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The Open Access Movement and its March in Africa

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Abstract

The past two decades have witnessed growing call and actions for free and immediate access to published scholarship online without technological, monetary or legal barriers from around the world. The phenomenon described as open access (OA) has been strengthened by the possibilities of digital network technologies represented in the ubiquitous Internet. While the goal of the OA movement remains good, it appears the epistemic disbalance in global knowledge creation and access has not abated. However, the promise of OA, the motivation on which it stands, its consequence and current state are reviewed in this paper with particular focus on the contribution of Africa to the global OA movement. It has been reported that the emergence of OA on the continent is albeit slow but with a mixed fortune of both progress and challenges. Notwithstanding, open access is seen as a development imperative for Africa that offers tremendous opportunities to the continent to actively contribute to global knowledge. It was reported that a number of universities and research institutions in Africa have adopted open access policies that require their researchers to publish their work in open access journals or repositories. The paper presented a number of open access initiatives and platforms that are actively being deployed to achieve OA mandate in the continent and concluded with recommendations.

Keywords: Open Access, Predatory Publishing, Article Process Charges, Predatory Journal, Gold OA, Green OA, Africa

Introduction

The open access (OA) movement emerged as a result of a couple of internecine events in the research community. These events are the "serials crisis"- widespread cancellations of libraries' subscriptions to journals, occasioned by the rising cost of journal subscription and the downward steep in library budgets (Beall, 2013a; Eve and Priego, 2017) ditto the evolution of digital capabilities of the ICT as evidenced in increasing network connectivity and high production of information in diverse formats on the internet (BOAI, no date; Beall, 2013a). The movement that started in the 1990s got consolidated through declarative statements and mandates of the early 2000s such as: "Budapest Open Access Initiative" (2002) (BOAI, no date), the "Bethesda Statement on Open Access Publishing" (2003) (Bethesda Statement BS, 2003), and the "Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities" (2003) (Jurchen, 2020). These documents while defining OA set the

framework on which the movement continue to thrive and evolve.

Twenty years on, the OA movement has shaken the academia and scholarly communication landscape with growing gravitation towards achieving the mandates of making Open the default in access to and reuse of academic research outputs on the Internet. Whereas the proposition for OA was seen as compliant with the goal of science itself, which is to serve as public good(BOAI, no date), however, the economics of it has remained a debated issue since the onset of the OA movement. Changing from the traditional pay-to-read practice mostly through library subscriptions to toll-free access through the Internet spawned the question of who covers the publication costs (Beall, 2013a).

Finding answer to this onerous question paved the way for the now abused pay-to-publish model and its corresponding shift of cost burdens from readers to authors. Interestingly, apart from huge financial turnover benefitted by prestigious traditional publishers from pay-to-publish(Rizor and Holley, 2014), several other illegitimate business entities have emerged with false claims of asking authors to pay for scholarly services such as peer-review they did not render(Beall, 2013b). These sets of new publishers have been described as predatory publishers (Beall, 2013a, 2015).

Predatory publishing has become so pervasive that it is conflated with Open Access by some actors in the sector (Beall, 2012; Krawczyk and Kulczycki, 2021).This view portend a potential damage to OA itself as the predatory label is used in certain contexts (Eve and Priego, 2017). However, there is no denying the notion that predatory publishing is "an unintended consequence of the open access movement" (*Is Open Access the same as Predatory Publishing?*, no date). These, in the view of some scholars, have consequently rendered both open access and the "validation of scientific knowledge" the two critical challenges in scholarly publishing confronting science in this era of information and communication technology (ICT)(Krawczyk and Kulczycki, 2021).

Notwithstanding, the response to the OA movement is not even from around the world, itself a shadow of the already existing global techno-economic inequality (Ola, 2018). While the movement has gained the most prominence from the resource-endowed global north especially Western Europe and North America from where it emanated, the global South seems to be playing a catchup albeit at disproportionate pace. Within the global South, Latin America nations are taking the leadership in propagation of the OA ideals with large scale projects such as the SciELO (Velterop, 2015). Africa and Asia, traditionally seen as peripheral producers of scholarly knowledge, have been reported to be the largest participants in the predatory publishing industry seen as outcome of the OA movement (Beall, 2013a; Ajuwon and Ajuwon, 2018). Despite this, researchers and institutions from the African continent are making strides to change the narratives of OA and scholarly outputs despite the peculiar circumstances of the region.

It is on these accounts that this article reviews literature to assess the origin and current state of the OA movement, the internecine emergence of the pseudo-publishers plus the harm they do to scholarly publishing and measures taken in the scholarly community to mitigate the damage of predatory practices, ensure quality and preserve credible scholarly communication practices and the sanctity of scientific records even in this era of open access and ubiquitous internet. The article reviewed the state of open access in Africa and updated existing scientific record on the subject.

The Open Access Movement: What is Open Access?

According to BOAI (2012), OA to peer-reviewed literature means:

> its free availability on the public Internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers, other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should give authors control over the integrity of their work and the right to be properly acknowledged and cited.

A concise definition was captioned in Suber's seminal book on OA in which he described OA as "digital, online, free of charge, and free of most copyright and licensing restrictions" (Suber, 2012, p. 4).

While pressing the argument for OA, BOAI further highlighted the following fundamental truths about OA:

- OA benefits research and researchers, and the lack of OA impedes them.
- OA for publicly-funded research benefits taxpayers and increases the return on their investment in research. It has economic benefits as well as academic or scholarly benefits.
- OA amplifies the social value of research, and OA policies amplify the social value of funding agencies and research institutions.
- The costs of OA can be recovered without adding more money to the current system of scholarly communication.
- OA is consistent with copyright law everywhere in the world, and gives both authors and readers more rights than they have under conventional publishing agreements.
- OA is consistent with the highest standards of quality.

Apart from this, several organisations and efforts are emerging to further drive home the point for open access. On the African continent, a group of researchers and stakeholders in the scholarly communication have come together to set a ten-point declarative agenda for Open Access on the continent and are working on infrastructures to support Open Access(AfricArXiv, no date). Also, several other infrastructures are emerging to help achieve the open access mandates. The open journal system (OJS), the DOAJ, DataCite are few of the many.

Arguments for OA

OA proponents like Peter Suber argued for the need to make publicly funded research available to the generality of the scientific community and the larger society (Suber, 2012, p. 14). This is in part due to how the ubiquitous Internet revolutionised communication and publishing leading to reduction in costs per article and redundancy in print articles (Tennant *et al.*, 2016). The other related basis for OA is the impracticable possibility of individual libraries or researchers or even a group subscribing to all published article in the face of fast-paced publication technologies and exponentially growing numbers of researchers and the concomitant rise in research outputs coupled with dwindling library budgets, the scenario popularly known as the Serials crisis (Beall, 2013a).

Furthermore, the damning realisation that continued lockup of research articles will not only impede scientific advancement, harm the promise of research but also have consequences for researchers and funders due to nonuse by the majority of the stakeholders who cannot afford access under the subscription-based model. Furthermore, Tennant et al presented a moral argument for open access to research in line with the United Nations Declaration of Human Rights that "everyone has the right… to share in scientific advancement and its benefits" (Tennant *et al.*, 2016, p. 4).

Given the foregoing, scholars, researchers, librarians and other stakeholders in the academia and scholarly communication began to come together at the turn of the millennium to host events and declare mandates in support of OA. Some of the declarative statements and mandates of the early 2000s include the "Budapest Open Access Initiative" (2002) (BOAI, no date), the "Bethesda Statement on Open Access Publishing" (2003) (Bethesda Statement BS, 2003), and the "Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities" (2003). Of these, the BOAI has become the most used and instructive with tremendous relation to the theme of this paper.

The BOAI declaration was not a mere speculation of ideals but an affirmative statement with actionable guides to achieving the OA mandate. The initiative prescribed author self-archiving and open-access journals as the ways to achieve and sustain open access to peer reviewed literature. These two would later be known as Green and Gold routes to OA respectively (Suber, 2012; Hooley, 2013; Tennant *et al.*, 2016).

The Green OA route stipulates that authors self-archive their research in institutional repositories and

similar infrastructures such as preprint servers while the Gold OA route is the journal's/publisher's approach to sustaining OA to published literature. This way authors are mandated to pay an article processing fee (APC) aimed at recovering cost that were covered by subscriptions in the traditional practice. Journals too use the Hybrid OA approach where publishers make some articles OA and some others subscription-access (Suber, 2012; Else, 2020; Jurchen, 2020). There are some other routes not so commonly used such as Black OA, Diamond/ Platinum OA and Bronze OA (Jurchen, 2020).

The APC-based model (Gold) seems to have proven to be the most economically acceptable option for subscription-based journals but with corresponding burden and barrier shift where access barrier has become substituted with publishing barrier. This is due to the exorbitant cost of publishing put at $1,500 to $6,000 (Pooley, 2019; Jurchen, 2020) and most recently a $11,390 proposed to take effect from 2021 for papers published in *Nature* and 32 other journals owned by the European publishing giant Springer-Nature (Else, 2020). These charges are basically out of reach for researchers in developing countries of the Global South. These are people already described as sitting on the periphery of knowledge (Omobowale *et al.*, 2014) and have been the most predated upon by a group of pseudo-journals currently benefiting from the APC model to make profit at the expense of the authors (Ajuwon and Ajuwon, 2018).

Green Open Access and the Repositories Technologies

No sooner the realization of the capabilities of the emergent internet technologies like institutional repositories that allow for self-archiving and publishing (Green OA route) than scholars began to make case for change in the ownership, management and distribution of research outputs(Crow, 2002). To this end, the institutional repository was recognised as a critical scholarly infrastructure for the management of research outputs of researchers in institutions and across subject domains (Lynch, 2003).It was suggested that with the institutional repositories all the five components of the scholarly communication lifecycle, viz, registration, certification, awareness, archiving and rewarding hitherto handled by publishers, libraries and other stakeholders, can now be singly managed with the repositories (MacColl, Jones and Andrew, 2006).

It is not thus a sheer coincidence to see the development of this type of infrastructure rise along the timeline of open access movement with the first institutional repositories, Eprints and Dspace, launched in 2002 and 2003 respectively which themselves were response to the rising popularity of ArXiv, a subject repository for physicists (MacColl, Jones and Andrew, 2006).These were also the periods that the aforementioned declarative and assertive statements to shape the direction of the OA movement were made.

There has been sharp increase in the adoption and deployment of open access institutional repositories by many academic and research institutions across the world. From a paltry scores in the early 2000s, the number of open access repositories across the world today stands at staggering 10,000s with the continent of Africamaking progress albeit slow(Pinfield *et al.*, 2014; OpenDOAR, 2023). African share of global repositories (265) is shown in Figure 1 below.

