquisition, online Copy Cataloging, use of Internet Information Search Strategy, use of library software, Data Entry, and Communication (Using emails). On the other hand, a large number of undergraduates assumed that the knowledge of statistical analysis and how to use social media were not needed in the job market as information professional. Gone were the days when this assumption was right but now a librarian needs to be vast in various IT skills as corroborated by Ocholla and Shongwe's (2013) study. The fourth industrial revolution narrows labour demand and imposes new requirements for education (Prisecaru, 2016).

The findings further revealed that the ICT-related courses offered and passed by a majority of the students during LIS training are information technology, computer system and Data processing, Database management, Digital library and preservation and web publishing. The inference here is that the students should not just be taught to pass examinations rather they should be able to apply the same knowledge in practical terms. The majority of the undergraduates also affirmed that the core ICT competencies required by LIS employers according to job adverts are scanning and uploading, data entry, communication(using Emails), and document/database management.

Conclusion

The workplace requirements for the information professional in this 21st century will continue to evolve as a result of the integration of ICT into library services. Consequently, the LIS curriculum will continue to respond to this gap by equipping its products with the necessary skills to function in a modern library.

Recommendations

In line with the findings, the study, therefore, recommends the following;

1. Beyond teaching the course research methodology, undergraduates should be exposed to practical sessions on the use of various statistical packages that would be used for research analysis.

2. Undergraduates should be taught the practicality of library service delivery using social media platforms in the curriculum. This is because most undergraduates believe that having the competency of library services delivery using social media was not necessary as information professional.
3. There is a need for an urgent review of Nigerian library schools' curricula to reflect courses that will prepare the undergraduates for our future libraries and information centers (Simisaye, Awodoyin and Osisanwo, 2022)
4. Due to the non-static nature of technology, it is fundamental that information professionals meet up with the challenges by engaging in life-long learning/self-learning, Continuing Professional Development (CPD) programmes.

References

Adetoro, N.(2011). Social Competence and information utilization among Library and Information Science undergraduates in Tai Solarin University of Education, Nigeria. *Chinese Librarianship, (31).http://www.iclc.us/cliej/cl31adetoro.pdf1*

Ansari, M. (2013). ICT skills proficiency of library professionals: a case study of universitiesinKarachi, Pakistan. *Chinese Librarianship, (36).*http://www.iclc.us/cliej/cl36ansari.pdf

Awodoyin, A., Adetoro, 'N., & Osisanwo, T. (2016). *Self-efficacy and new technology adoption and use among trainee mid-wives in Ijebu-Ode, Nigeria. Education and Information Technologies Journal, 22 (4), 1911-1925.*

Buarki, H., Hepworth, M., Murray, I., & McKnight, C. (2008). educating library and information science professionals in Kuwaiti Higher Education.https://www.researchgate.net/publication/28810067_Educating_Library_and_Information_Science_Professionals_in_Kuwaiti_Higher_Education/citation/download

Cerny, M. (2021). Digital competences of students of library studies: comparison of research results for 2018–2020. Education Sciences,11(11), 1-13.https://doi.org/10.3390/educsci11110729

Dunbar, M. (2015). *Skills and capacity: what does learning need to look like today to prepare the workforce of 2030?*(DFID think piece). http://www.heart-resources.org/wp-content/uploads/2016/01/DFID-Skills-and-Capacity-Think-Piece-Dunbar.pdf?x30250

Fatima, H., Shafique, F., & Firdous, A.(2012). ICT skills of LIS students: A survey of two library schools of the Punjab. *Pakistan Journal of Library & Information Science, 13, 1-11.*

Hossain, M., & Sormunen, E.(2019). ICT Skills of Library and Information Science (LIS) students in Bangladesh. *The International Information & Library Review 51, 1-15.*

Hundu, J., & Anaele, I. (2014). Implications of information technology on the training of library and information science professionals in Nigeria: an analysis of the curricula of some selected library schools. *Journal of Information and Knowledge Management, 5(2),186-202.*

Litsalia, A. (2017). ICT proficiency of lis professionals: a case study of Tangaza University College Librarians in Kenya. (Mini Dissertation, University of Pretoria).https://repository.up.ac.za/bitstream/handle/2263/72860/Agava_ICT_2017.pdf?sequence=1&isAllowed=y

Lysiak, L. (2020). 21st century innovations *librarians, trend-watching, and the warning signs of fads. Pennsylvania Libraries: Research & Practice,8 (2),130-137.*

Ocholla, D. (2003). An overview of information and communication technologies (ICT) in the LIS schools of Eastern and Southern Africa. *Education for Information, 21(2-3),181-194.*

Ocholla, D. & Shongwe, M. (2013). An analysis of the Library and Information Science (LIS) Job market in South Africa. *South African Journal of Library and Information Science, 79(1), 35-43.*

Prisecaru, P. (2016).Challenges of the fourth industrial revolution. *Knowledge Horizons –Economics, 8 (1), 57–62.*

Raju, J. (2017). LIS professional competency index for the higher education sector in

South Africa. Cape Town: University of Cape Town Libraries. DOI: http://dx.doi.org/10.15641/0-7992-2536-5

Raju, J. (2019). Embracing new trends in scholarly communication: from competency requirements in the workplace to lis curriculum presence. *Journal of Librarianship and Scholarly Communication, 7(1), 1-25.*

Raju, J. (2020). Future LIS education and evolving global competency requirements for the digital information environment: an epistemological overview. *Journal of Education for Library and Information Science, 61 (3), 342-356*

Rolleston, C. (2018, 1 June). 21st Century Skills: Upskilling for an uncertain future? https://www.younglives.org.uk/content/21st-century-skills-upskilling-uncertain-future

Rossignoli, J., & Amonoo-Kuofi, F. (2019). *21st century skills: Evidence of issues in definition, demand and delivery for development contexts* (K4D Helpdesk Report). Brighton, UK: Institute of Development Studies.https://assets.publishing.service.gov.uk/media/5d71187ce5274a097c07b985/21st_century.pdf

Shahbazi, R., Fahimnia, F., & Khoshemehr, A. (2016). Analyzing the market of newly emerging it-based jobs in library and information science and identifying it librarian competencies. *International Journal of Information Science and Management, 14(2), 59-81.*

Simisaye, A., Awodoyin, A., & Osisanwo, T. (2022).Comparative analysis of innovative preparedness of library schools in Nigeria and abroad for the fourth industrial revolution. A paper presented at the 24th Nigerian Association of Library and Information Science Educators conference, 10-14 October 2022, Federal Polytechnic, Offa in Kwara State

Tella, A. (2020). Robots are coming to the libraries: are librarians ready to accommodate them? *Library Hi Tech News, 37 (8), 13-17.*

UNESCO. (2012). *Youth and skills: putting education to work*. Paris: UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000218003

Warraich, N. (2008). LIS graduates employability-needs and expectations of the Library and Information Science (LIS) curriculum at the University of the Punjab (PU): An appraisal of Pakistani LIS professionals. A paper presented at the 74th IFLA General Conference and council.

Wise, S., Henninger, M. &Kennan, M. (2011) Changing Trends In LIS Job Advertisements. *Australian Academic & Research Libraries, 42(4), 268-295.*