Additionally, several subject and regional repositories have emerged as storehouses of research. A major success story is the ArXiv, the foremost subject repository that allows researchers in the fields of Physics, Astronomy, Mathematics, Computer science among others to immediately share their research- preprints, and receive feedbacks ahead of formal publication in a journal. Started as an email list serve in 1989, ArXiv, with over two million papers, has grown to become one of the most important sources of scholarly information for researchers in the cognate fields (Garisto, 2022). Preprints which are "the author's original manuscript before submission to a journal" have been suggested to play a larger role in the scholarly communication landscape (Luther, 2017, p. 1). Examples of other preprints servers that have been inspired by the success of ArXiv are: *Wellcome Open Research,* bioRxiv, *F1000 Research, The Winnower,* Preprints.org, PsyArXiv, AgriXiv, SocArXiv and engrXiv, Social Science Research Network (SSRN), AfricArXiv(Luther, 2017; Ahinon *et al.*, 2020).

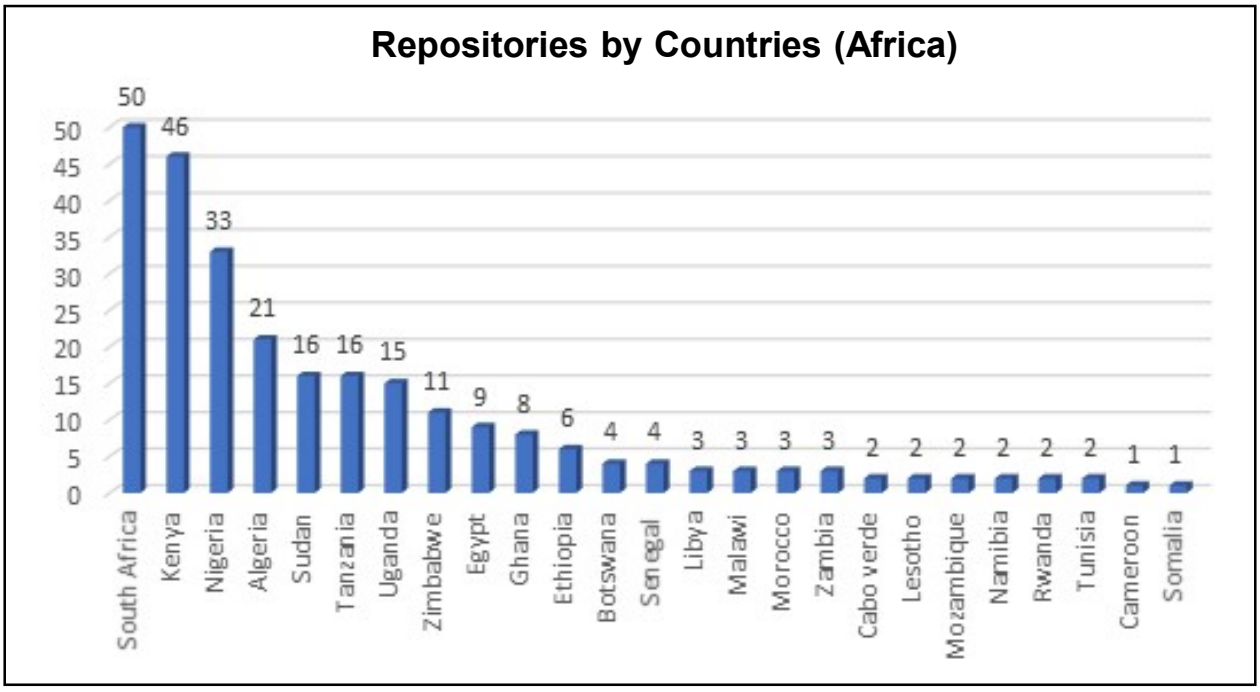

Figure 1: Repositories in Africa by Countries

Source: OpenDOAR (2023)

The Gold OA and Article Processing Charges (APC)

Whereas the repositories and other authors' self-archiving platforms have been coded the Green OA, the publishers' own contribution to OA is the gold route. Through this approach, publishers, existing and new ones, have the mandate to ensure open access to all their published scholarly literature. Given the economics of the publishing business, achieving this implies that publishers devise means of recovering the costs of their operations as well as maintain their profit bottom line. Whereas many approaches have been proposed and practised, the charging of authors for the publication of their accepted peer-reviewed manuscripts has proved to be the most frequently used approach so far. (Jurchen, 2020). This amount paid by authors is widely known as the Article Processing Charge (APC).

With the APC, many traditional publishers who hitherto had survived on subscriptions and toll-access are either transitioning to OA publishing with their existing journals or starting off new journals that purely operates this model. In other cases, some publishers purely set out on the Gold OA route. The Public Library of Science (PLOS) and BioMedCentral (BMC) now an imprint of Sage were the leading pure OA publishers that started out entirely as APC-funded publishers (Jurchen, 2020). Reported average range of APC is put between $1,500 and $6,000 (Pooley, 2019; Jurchen, 2020) for big trustworthy journals whereas the charge may be as low as $100 for predatory and deceptive journals(Xia, 2015). It is thus not farfetched to know why some thinkers conflate OA with predatory publishing.

Predatory Publishing

Not only have technologies and the OA movement enhanced the accessibility of research findings, spinoff businesses have also regrettably emerged with it to the detriment of good science. The Gold OA route whereby authors pay publication charges to make their works OA has been particularly taken advantage of with far-reaching consequences on the entire spectrum of activities surrounding scientific inquiries and communication of scholarship. For instance, published bad research procedure or

methodology lacking in evidence is either unsuitable for further academic advancement or become precedent for future studies with attendant consequences. Publishing outfits with this behaviour have been described by different names prominent among which is the protested "predatory" publisher/ journal coined by American librarian, Jeffrey Beall (Beall, 2015). Protested because some see such term as "accusatory" against publications from the Global South (Eve and Priego, 2017).

There are two or more shades of predatory publishing. There is the escapist group that believed the instances where authors are not aware of the dubious practices of these publishers, ignorantly submit papers to them and are thus considered to be predated upon(Xia *et al.*, 2015). There is also a school of thought that believes that some authors deliberately publish with these journals because of less rigour and cheaper publication fees. In this case, the authors are not preys and the publishers are regarded as "pseudo-journals" (Laine and Winker, 2017). Indicating the harm they cause for researchers in resource poor countries, Clark and Smith (2015) described predatory journals as "publications taking large fees without providing robust editorial or publishing services".

Irrespective of the name they are called, predatory journals or publishers exhibit some peculiar attributes which have been well reported by researchers and international scholarly societies and organisations (Beall, 2015; Rich, 2016; Laine and Winker, 2017; Ajuwon and Ajuwon, 2018; AMWA, EMWA and ISMPP, 2019; Murphy, 2019). These attributes clearly distinguish them from traditional scholarly publishers. According to studies, predatory journals scout for manuscripts through vigorous marketing and spam emails, promising quick review, rapid publication as open access for an amount lower than those of credible APC-funded journals(Clark and Smith, 2015; Laine and Winker, 2017). Their motive is financial gain, and they are corrupting the communication of science. Most appallingly, some goes to the extreme of collecting article publication fees without publishing the article on their website as promised (Laine and Winker, 2017).

Ajuwon and Ajuwon (2018) presented a tabularised summary of commonly cited features of predatory journals in the literature:

"Characteristics of Predatory Publishers and Journals" by Ajuwon and Ajuwon (2018)

1	The journal has a title with disjointed scope, e.g. Journal of Education, Management and Philosophy
2	The website of the journal has spelling and grammatical errors
3	The website of the journal has distorted/fuzzy images
4	The journal does not provide information on manuscript handling processes
5	Journals send unsolicited emails requesting for submission of manuscripts
6	Journals request for submission of manuscripts using email addresses instead of online submission process
7	Journals use non-professional or journal affiliated email addresses for correspondence
8	Journals do not provide information on retraction, digitization and copyright policies
9	The website of the journal does not provide sufficient information about members of editorial boards or include fake names as members
10	The website does not reveal the physical address of the publisher/journal or uses an incorrect address
11	The journal does not make full disclosure of fees to be paid for processing of articles
12	Journals make unrealistic promise of rapid time-frame of peer review and publication

Source: Ajuwon and Ajuwon (2018)

Impact of Predatory Journals Among African Scholars and Beyond

Predatory publishing has come to exert significant load of negative impacts on scholarly communication and scholars from around the world especially in regions like Africa where they have been reported to be prevalent. Broadly, these publications accord OA publishing in general unwarranted negative publicity (Shen and Björk, 2015) making some people to disparage the entire OA cause (Beall, 2012). This is one of the reasons some scholars like Jeffrey Beall are critical of the entire OA movement. Beall, contended that OA is a breeding ground for predatory publishing practices (Beall, 2013b). Predatory publishing is not only consequential for authors but to the entire scientific community and the scholarly communications sector in particular (Cukier *et al.*, 2020).

The damaging effect on authors' reputation can be quite enormous. According to (AMWA, EMWA and ISMPP, 2019) authors suffer reputation damage by unwittingly publishing in and/or listed in the editorial boards of predatory journals. They may become "trapped" due to inability to withdraw manuscripts or retract published papers after discovering that the journal is predatory. Usually, these journals do not have retraction policy and often deny authors from withdrawing or retracting papers.

Apart from this, there is the danger of block damage done to institutions, geographical regions and countries in particular(Ayeni and Adetoro, 2017). Literature have well reported the prevalence of predatory publishing practices among early careers and unmentored graduate students and researchers from Africa and developing countries (Truth, 2012; Omobowale *et al.*, 2014; Nwagwu and Ojemeni, 2015; Xia *et al.*, 2015; Rich, 2016; Ajuwon and Ajuwon, 2018). Particularly, researchers from three developing countries: India, Pakistan and Nigeria in the continents of Asia and Africa, have been reported to be the most contributors to predatory OA journals (Xia *et al.*, 2015; Ajuwon and Ajuwon, 2018).African Scholars' fields of study are diversifying, and as a result, they require ongoing access to high-caliber manuscripts in order to do their research. However, the existence of predatory journals has a significant negative impact because of the lack of scientific merit, the poor quality of the peer review process, and the lack of adequate editorial oversight.

While his study confirmed that African, especially Nigerian, authors patronised predatory journals, Adeyinka Tella highlighted a cause-effect analysis of the practice. Tella (2020) reported the causes to be "desperation at the thought of missing out on promotion, long waits for reviews from reputable journals, deficient information literacy, and inadequate knowledge of the journals in their specific subject area". These results in unpleasant implications for researchers in the region such as rising interest in low quality research and loss of confidence by scholars outside Africa "in the ability of Nigerian academics to conduct quality research" (Tella, 2020). Moreover, these researchers risk participating in ethical international scholarly duties such as not be invited to serve as reviewers or international panelists at prestigious conferences and meetings, nor being invited to serve as external examiners at universities overseas (Ayeni and Adetoro, 2017).

Mouton and Valentine (2017) noted the growth of predatory journals in South Africa since 2011 and the probable loss of millions of rands based on South African reward system to institutions whose authors publish articles in accredited journals. They feared that "predatory publishing poses a serious challenge to science in South Africa. If it continues to increase at the rate of growth seen in the past 5 years, predatory publishing may well become accepted practice in some disciplines and at some universities" which according to them will erode public's trust in scientific research.

Relatedly, Eve and Priego (2017) evaluated the harms to different groups within the scholarly communication sector. They reported that academic authors suffer reputational damage and loss of institutional reward. They added that academic hiring, promotion, and tenure committees suffer misjudgment and loss of labour time while the general public suffer poor understanding of science. The damage, according to them, extends to librarians who suffer loss of gained grounds in their support for the bid to make open access default to knowledge, cut soaring library budget, halt the serials crisis among others. Funders, learned societies and traditional academic publishers are other groups within the sector they argued are harmed by predatory practices.

Although, predatory journals have been generally known to have harmful effects, some scholars however share contrary opinion (Eve and Priego, 2017). Their argument stemmed from the flawed system of peer review to which some other scholars have agreed needed to be reviewed(Kassirer and Campion, 1994; Smith, 2006). These authors contended that it is possible for good academic artefacts to be lodged in a bad container for which they argued that predation could have been said to occur thus supporting article-level metric. This could be the case for many scholarly outputs from African published in the so-called predatory journals due to reasons already discussed above.

While their point is encouraging scholars to read published literature critically rather than use publication venue to judge predation or bad science, they however dissociated from the deceptive practices of predatory journals when they "claim to provide a service when such service is not provided" (Eve and Priego, 2017). They reiterated that the glamour or reputation of journals does not always correlate with non-predatory practices especially if predatory is viewed as the absence of peer review.

Efforts to Curtail Predatory Practices and Assure Quality of Scientific Records

To address the problem of predatory publishing, there have been a number of initiatives to raise awareness about the issue and to provide guidance to researchers and institutions on how to identify and avoid predatory publishers. These have been reported by relevant studies (Beall, 2015; Rich, 2016; Ayeni and Adetoro, 2017; Laine and Winker, 2017; Pooley, 2019; Cukier *et al.*, 2020; Jurchen, 2020).

However, Julie Murphy in her paper titled "Predatory Publishing and the Response from the Scholarly Community" highlighted a couple of the approaches taken by the scholarly community to solve the predatory publishing crisis. She grouped the approaches under three broad headings, viz, Blacklists, Whitelists and Educational efforts (Murphy, 2019).

The blacklists approach were efforts taken by concerned scholars to use a set of self-developed criteria to identify and name publishers and journals they presume to be engaging in unethical publishing practices. Examples are the famous but now discontinued Beall's list published and updated for about five years on http://scholarlyoa.com/by librarian Jeffrey Beall who was the first scholar to coin the term "predatory journals"(Beall, 2013a). Though discontinued in 2017,Beall's list was succeeded by a couple of platforms that continued from the last update of Beall. Two notable of such lists according to Murphy are: "Beall's List of Predatory Journals and Publishers" available at https://beallslist. weebly. com/ and "Stop Predatory Journals" available at https://predatoryjournals.com/(Murphy, 2019).The other blacklist reported by Murphy is Cabell's Scholarly Analytics (Cabell's Blacklist) initially called Directory of Publishing Opportunities.

Additionally, Whitelists emerged from the background that it was not just enough to name journals and publishers with unethical publishing practices but to guide authors with lists of those doing the right things. Some of the reported whitelists according to Murphy are the Cabell's Whitelist which "provides complete contact and publication information including method of access, submission, review and publication process information, peer review data, impact factor, Clarivate analytics, "Cabell's Classification Index" journal rankings derived from Scopus information, and Altmetric reports" (Murphy, 2019, p. 3).

The other Whitelists reported by Murphy are: Directory of Open Access Journals (DOAJ) which described as "the most respected OA-specific whitelist", and the Open Access Scholarly Publishers Association (OASPA), established in 2008 with stringent membership criteria to promote best practices in OA publishing. The DOAJ has also been seen as a screening hub for authors to confirm the authenticity of OA journals. This is as a result of the discrete guidelines a journal must meet to get accepted into the directory. This way, it is expected that all journals indexed in DOAJ are trustworthy (Kisely, 2019).

On the educational efforts, Murphy reported some of the community driven initiatives in the academia. They include: "Think.Check.Submit." Operational at http://thinkchecksubmit.org to guide authors with a checklist to consider before submitting their research to an OA journal. The potential of this initiative to help authors against predatory publishers has been reported by other scholars (Tennant *et al.*,

2016). Other educational efforts reported by Murphy are: Project Cupcake, TRANsparency in Scholarly Publishing for Open Scholarship Evolution (TRANSPOSE) and the Journal Publishing Practices and Standards (JPPS) (Murphy, 2019).The JPPS is a quality assurance mechanism for journals published in the Global South developed by African Journals Online_(AJOL) and International Network for the Availability of Scientific Publications (INASP).

Specifically for the Nigerian research environment with its peculiar "personal and structural challenges", Ajuwon and Ajuwon (2018) made some far-reaching recommendations on measures to adopt for curbing predatory practices. They range from improved funding for research including article processing charges, change of emphasis on quantity but quality of papers in the assessment of researchers and scholars for appointment and promotion, education of early career researchers about credible publishing venues, to support from the Nigerian National University Commission to local credible publishers towards online presence and improved peer review process.

Open Access and Africa

The state of open access in Africa today is a mixed one, with progress being made in some areas but challenges remaining in others. Notwithstanding, open access has been described as a development imperative for Africa that offers tremendous opportunities to the continent to actively contribute to global knowledge (Nwagwu, 2013). Access to quality research is before now a herculean task for African researchers and students but as the ubiquitous Internet technology continue to facilitate access to information getting access from every corner of the world becomes less of a burden to the extent that Africans were seen as passive downloaders of knowledge. It thus appear, the access inequity has been replaced with contribution inequity as the share of Africa's contribution to global research outputs stood at awful less than 1% (Ngongalah *et al.*, 2018) and Nigeria's contribution was in particular seen as low (Alordiah *et al.*, 2021). It is to this effect that the open access movement is perceived as a good chance for Africa to reduce the inequity caused by the invisibility of its research outputs.

On the positive side, there has been a growing recognition of the importance of open access in Africa, and many initiatives and policies have been developed to promote it. For example, a number of universities and research institutions in Africa have adopted open access policies that require their researchers to publish their work in open access journals or repositories(Nwagwu, 2013). In addition to this, a multi-stakeholder group of people in the academia and scholarly communications have come together develop principles and infrastructure to drive open access on the continent. The declarative statement, named "Principles for Open Access in Scholarly Communication in and about Africa", averred as quoted below:

(1) Academic Research and knowledge from and about Africa should be freely available to all who wish to access, use or reuse it while at the same time being protected from misuse and misappropriation.

(2) African scientists and scientists working on African topics and/or territory will make their research achievements including underlying datasets available in a digital Open Access repository or journal and an explicit Open Access license is applied.

(3) African research output should be made available in the principle common language of the global science community as well as in one or more local African languages.

(4) It is important to take into consideration in the discussions indigenous and traditional knowledge in its various forms.

(5) It is necessary to respect the diverse dynamics of knowledge generation and circulation by discipline and geographical area.

(6) It is necessary to recognise, respect and acknowledge the regional diversity of African scientific journals, institutional repositories and academic systems.

(7) African Open Access policies and initiatives promote Open Scholarship, Open Source and Open Standards for interoperability purposes.

(8) Multi-stakeholder mechanisms for collaboration and cooperation should be

established to ensure equal participation across the African continent.

(9) Economic investment in Open Access is consistent with its benefit to societies on the African continent – therefore institutions and governments in Africa provide the enabling environment, infrastructure and capacity building required to support Open Access

(10) African Open Access stakeholders and actors keep up close dialogues with representatives from all world regions, namely Europe, the Americas, Asia, and Oceania

Source: (AfricArXiv, no date) at https://info.africarxiv.org/african-oa-principles/

On open scholarly infrastructure, a number of open access repositories (green OA route) and platforms have been developed to make African research more visible and accessible. These include:

The AfricArXiv- a community-led regional or continental digital repository for African scholarly outputs(Ahinon *et al.*, 2020).The archive aims to improve the citability and discoverability of African scholarly works and thus accepts research outputs of diverse forms such as "manuscripts, datasets, presentations, posters, code, proposals" (AfricArXiv, no date).

African Journals Online (AJOL), established in 1998 is the premier digital platform of scholarly journals published on the Africa continent. It is currently the single largest aggregator of African-published journals (with 675 journals) 55% (372) of which are open access journals. The goal of the AJOL project is"to increase global and continental online access, awareness, quality and use of African-published, peer-reviewed research" (AJOL, no date). Nigeria (278), South Africa (102), Ethiopia (45), Kenya (38), Ghana (37) and Tanzania (32) are the countries with most participating journals of 30 or more.

The other initiatives are the African Academy of Sciences' Open Research platform that employs the transparent peer review method to publish the scholarly works of researchers funded by and affiliated with the African Academy of Sciences(The AAS, no date).Also, the Scientific Electronic Library Online **(**SciELO) SA is South Africa's foremost open access searchable full-text journal database in service of the South African research community. However, SciELO SA is limited to a selected collection of peer-reviewed scholarly journals from South Africa(SciELO, 2023).

Whereas most of the OA initiatives are driven largely by people and institutions from and/or in South Africa (Nwagwu, 2013), Nigeria is gradually rising to the occasion with the recent launch of the National Repository of Nigeria (NRN) by the National Library of Nigeria. The repository's aims are to: "preserve in electronic format the intellectual and cultural resources of Nigeria for posterity; increase the visibility of the Nigerian knowledge storehouse and its scholarly, literary and cultural heritage; and increase the availability and accessibility of local Nigerian content to the global community" (National Library of Nigeria, 2023).

Furthermore, Arab and Francophone African countries, driven by cognitive justice and fairness, are also making strides to achieve open access to research outputs. They are addressing the inequity issue by breaking the English-dominated culture of scholarly communication through the use of multilingual approach to present the journals they propagate on their platforms. Grenier des savoirs and DICAMES are two of their most prominent open access initiatives and platforms and they are both supported by the Association Science Afrique.

Grenier des savoirs, translated as "Attic of Knowledge", is a journal platform that "publishes and distributes several dozen African and Haitian scientific journals in open access to fight against the invisibility and low accessibility of African and Haitian knowledge in the academic world or in society in general"(The Attic of Knowledge, no date, p. 1). Journals participating in the Grenier des savoirs abide by a set of conditions which include: "free full access under CC BY-SA license, absence of publication fees requested from authors and cognitive justice, multidisciplinarity, epistemological pluralism, multilingualism, fight against sexism in science, social relevance of articles" (The Attic of Knowledge, no date, p. 1).

DICAMES is a regional repository hub of the African and Malagasy Council for Higher Education (CAMES). DICAMES is the other pan-African collaborative project of the Association Science Afrique that "aims to preserve and disseminate all

the scientific production of universities in the CAMES area" freely (DICAMES, no date).

These platforms and many others have been instrumental in promoting open access to African research and facilitating collaboration among African researchers.

Notwithstanding, there are still challenges that need to be addressed. One of the biggest challenges is the lack of reliable and affordable Internet connectivity in many parts of Africa, which can limit access to open access resources(Nwagwu and Ahmed, 2009). In addition, there is a lack of awareness and understanding of open access among some researchers and institutions, which can make it difficult to promote and implement open access policies(Nwagwu, 2013).

Furthermore, while there has been some progress in promoting open access in Africa, there is still a significant gap between African research output and its visibility and impact on the global stage. This highlights the need for more support and investment in open access initiatives in Africa. Nwagwu (2013) has called on the participation of governments and their agencies in the bid to sustain the progress made in promoting open access in Africa.

Another recent worrying challenge for Africa researchers is the humongous and practically unaffordable article processing charges of elite journals to publish Gold OA. Many scholars and observants of open access have described this as a disincentive (Nwagwu, 2013), promoter of inequalities (Asubiaro, 2022), a clog in the wheel of progress (Nabyonga-Orem *et al.*, 2020) and a dilemma for African researchers (Mekonnen *et al.*, 2022). Although, some of the journals provide APC reduction or waivers to scholars from certain countries based on some economic indicators but this has been notably criticized (Gardner Jr *et al.*, 2021; Nwagwu, 2023).

Conclusion

The movement for the free and immediate access without the restrictions of policies and rights but with full attribution of authors is a just and desirable cause that should be supported by everyone that seek the general good of human society and that see research as a public good for the sustainability and improvement of man and his environment. This phenomenon described as open access has been strengthened by the possibilities of digital networked technologies represented in the ubiquitous Internet. Though a desirable global cause finding a sustainable economic model for OA has been a thorny issue that the APC-based model of the Gold OA route has further complicated with the undesirable outcome of the emergence of profit-oriented and science-destroying publishers called vanity presses, pseudo-journals or better known as predatory journals and publishers. Some of the efforts to curtail the bad OA practice were reported in this paper with the greater hope that a better model beyond the APC would emerge to make OA default for all published research in the nearest future.

On the African continent, however, OA is emerging albeit slowly but with a mixed fortune. While progress is being made in some areas but challenges remain in others. Notwithstanding, open access has been described as a development imperative for Africa that offers tremendous opportunities to the continent to actively contribute to global knowledge. To this end, the paper reported that many initiatives and policies have been developed to promote open access on the continent. We noted that a number of universities and research institutions in Africa have adopted open access policies that require their researchers to publish their work in open access journals or repositories. The paper presented a number of open access initiatives and platforms that are actively being deployed to achieve OA mandate for and in the continent.

It is recommended that the OA initiatives on the continent be given more aggressive support by African governments, institutions, multilateral organisations on the African continent and scholars themselves. Serious educational programmes and carrot-and-stick approaches should be considered to tackle the predatory publishing problem prevalent among African scholars so as to mitigate its unpleasant implications.

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Transparency in the Application of Theoretical Frameworks to the Advancement of Knowledge in Selected Library and Information Science Journals: A Systematic Review

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Abstract

The purpose of this systematic review was to determine the extent of theoretical transparency in library and information science (LIS) scholarship. Many studies have looked at theorising and the use of theory in LIS. Unlike previous studies this research provides insights into transparency in the use of theoretical frameworks in the LIS field. Transparency is essential because different researchers employ the terms theory, theoretical framework, and conceptual framework in various ways.The transparent use of theory and the resultant theoretical framework enables other researchers to assess whether the theory is appropriate, consistent, and coherent with the empirical evidence. This systematic search followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for reporting on systematic reviews supported by ADIMA®. A total number of 138 out of 2029 articles from 12 LIS-focused journals were analysed in March 2023. Most of the articles (88.6%) specified the framework they used. There was a high level of transparency in relation to the suitability of the theory to address the research problem. The degree of openness about the aim to utilise a theoretical or conceptual framework was moderate to high. The articles had a low or minimal level of transparency when it came to justifying why a certain theory was chosen for the study. Theory dropping was not apparent in the articles. The results from the articles demonstrate that LIS scholars appreciate that a theoretical framework or conceptual framework must be used in research. To ensure that readers understand the rationale behind the theories chosen for a study, it is necessary to be open about the reasons behind the selection of a particular theory. The explanation of how the theory contributed to explaining the phenomenon of interest is also essential. This article might help scholars get beyond theoretical obstacles related to the transparent use of a theoretical framework and produce theoretically sound research. It also opens discourse on "best practice" in the use of analytical tools forresearchin the advancement of knowledge.

Keywords*:* Theoretical Frameworks, Conceptual Frameworks, Theoretical Lens, Analytical Framework, Transparency And Theory, Core LIS Journals

Introduction and Background

The usage of theoretical frameworks (TF) and conceptual frameworks (CF)in library and information science (LIS) is a pertinent discourse because there are ongoing discussions of theory use and theorising among LIS scholars,includingBilal (2022)and VanScoy et al. (2022). Indeed, the role of theory in LIS research was a subject of discussion of one of the panels at the 86th Annual Meeting of the American Society for Information, Science and Technology in 2023 (American Society for Information, Science and Technology, 2023).

Many scholarsadvocate theory use and theorising and its potential contribution to the LIS field (Kumasi, Charbonneau and Walster, 2013; Jeong and Kim, 2005; Pettigrew and McKechnie, 2001; Ukwoma and Ngulube, 2021). There are various schools of thought regarding how crucial it is to base research on theory (Julien,1996; Ngulube, 2020). There is no denying that theories serve as the foundation for CFs and TFs. Adopting a theoretical or conceptual framework gives the research findings broad significance and applicability and provides useful assumptions to direct an inquiry. Theories support knowledge generation and the growth of a coherent body of knowledge in the field.Theoriesareamong the primary indicators of thematurity of a discipline(Connaway and Powell, 2010).

Indeed,"theory is the currency of our scholarly realm" (Corley and Gioia, 2011) and research that is not based on theory "is simply description" (Van House, 1991: 87). The absence of a theory in a scholarly piece of research can lead to the creation of bad scienceeven if the methodology is sound (Kaplan, Saunders and Bryan, 2011).Hence, "much is gainedif one realises that neither scientific nor practical results can be expected without adequate development of the theoretical aspect of the work" (Lewin, 1945: 132).In other words, "nothing can be studied empirically in the absence of theory and research methods" (Bergman, 2011:99) because they make it possible to impose order on naturally chaotic events (Fawcett and Downs, 1992).

Theory is needed because it is the basis for "(1) building a new foundation for knowledge, (2) consolidating knowledge, (3) making meaning between strands of knowledge, or (4) translating knowledge" (Krlev, 2023).In other words, the functions of theory include aiding in the comprehension of the phenomena they explain, providing basic concepts to address the key issues, offering a foundation for predictions, and directing the course of further investigation (Madara, Namango, and Katana, 2016). Theories used in research can be descriptive (what is this?), relational, (what is happening here? and explanatory (why?) (McGregor, 2018; Ngulube, 2018).Different perspectives and criteria can be applied to determine if a theory is fit for purpose, including, stability, coherence, uniqueness, consistency, refutability and parsimony (Madara et al., 2016).

The use of theory can be either be objectivist deductive or subjectivist deductive (Varpio, Paradis, Uijtdehaage, and Young, 2020). The objectivist deductive approach is theory-driven becausethe researcher moves from theory to data. In the subjectivist deductive approach, the researcher collects data to generate a theory like in the grounded theory research method, for instance.An open exposition of whether the research was theory-driven or data-driven can assist other researchers to understand how the theories were used in a particular research and how they may use them to advance knowledge in their context.

Theory matters in the neighbouring field to LIS such as information science(IS). For instance, Zins (2007) classified epistemology asone of the theoretical aspects that were important to the field. However, it is important to note that an epistemology (i.e., theory of knowledge and metatheory), and"epistemological paradigms that have influenced information science so far, such as hermeneutics, critical rationalism, critical theory, semiotics, constructivism, second order cybernetics, and system theory" (Capurro, 2010: 248), are not theories but metatheories.Although a metatheory is concerned with the conceptual proceduresof science, it is not a theory as partially suggested by Henning, Van Rensburg and Smit (2004).

A metatheory is the examination, analysis, and description of the means for developing theory and the utilisation of theory(Zaltman, Pinson and Angelmar, 1973). A metatheoryis invaluable to scholars because it aidsthem to develop theories,ask fundamental scientific and philosophic questions in the right way, and "it discloses conceptual sickness

and prescribes treatment for it, and widens the horizon of research" (De Groot, 1969: 19).Some scholars misconstrue metatheories such as paradigms in the Kuhniansense to be theories. Metatheory as a science of science cannot explain a social phenomenon (Zaltman et al., 1973).

Broadly speaking, a metatheory cannot be the basis of a TF or CFof a study like a theory or model. Grand or middle range theories are mainly the basis of formulating a TF or constructing CF. Grand theoriesare not appropriate for directing social science research (Bryman, 2012). Middle range theories are suitable for guiding research, because they are contextually relevant,as they are formulated specifically in connection with a certain phenomenon.

The confusionover theory usesand theorisation is compounded by the fact that it has been used and defined differently in various quarters. An opened-ended statement such as this one does not help the situation:

> Theory belongs to the family of words that includes guess, speculation, supposition, conjecture, proposition, hypothesis, conception, explanation, [and] model, so if everything from a 'guess' to a general falsifiable explanation has a tinge of theoryto it, then it becomes more difficult to separate what theory is from what isn't (Runkel and Runkel, 1984 cited by Weick, 1995).

The quotation seems to signify different things to different people, which leads to conflicting and opposing ideas about the concept, but it is partially sensible. What it does not do is clearly demonstrate how these terms relate to one another, which leads to misunderstanding and "incredible anarchy" in theory development and theory use in many fields (Freese, 1980: 189).

Images of real-world experiences and structures are created and expressed as visual and verbal modelsthat are representative of concepts or propositionsor theories (Ngulube, Mathipa and Gumbo, 2015; Zaltman et al., 1973). A hypothesis can be derived from the model and tested through some metatheorylikeasuitableresearch methodology based on appropriate epistemological and ontological assumptions.Models and theories should not be used interchangeably because they are not equivalent (Fried, 2020; Gunnell, 1969; Ngulube, Mathipa and Gumbo, 2015). Unlike theories, models do not have the power to explain, predict and control a social phenomenon as they tend tosimply describe it (Ngulube, Mathipa and Gumbo, 2015; Yadav, 2023).

In other words, models describe something, and theories explain why something happens (Ngulube, Mathipa and Gumbo, 2015). Put differently, a theory is "the entire body of generalisations and principles developed for a field", whereas models describe "stages of understanding a phenomenon" (Bates, 2005). To make a theory or concept easier to understand, models are used.However, they do not fullyreflect the complexity of the phenomenon. One way to distinguish between a model and a theory is to think of a model as a visual tool that is practical and helps observers emphasise the key elements of their explanations and to think of a theory as a story about why.

Concepts are the building blocks of theories, and they are discipline specific and the field articulates what those concepts represent (Hassan, Mathiassen and Lowry, 2019).In other words, a field of study's choice of concepts becomes crucial because a claim represents a firm stance it has taken on any topic (Foucault, 1972). The adoption of a given concept depends on the knowledge base of the recipients and their experiences. The concept may not provide any information for the recipients or observers if they are unfamiliar with the language or code (Mingers and Standing, 2018). An abstract selective description of the relationships between a range of concepts constitutes a theory that in turn assist researchers to understand an aspect of the world (Varpio et al., 2020; Zongozzi, 2021). The use of the whole range of concepts from a theory constitutes a theoretical framework.

A field's capacity to generate original concepts and claims is a sign that it is developing as a discipline (Hassan, Mathiassen and Lowry, 2019).That raises thequestionwhether theories that are borrowed from other disciplines can fully explain a phenomenon in another fieldwithout infusing the researcher's a priori knowledge and experience, and the context of the phenomenon. That makes it incumbent for researchers to reflect on the extent to which they can use theories without tapping into their a priori

knowledge and experiences when explaining social phenomena.

This study does not have the intention to get into the discussion of theory borrowing. It is just flagged here to give an opportunity to LIS researchersto explore it further in their theory use and theorisation.Ukwoma and Ngulube (2021) give an insightful discussion on theory borrowing. Suffice to say that when choosing a theory,it is important to understand the concepts of theory triangulation, theory borrowing, theory dropping and theory diversification. These concepts can help a researcher to determine how elegant the chosen theory is (Ngulube, 2020). A solid understanding of the usage and application of theory is the foundation for selecting a good theory that can improve knowledge.

Theoretical frameworks are formulated based on a theory. It is important that the distinction between a TF and a CF be preserved. When it comes to these crucial tools for conceptualising research, the literature frequently generates misunderstanding (Ngulube, Mathipa and Gumbo, 2015; Ngulube, 2020; Van der Waldt, 2020). It is important to note that a TF and a CF are conceptually different, and cannot be used interchangeably (Ngulube, 2018; 2020).

When one overarching theory serves as the foundation for a study, it is referred to as a theoretical framework since every concept or aspect in the theory is represented in all the objectives or the research questions guiding the study. On the other hand, aCF is narrower and more specific than a TFwhich is broader (Ravitch and Riggan, 2017). A CF is a diagrammatical or written representation of variables or characteristics of the phenomenon that the study is concerned with (Miles and Huberman, 1994; Van der Waldt, 2020). It is not entirely correct that a conceptual framework should always visualise the cause-and-effect relationship as suggested by Swaen and George (2022) and Van der Waldt (2020) because this may not be true of qualitative or mixed methods research studies. A CF can be developed from the extant literature, aspects of theories, personal experiences, models and the context of the phenomenon (Ngulube, 2020; Van der Waldt, 2020). Theories constitute one of the core dimensions of a CF (Ngulube, 2020; Van der Waldt, 2020).

A tree metaphor can help illustrate the relationship between a TF and a CF even though it is not philosophically exact. A single stem or trunk that supports branches and leaves makes up a tree. If a study uses all the aspects of a theory as a lens to explain a phenomenon under study, then it will be informed by a TF. In other words, a TF is a valid analytical tool for conceptualising a study if all the components or claims of the theory underpin the study. The "tree" is then used as a theory to inform the study. However, if a branch or leaves informs the study, we move away from the notion of a TF as aspects of the tree will be used. In that case, we have a CF as aspects of the theory or "tree" will be brought to bear. Whether or not a study uses a TF or CF will partly depend on how much is known about the phenomenon or the extent to which the theory addresses all the objectives of a study (Ngulube, 2018). Understanding this distinction between a TF and CF constitutes a transparent application of a TF.The term transparency is rarely defined in research circles, and it is taken for granted (Jackson, 2014). Transparency in the application of a TF refers to thedegree of explanation of how, what, why, and when the pertinent theory was applied in the research process is described, including stating who used the theoryand their level of success.

One of the burning questions in scholarship is: Can a CF and a TF be used in one inquiry? There is not agreement on this. One school of thought states that they cannot be used together because they do not serve the same purpose in a research project (Ngulube, 2020). Word (2020) is of the opinion that "the conceptual framework falls under the broader theoretical framework". It is possible to have a theory and model in any inquiry. The model can be a CF depicting the major components of a theory. In the same way, one would represent a theory diagrammatically as a CF. The theory captures the link between the propositions while the CF depicts the links among the concepts that constitute the theory and the context of the inquiry. That implies that one can depict a theory as a CF of a study. What is essential is transparency if a theory is used as a CF.

> Almost all social scientists, whatever their normative, epistemological, theoretical, and substantive beliefs, accept the basic norm of research transparency… Making data, theory, and method transparent invites others to enter the conversation as equals (Moravcsik,2019: 2).

Being transparent allows for understanding, debate, improvement, and extension of a piece of scholarly work by other scholars. Transparency is an idea that applies to all contexts and is crucial in many areas, including theory reporting.

Related studies

There are many studies that are close predecessors of this research ever since Julien (1996) called upon for an assessment of the extent to which LIS research applied theory based on systematic reviews. Using a different CF from the current study, Pettigrew andMcKechnie (2001) analysed 1,160 articles in six majorLIS journals from 1993 to 1998 and revealed that some theorywas applied in 31.4% of the articles. Jeong and Kim (2005) analysed 654 LIS articles published in two major Korean journals since 1970 that revealed significant theory use and theory borrowing. In another study, Kim and Jeong (2006) examined the application anddevelopment of theory in 1,661 LIS journal articles that were published in four journals between 1984 and 2003. They discovered that 41.4% of the papers applied or developed some theory. Kumasi, Charbonneau and Walster(2013) revealed that theory was presented and discussedin seven prominent libraryscience-focused journals from 2009 to 2011 and concluded that the use of theory ranged from minimal, moderate to major.Bilal (2022) examined 14 journals from 1999 to 2019 and posited that 60% of the articles had theoretical foundations in theories or models.

The review of these relatedstudies revealed that transparency in the use of theory in LIS research was underdeveloped. Theoretical transparency does not seem to be a subject widely discussed in the literature. The current study advances the frontiers of the LIS knowledge base by contributing to the discourse of the need for theoretical transparency when conducting research in the field using the systematic review approach.Research strategy systematic reviews have the advantage of systematically assessing and summarising current knowledge in LIS on theoretical and conceptual frameworks using rigorous methods to identify research gaps, reduce bias and produce reliable conclusions (Siddaway, Wood and Hedges, 2019; Yuan and Hunt, 2009).

Conceptual Framework (CF)

Transparency-establishing methods have been developed in various fields. For instance, the field of health studies devised the Theory and Techniques Tool consisting of 19 items to improve the reporting of theory use in intervention studies (Human Behaviour Change Project, 2023). On the other hand, political scientists developed the Theory Impact Project (TIP) to determine how theories were used and assessed in international relations research (Better Evaluation, 2022). These tools were not used in this study because they did not meet the objectives of the research. Consequently, the CF depicted in Figure 1 was formulated.The degree of transparency when using aTF includes statements on the intention to use the TF, a description of the reason why the TF was chosen, and an explanation of its suitability to address the research problem. An article having all these indicators exhibits a high degree of transparency in the use of a TF. Unlike Pettigrew and McKechnie (2001), the current study made a distinction between theories and metatheories.

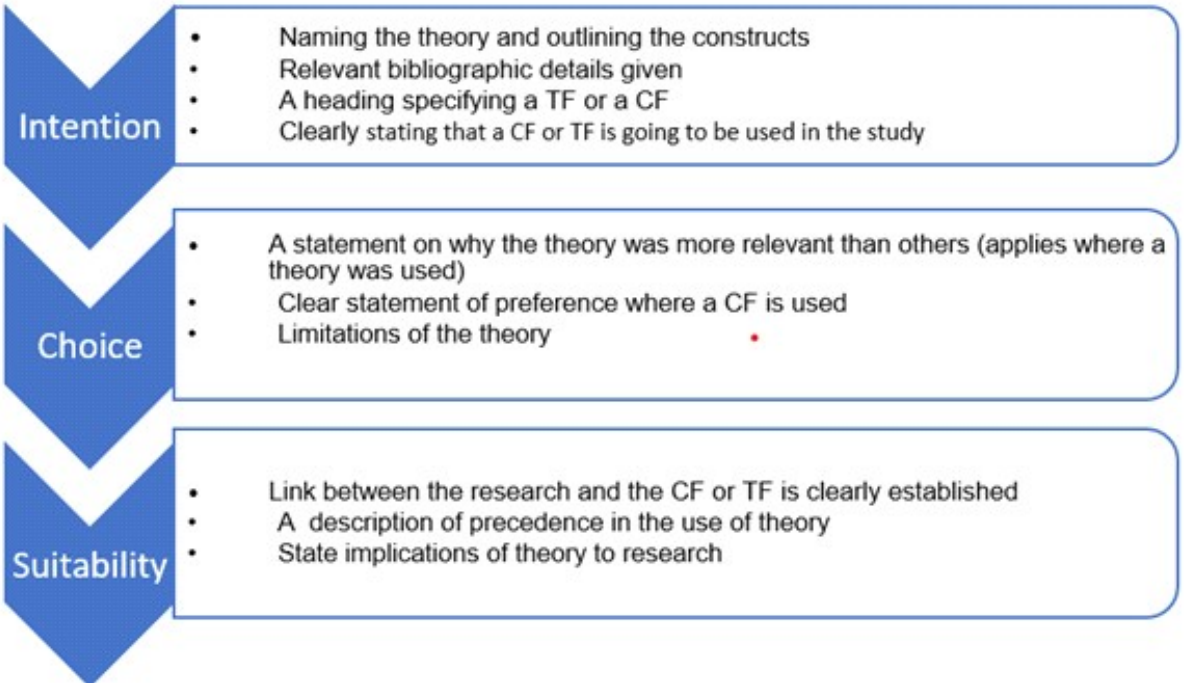

Figure 1: Conceptions of transparency in the use of a TF (Authors, 2023)

Statement of the Problem

Theoretically grounded research can contribute to valid research and the advancement of knowledge in a cognitive field. Many scholars in the LIS field recognise thattheory use and theorisingcan contribute to the growth of knowledge in the field (Kumasi, Charbonneau and Walster, 2013; Pettigrew and McKechnie, 2001; Ukwoma and Ngulube, 2021). Theory use and theorising should be "based on a coherent and explicit framework of assumptions, definitions, and propositions that, taken together,have some explanatory power" (Julien, 1996: 56).However, researchers in LIS have different uses and interpretations of theoretical concepts. In that regard, LIS scholars should build or use theories in a transparent manner by outlining the precise procedures they use in choosing or developinga theory as well as disclosing the choices and judgments they made while using or developing it. Transparency ensures that the application of theory is founded on a clear and cogent framework of presumptions, definitions, and propositions (Julien, 1996). This is going to increase the validity and quality of the research. It is critical to understand that everyone benefits from transparency, including researchers and policy makers (Baskin and Gross, 2019). Researchers can demonstrate the ethical basis and excellence of their work by being transparent (Moravcsik, 2019).

According to Hernon and Schwartz (1993), high-quality LIS research can give researchers models to enhance their own studies and aid in making research choices and to advance LIS research and teaching (Järvelin and Vakkari, 1990). Without an exposition of a need to be transparent when using theory, researchers in the field will uncritically and inappropriately use theory in their researchresulting in questionable research that will be of low quality. However, there is limited literature on transparency in the use of aTF in LIS.This study is significant becauseit buildson the others to raise awareness of the importance of transparency in theory use and theorising to produce appropriate, reproducibly, and theoretically grounded research.Transparency is a fundamental tenet of ethical research practise because it enables others to assess the accuracy, dependability, and legitimacy of the research claims. The research question that this study addressed was: What is the level of transparency in the use of a TF by LIS scholars in the production of knowledge?The sub-questions that guided the study were:

- How was the intention to use a TF in the study articulated?
- Whywas the theory underpinning the TF chosen?
- How well suited for its function was the TF?

Methodology

The first phase of the study was to select LIS-focusedjournals to include in the sample. It was challenging to choose a sample for the study because there was no established list of the ranking of LIS-focused journals. For instance, attempts by Nisonger and Davis (2005) and Nixon (2014) to provide a partial list of journals were inadequate due to the geographical limitation of the lists and the methodologies used to compile them.Both studies were not inclusive as they mainly addressed the United States (US) context.

The Web of Science (WoS)and Scopusprovide a possibleranking system, but the problem is that the list overlappedwith journals from fields such as information systems and computer science. Despite this apparent shortcoming,the researchers chose to rely on them because theyare relatively established ranking systems with wide coverage and acceptance.The researchers had to decide on which journal ranking system to use between Scimago Journal Rankings [SJR](Scopus, 2022) and Journal Citation Reports(JCR) (Clarivate, 2023). It was clear that the two ranking algorithms' quantiles (Q)for the journals were different from one another as shown in Appendix 1.

Notwithstanding the differences between the journals' rankings in the two ranking systems, the researchers chose to rely on the rankings in JCR because of its lengthy history; that is, having been established in 1975 (Garfield, 1994; Science Citation Index, 1993).That partly explains why the researchers did not rely on the list by Resurchify (2022), which is based on Scopus, and likewise recommends JCR to the readers. Aharony (2012) also used Journal Citation Reports (JCR) to identify the top LIS journals in their study – notwithstanding that the title of the articles is misleading since the author concedes that six out of the journals included in the study were IS journals and only four were LIS journals.

Instead of filtering the lists by discipline,the first phase of the study involved aBoolean Operators search of the JCR database using some of the commonly used LIS terms (Hjørland, 2000),including "library science", "information science", "library studies" and "information studies"in March 2023,yielding 190 records of journal titles. A total of 100 of the 190journal title records were between Q1 and Q4. The 90 records that were not includedin any of the quantiles were excluded from the sample as it implied that they did not fit into any quantile based on the formula for determining the quantiles. The selected 100 records were classified by scope, publisher and place of publication, and subject category. Only publications with an emphasis on the LIS field, as defined by the journal's scope and SJR classification, were chosen.Only oneout of the 12 selected journalsdoes not have a term related to libraries in the title. Appendix 1 includes the specifics. Just 12 journals were eventually included in the study. Apart from South America and Antarctica, the final list relatively covers all the continents of the world. These may be considered as the major LIS journals based on the methodology that was used in the selection.

The journals that were included in this systematic review included: *Library and Information Research, College and Research Libraries, Journal of Librarianship and Information Science, Library Quarterly, Journal of Academic Librarianship, Library Trends, Malaysian Journal of Library and Information Science, Portal: Libraries and the Academy, Reference Services Review, African Journal of Library Archives and Information Science, Journal of the Australian Library and Information Association* and *LIBRI-International Journal of Libraries and Information Studies*. The first six journals used in this study were part of the samples which were considered as the main LIS journals by the authors included in Appendix 1.

During the second phase, the study involved a search strategy performed with the help of Boolean operators focusing on the terms: "theoretical framework"; "theoretical setting", "theoretical context"; "theoretical underpinnings"; "theoretical lens"; "conceptualsetting"; "conceptual context"; "conceptual underpinnings"; "conceptual lens"in each of the 12 journals during the period 1991 and

2022. The year 1991 was used as the starting date because two of the journals used in the study were established in 1991 (see Appendix 1). The main searches were conducted inMarch 2023. Excel® was used to code and categorise data for qualitative data analysis. Data extraction, synthesisand reporting were carried out using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework (Moher et al., 2009). An independent postgraduate fellow assessed the first search to ensure the search tactics were comprehensive and robust. Figure 2 shows a flow diagram of the review process. It is interesting to note that the study of Aharony (2012) did not pick these keywords considering that two journals analysed in the current study, as illustrated in Appendix 1, were part of the sample of that study.

Table 1: Inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Publication date	Articles published between 1991 and 2022	Articles published before 1991 and after 2022
Language and duplicates	Articles published in English	Articles published in a language other than English and duplicates
Publication type	Peer-reviewed articles	Editorials, letters, conference proceedings, meeting abstracts, short communications, obituaries, dissertations, discussions, book reviews and systematic reviews (e.g., systematic, scoping, and rapid reviews) and reports
Specification of TF	Mentions TF in one or all the following areas: title and abstract; describes the utility of TF to understanding the phenomenon	No TFor CF specified
Specification of CF, including models	Mentions CF in one or all the following areas: title and abstract; explains why a CF was used instead of a TF	No CF or models specified

The third phase of the study was the screening of 2029 records to remain with journal articles in the English language after removing duplicates, book reviews, conference proceedings and other publication types. The title/abstract screening was conducted utilising Rayyan® software. Full-text screening was conducted using CADIMA (Julius Kühn-Institut Federal Research Centre for Cultivated Plants, 2023) to ensure rigorin line with the inclusion and exclusion criteria outlined in Table 1. The results were compared with 25% of the manual results based on the reading of the full article, introduction and review of the literature sections. Bilal (2022) revealed that the introduction and literature review sections of the articles were where theories or models were most frequently addressed. Finally, 138 articles remained out of 708 as indicated in Figure 2. The fourth phase of the study was a content analysis of 138 journal articles.

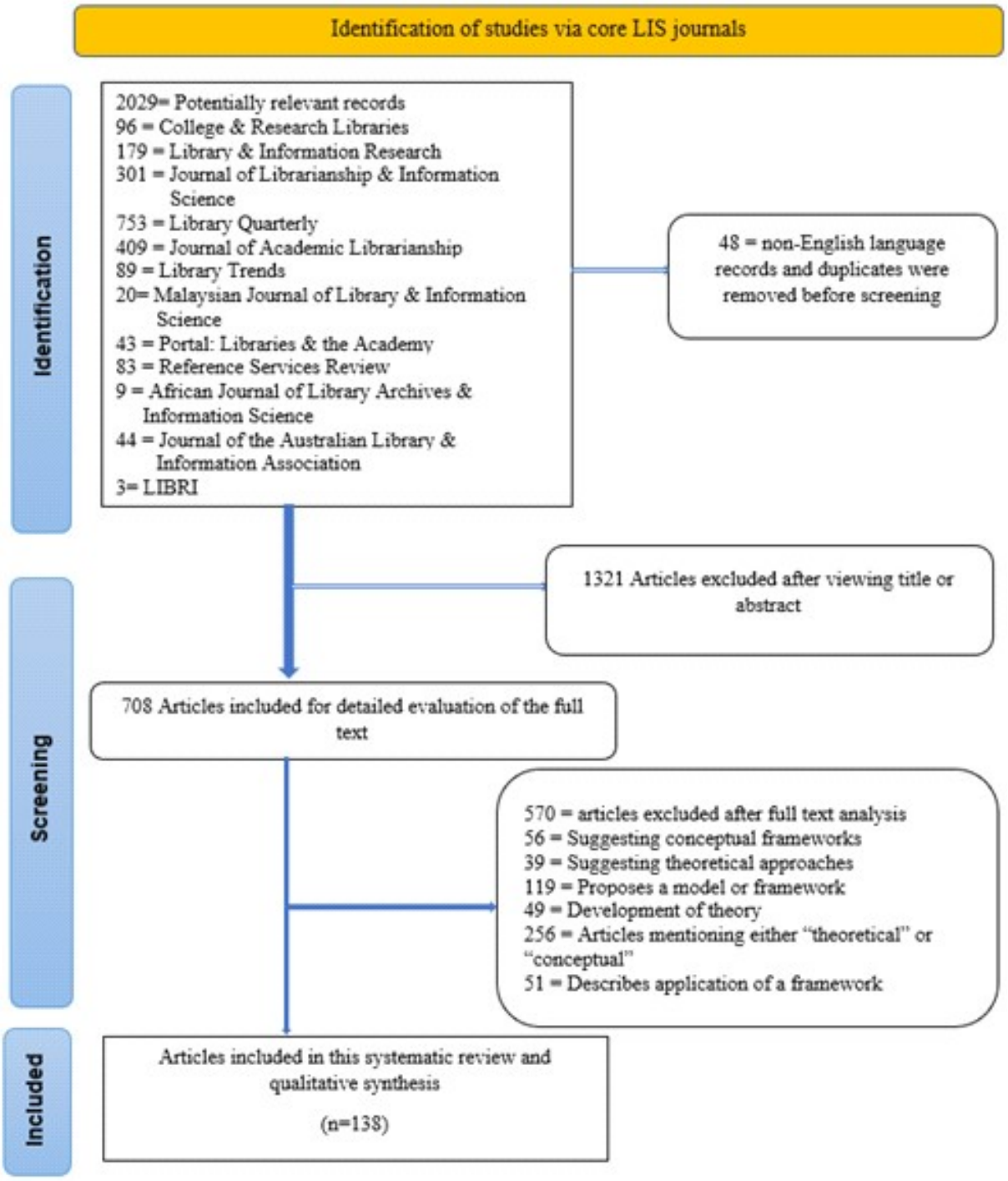

Figure 2: PRISMA flow diagram, CF, TF

Content Analysis of the Journal Articles and Intercoder Reliability

After being popularised by Krippendorff (1980), content analysis is recognised as a credible research strategy for understanding various aspects of scholarly communication, including LIS (Aharony, 2012; Armann-Keown and Patterson, 2020; Allen and Reser, 1990). Content analysis systematically analyses the content of recorded communication to establish patterns, themes, and any pertinent features (Braun and Clarke, 2006; Luo, 2022).That makes this systematic review qualitative in contrast to the

statistical one (Holopainen, Hakulinen-Viitanen and Tossavainen, 2008).The analysis of the records was based on the CFdepicted in Figure 1 and the processof coding adopted by Pettigrew and McKechnie (2001:65),which considered a theory as:

> identified if the author(s) describes it as such in the article (applicable to established or proposed theories) or uses such key terms as "conceptual" (including its variations, e.g., conceptualization), "framework," "grounded," or "underpinnings" to describe an idea/view or approach assuch.

Intercoder reliability was established by systematically selecting a sample of articles from an Excel® database of the articles that were downloaded from the journals. Articles with numbers 1, 6, 11, 16, and so on were chosen based on a fixed periodic interval arbitrarily chosen at (5n). Theresulting sample was that 28 (20%) articles out of 138 articleswere included for analysis. Three postdoctoral fellows coded the 28 articlesusing the framework in Figure 1 and the coding proposal suggested by Pettigrew and McKechnie (2001). The three coders' disagreements were resolved by the authors after they evaluated the coding.Statistical Package of the Social Sciences (SPSS) version 26 was used to run the intercoder reliability test (i.e., Cohen's Kappa (ê)) and the values ranged between 0.826 and 0.944.That represents a strong degree of agreement (McHugh, 2012; Zhao, Feng, Ao and Liu, 2022).That implied that the risk of bias was reduced and the quality of the evidence enhanced. After reading the articles, only 44 were selected as they met the objectives of this review. The articles were assigned the codesTRANS 1 to TRANS 44 to maintain the anonymity of the articles and the authors.

Results

The results are presented based on the three research questions. Table 2 summarises the indicators of transparency in the use of theory in the articles that were analysed. The level of transparency waslow (minimal) if the total number of indicators were below 50%; average (moderate)if it was pegged at 50% and high it was above 50%.

Table 2: Indicators of transparency in the use of theory in the articles

	Indicator	Frequency		Level of transparency
		N	%	High
Intention	The theories named	44	100	
	Bibliographic references for the sources of theories	44	100	High
	Constructs outlined	42(44)	95.5	High
	Heading specifying the framework	39(44)	88.6	High
	Heading specifying the framework appropriate	22(44)	50	Average
	Heading specifying the framework inappropriate	17(44)	38.6	Low
	Statement on the use of a TF made	3(34)	8.8	Low
	Statement on the use of a CF made	6(10)	60	High
Choice	Reasons why the theory was preferred over others	18(44)	41	Low
	Limitations of the theory described	11(44)	25	Low
	CF use stated	3(10)	30	Low
	TF use stated	2(34)	5.9	Low
Suitability	Link between the research problem and the CF or TF established	37(44)	84.1	High
	Precedence in the use of theory described	24(44)	54.5	High
	Implications of the theory or concepts for understanding the phenomenon indicated	29(44)	65.9	High

Articulation of the Intention to use a Theoretical Framework in the Study

The findings in Table 2 reveal that a total of 88.6% specified the framework they used. Appropriate references were provided. Four journal articles did not have a heading specifying a TF or CF. All articles stated the theories that informed the studies and 95.5 % of the articles outlined the constructs in thetheories.Theories were mainly middle range theories in contrast to grand theories. Ten articles used a CF and three of them represented the CF graphically. Six studies out of ten stated that a CF was going to be used in contrast to three studies out of 34 that indicated that the studies employed a TF.

The findings revealed that some articles showed a lack of understanding of the difference between a CF and a TF. For instance, TRANS 2and TRANS 5 used the terms interchangeably andTRANS 6 had both a CF and TF. Furthermore, TRANS 16, TRANS 24,TRANS 30 and TRANS 40 used some concepts from one or two theories and labelled the analytical tool as a TF. TRANS 11 stated the TF as social constructivism and interpretive theory.

Various labels wereused in the place of a TF or CF by the articles. That made the heading specifying the framework to be either inappropriate (38%)or appropriate (50). TRANS 4 used the label "theoretical perspective" in place of a CF or TF.TRANS 12 identified their TF as a "theoretical lens". TRANS 4 and TRANS 24 described their analytical tools as an"analytical framework".TRANS 30 used a model and called it a "theoretical framework label". TRANS 44 categorised their analytical device as both a theory and modelandreferred to them as a"theoretical perspective".With two indicators scoring low levels of transparency,one scoring an average, and more than half scoringhigh, the transparency related to the intention was deemed to be above average or moderate.

Choice of the Theory Underpinning the Theoretical Framework

The findings in Table 2 indicate that the transparency in the choice of aTF or CFwas low throughout or minimal. A total of 18 articles out of 44 gave reasons why the theory was preferred over others. The reasons ranged from the theory being "elegant", "effective", "simple", "straightforward", "practical" to "inventive". Only 11 articles described the shortcomings of the theory. Two studies out of 34 that used a TF stated that a TF was going to be used. Three out of 10 articles that used a CFstated upfront that the study was going to be using a CF instead of a TF. Six out of the ten studies indicated why a CF was used instead of a TF.

Theoretical Framework Suited for its Function

The level of transparency was high in all indicators in relation to the suitability of the theory in addressing the research problem. A total of 37 out of 44 articles established the link between the research problem and the CF or TF. The precedence in the use of theory was described by 24 out of 44 articles. The implications of the theories or concepts for understanding the phenomenon were explained by 65.9% of the articles.

Discussion

Based on the findings, the discussions are presented in line with three research questions and the conceptual framework.

Articulation of the Intention to use a Theoretical Framework in the Study

The findings show that the articles had an intention to use the theories by stating the theory that was utilised,including its constructs. Unlike in the study by Kumasi et al. (2013), the appropriate bibliographic references for the theories that were used were given. All articles used middle range theories implying that they were employing theories that were contextually relevant, less abstract than grand theories, and facilitated the integration of theories to empirical research(Risjord, 2011).

Several articles specified the heading of the framework.If an article indicates the heading as a CF or TF,it shows that the intention to use these analytical tools was there.That means that there was a recognition of the importance of these tools in explaining a research problem.However, some headings specifying the framework were not labelled appropriately as there were instances where an article used concepts from theories or the extant

literature and was classified as aTF instead of a CF. The articles that used a CF and diagrammatically represented it demonstrated that they knewthat the literature recommends a graphical presentation of the CF (Miles and Huberman, 1994; Van der Waldt, 2020).

The findings revealed that fourscholarly journals did not have a heading specifying these analytical tools. Failure to have CF or TF implies that the resultant research will have limited significance and applicability. These journals fail to recognise the importance of these tools inexplaining phenomena to the detriment of knowledge production and theory building.Research which is not supported by theory produces discrete information or data that does not advance the body of knowledge in the field (Van House, 1991). That may imply that findings remainunexplained,making the generationof new hypotheses or questionsdifficult.

The fact that many studies did not state upfront that a TF or CFwas going to be used displaysa low level of transparency in their intention to use the tools. That might imply that their conceptualisation of the matter was not clear. It is important to state that the research is supported by a TF or CF (Ngulube, 2020), as it demonstrates an understanding of the different uses of thesetwo tools of conceptualising research. For instance, some useda TF and CF interchangeably, which is not appropriate (Ngulube, 2020; Van der Waldt, 2020). It is incumbent upon the researchers to clarify the intention if the terms are used interchangeably (Word, 2020). However, it is conceptually wrong for some of the articles to equate a model to a theory forming the basis of a TF instead of using the model as a foundation of a CF (Fried, 2020; Gunnell, 1969; Ngulube, Mathipa and Gumbo, 2015). It implies that there was a misconception about the criteria of choosing a TF or a CF. Another misconception was an article that regarded constructivism as a theory that formed the foundation of its TF. Metatheories such as constructivism cannot explain or interpret phenomena, but they can provide a lens to investigate it (Ngulube, 2018; Zaltman et al., 1973). The fact that one of the articles had both a CF and TF poses conceptual challenges because of a lack of agreement on the matter. When a theory is used as a CF, it is essential for an explanation to be given why it is not used as a TF.There is a need to be transparent about it.

The articles used terms like "theoretical perspective"and "analytical framework" when referring to their TF or CF.Such terms should be used with caution in that context. A theoretical perspective is not equivalent to a TF or a CF, although they are related. A theoretical perspective is based on a metatheory. Based on paradigms or assumptions about reality and knowledge, a theoretical perspective is the lens through which the worldis viewed (Creswell and Creswell, 2018; Fried, 2020; Technological University Dublin Library Service, 2023).The ability of the theory to explain the phenomenon under study determines why it should be chosen, and the theoretical perspective influences what data should be gathered, how questions should be formulated, and how the theory should be applied.

On the other hand,an analytical framework is also not equivalent to a TF or a CFas suggested by some of the articles that were reviewed. A TF is frequently the foundation for an analytical framework (Stanley, 2012). However, an analytical framework is a methodologically-driven approach that concentrates more on the linkages and elements that are pertinent to the research question (Biria, 2017, Kunkel, 2017; Stanley, 2012). That implies that there is a difference between an analytical framework and a TF or a CF, as they serve a different purpose. The study is driven by a TF, whilst the methodologyis driven by an analytical framework (Kunkel, 2017). These terms should be used with introspection when they are applied in the context of a TF or a CF.

Choice of the Theory Underpinning the Theoretical Framework

The articles had a low level of transparency in relation to choosing theories for the studies. When choosing a theory, it is importantto explain if the theory is fit for purpose and why it is more elegant than other theories. That exhibits the researcher's knowledge of competing or alternative theories and how they relate to or differ from the preferred theory. That also demonstrates the reasoning, assumptions and criteria used to select a certain theory and its link to the research design and analysis (Stewart and Klein, 2016).

Some theories have been challenged and criticised (Collins and Stockton, 2018; Creswell and Creswell, 2018) and theories have limitations when

explaining a phenomenon (Ngulube, 2020). Furthermore, theories are not absolute facts and fixed or static entities (Muurinen and Kääriäinen, 2022). Questionable measurement procedures or vague dichotomies may also have an impact on the validity and usefulness of theories (Fried, 2020).Only five articles stated the limitations of the theories. Does it mean that the 39 articles that did not consider this indicator did not appreciate that theories are dynamic, speculative and provisional structures that can be changed or improved through time?Neglecting to state the limitations of a theory may imply that there are assumptions that theories are universal statements which can explain everything. Which is not the case.

The context where the theories are being applied can also be a limitation if it is very different from the one where the theory was originally formulated. It is critical to address thematters of criticism of the theory and the contextual shortcomings of theresearch design and analysis.Theories may also have limited explanatory power. For instance, TRANS 3 explained how the use of unified theory of acceptance and the use of technology (UTAUT-2) gave a different perspective in a non-English-speaking society.

The findings show that the level of transparencywas very low in relation to stating whether the article used a TF or a CF. If an article statedthat a CF or a TF was used,it shows that there is an understanding that they serve a different purpose, and they are based on different assumptions (Afribary, 2020).A statement of the choice made between a CF or a TF helps the readersto better understand the objectives, focus, constraints, and underlying assumptions of a study. Stating if a CF or a TF was going to be used and the reasons thereof demonstrates a high level of transparency in the use of theory and theorising.

Theoretical Framework Suited for its Function

Transparency in relation to the degree of suitability of the theory was very high as compared to other indicators outlined in Table 2. Connecting the research problem and the theory validates the research topic and enhances the robustnessand impact of research findings (Sternheimer, 2019; Stewart and Klein, 2016).The articles explained how the findings were consistent (or inconsistent) with the selected TF or CF. Even better, they provided recommendations for further research in line with the theories they used in their research. New theories can be generated and existing ones challengedifthe theory and research findingsare linked (Sternheimer, 2019). That implies that there is the potential for the developmentof new theories and to develop alternate explanations based on theory (Pacheco-Vega, 2020).

Transparencyin the use of theory and theorising demands that an indicationmust be given on whether the theorieswereused in their original state, adapted, or modified, to suit the research requirements (Stewart and Klein, 2016). Where there is no precedent in the use of the theory, there must also be transparency. A declaration that the theory was being applied for the first time in a particular context or research problem will be essential (Collins and Stockton, 2018).

The implications of the theory to understanding the problem were underscored in many articles, which means that theory dropping as conceptualised by Kumasi et al. (2013) was minimal in the articles that were analysed. The theories were fully integrated into the discussion throughoutmany articles as recommended by Ennis (1999) andthere was full application of the use of theory (Kumasi et al., 2013).It takes a lot of discipline to use a TF or a CF throughout the whole research process (Ennis, 1999; Ngulube, Mathipa and Gumbo, 2015).

Limitations of the Study

The results of the current study should be evaluated because it hasseveral limitations. The inclusion criteria based on the journal articles published in the English language and indexed in the JCR impose a limitation to the study. The absence of common operational codes used as indicators of theorisation and theory use was another setback. The use of the CF in Figure 1 and the literature partly alleviated the problem.

The methodology used has limitations to the comprehensiveness of the results. A mixed methods research approach had the potential to capture the comprehensiveness of the phenomena. After having looked at the trends and patterns in scholarly communication in the first phase, the second phase can include interviews conducted with a sample of

authors, members of editorial boards, and reviewers. The Delphi method also offers another alternative.

Althoughthe literature reviews sections in the articles can be a proxy of a CF(Ngulube et al., 2015; Ravitch and Riggan, 2017)and may cover theories used in a study, they were beyond the scope of this study. The study did not establish the correlation between the impact factor of a journal and the use of theory. Finally, the review focused specifically on transparency in the use of theoretical frameworks and did not target broad theory use and theorisation in LIS. Despite these limitations, the study contributes to the deeper understanding of transparency in the use of a TF when conducting research.

Conclusion and Recommendations

This article describes a systematic literature review on transparency in the use of a TF for the advancement of knowledge in LIS-focused journals during the period 1991 to 2022. The review followed the PRISMA guidelines, and the screening process resulted in 138articles, which were based on 12 journals that were systematically identified as core to the discipline. This systematic review revealed that there was a moderate level of transparency when choosing a theory to inform a study. That implies that there was an intention to link the studies to the broader literature and effectively explain and interpret their findings. In other words, by being transparent about their intention to use a TF or a CF, the articles set a theoretical expectation and the tone on how the study was going to be conducted.

The level of transparency when choosing a theory was low. That was in stark contrast to the level of transparencyassociated with explaining the suitability of the theory to the study. There is a need to be transparent about the choice of the theory so that readers can comprehend the spectrum, focus and limitations of the theory. Being transparent about the precedence in the use of the theoriesand establishing the link between the theories and the research question as well as their implications for understanding the phenomenon was the strongest point in the articles. That should be reinforced to advance the frontiers of knowledge.In a nutshell, the TF and CF are an essential part of research projects and research articles, which implies that they should be used transparently for them to advance valid and transformative knowledge. Transparency in the use of a TF will help novice researchersto use the tools of conceptualising and analysing research appropriately and effectively.

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Appendix 1: Sample of journals used in the study

Rank	Journal and1st year published*	Sample of journals used in previous studies	Scope, subject category and place of publication**	SJR 2021	JCR 2021
1	*Library and Information Research* (1983)	(Aharony, 2012; Bilal, 2022; Järvelin and Vakkari, 2014; Kim and Jeong, 2006; Kumasi, Charbonneau and Walster, 2013; Nisonger and Davis, 2005; Nixon, 2014; Pettigrew and McKechnie, 2001)	Cross-disciplinary with a focus on LIS (UK)	0.92 (Q1)	2.73 (Q2)
2	*College and Research Libraries* (1939)	(Aharony, 2012; Järvelin and Vakkari, 2014; Kumasi, Charbonneau and Walster, 2013; Nisonger and Davis, 2005; Nixon, 2014)	LIS (USA	1.11 (Q1)	2.381 (Q2)
3	*Journal of Librarianship and Information Science* (1991)	(Järvelin and Vakkari, 2014; Nisonger and Davis, 2005; Nixon, 2014)	LIS (UK)	0.76 (Q1)	1.992 (Q3)
4	Library Quarterly (1931)	(Bilal, 2022; Järvelin and Vakkari, 2014; Kumasi, Charbonneau and Walster, 2013; Nisonger and Davis, 2005; Nixon, 2014; Pettigrew and McKechnie, 2001)	LIS (USA	0.68 (Q1)	1.895 (Q3)
5	*Journal of Academic Librarianship* (1975)	(Nisonger and Davis, 2005; Nixon, 2014)	LIS (UK)	0.74 (Q1)	1.533 (Q3)
6	*Library Trends* (1952)	(Järvelin and Vakkari, 2014; Kumasi, Charbonneau and Walster, 2013; Nisonger and Davis, 2005; Nixon, 2014)	LIS (USA	0.54 (Q1)	1.311 (Q3)
7	*Malaysian Journal of Library and Information Science* (1996)	Never used in related studies	Relevant to Asia Pacific region: LIS (Malaysia)	0.33 (Q2)	1.25 (Q3)
8	*Portal: Libraries and the Academy* (2001)	(Nixon, 2014)	LIS (USA)	0.59 (Q1)	1.067 (Q3)
9	*Reference Services Review* (1972)	(Nisonger and Davis, 2005; Nixon, 2014)	LIS (UK)	0.75 (Q1)	0.831 (Q4)
10	*African Journal of Library, Archives and Information Science* (1991)	Never used in related studies	Relevant to Africa: LIS (Nigeria)	0.13 (Q4)	0.828 (Q4)
11	*Journal of the Australian Library and Information Association* (2017)	Never used in related studies	Relevant to Australian and Southern Asia Pacific: LIS (UK)	0.52 (Q2)	0.725 (Q4)
12	*LIBRI-International Journal of Libraries and Information Studies* (1950)	(Järvelin and Vakkari, 2014; Nisonger and Davis, 2005; Nixon, 2014)	LIS	0.30 (Q3)	0.521 (Q4)

* Based on Clarivate (2023).

**The scope of the journal is international unless otherwise stated

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Readiness of Ghanaian University Libraries Towards the Adoption and Implementation of Resource Description and Access

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Abstract

This research paper, which is part of a broader study, seeks to contribute to knowledge on the Resource Description and Access standard by exploring the state of readiness of Ghanaian university libraries to implement the standard, as well as highlighting the myriad of activities and initiatives that libraries should undertake in preparation for RDA implementation. This convergent parallel mixed methods study engaged 62 cataloguing practitioners, across nine university libraries, through questionnaires and interviews as data collection instruments. The analysis of data revealed the importance of planning and an overwhelming state of unpreparedness among Ghanaian university libraries to implement the standard. The study also contributes various appropriate activities and initiatives for readying libraries for RDA implementation to RDA literature. It is recommended among others, that university library management and leaders of professional library organisations designate RDA preparatory periods and forge collaborations and partnerships with libraries that have implemented the RDA standard.

Keywords: Resource Description and Access; Readiness; Implementation; University libraries; Ghana

Introduction

Resource Description and Access (RDA) as a cataloguing standard, is increasingly attaining acceptance and universality as the bibliographic standard of the current dispensation since its full implementation in 2013. Evidence of this acceptance is marked by the growing number of subscriptions to the standard and the upsurge in RDA records in the Online Public Access Catalogues of libraries and bibliographic utilities (Hennelly 2016). The influence and usage of the Anglo-American Cataloguing Rules 2nd Edition (AACR2) is fast diminishing, as more library systems transition to RDA for bibliographic description.

The transition to RDA, from AACR2 is characterised by deliberate and meticulous planning with vast financial, logistical, managerial and institutional implications. Cronin (2014) extols the principles of feasibility, merit and culture in the transition to RDA at the University of Chicago, and identified systems support, staffing levels, minimal disruption to users and change management as issues considered at the forefront of the transition process. Lee (2014), chronicling the adoption and implementation of the RDA standard in the United Kingdom's Courtauld Institute of Art, draws attention to the considerable period spent by the institution on

pre-planning the RDA transition and readying themselves towards RDA implementation.

Libraries, in readying themselves to adopt RDA, connotes the realisation of the need for the standard, and the benefits that accrues to it, if it is adopted and implemented, as well as the awareness of the potential pitfalls of relying on an outdated standard. Indicators of readiness to adopt the RDA standard in libraries include the following: collection of RDA training materials; the search for potential RDA experts; the commencement of translation of the RDA Toolkit into other languages which are not available currently; verifying the compatibility of the current integrated library system to the RDA standard; and the setting up of governance bodies (Luo, Zhao, and Qi 2014; Hennelly 2016). These indicators are undertaken in a preparatory period, which is a period meant for learning, undertaking feasibilities and all the leg works required for a successful implementation. The readiness of libraries to adopt RDA is facilitated by the availability of funding and technical expertise and inhibited by the inadequacy or absence of these same resources (Van Rensburg 2017; Turner, 2014).

Adoption of RDA follows the expiration of the preparatory period which is used for pre-planning, planning and readying the library for RDA (Lee 2014). Adoption connotes the decision of the library to endorse RDA as its cataloguing standard and is indicated by the commitment of resources by the library towards the use of the standard for its bibliographic description. The acquisition of training materials, organisation of training programmes, readying and making the prevailing Integrated Library Systems (ILS) RDA compliant, and the determination of a definite date for migration, signify the adoption of RDA and heralds its implementation in the foreseeable future (Lee 2014). Adoption of RDA in libraries can be facilitated by availability of funding and technical expertise and the support of the management of libraries, and can, similarly, be hampered by their lack or inadequacy (Van Rensburg 2017; Morris and Wiggins 2016).

Adoption of RDA and the myriad of activities under its purview is a harbinger to the implementation of the RDA standard. Implementation of RDA connotes the changing over from AACR2 to RDA on a definite date. Implementation of RDA is indicated by a change in the library's MARC records from AACR2 to RDA in the library's OPAC. The active conversion of existing MARC records from AACR2 to RDA (conversion of legacy data), is also regarded as another indication of RDA implementation in a library (Morris and Wiggins 2016). The backing of library management and the availability of RDA experts and system librarians to manage RDA integration into existing ILS are factors that will facilitate implementation of RDA in libraries, while their unavailability inhibits the RDA implementation effort (Van Rensburg 2017; Morris and Wiggins 2016).

Statement of the Problem

Since 2014, cataloguing records, particularly those originating from advanced jurisdictions, are being created based on the RDA standard. Consequently, the MARC records in the Library of Congress catalogue and those of other bibliographic utilities, such as Online Computer Library Centre (OCLC), are being created in RDA or being converted from AACR2 to RDA (Morris and Wiggins 2016). Simultaneously, libraries in Ghana are importing these RDA records into their AACR2 compliant Integrated Library Systems and catalogues through their predominant copy cataloguing practice (Yeboah 2021). It is instructive to note that the similarity in the foundation and structure of RDA and AACR2 is what has enabled the concurrent co-habitation of both RDA and AACR2 records in a single ILS (Oliver 2010). This respite is momentary however, and is not expected to be a long-term alternative, especially as emerging and existing ILS become fully RDA compliant. This implies that the practice, by most Ghanaian university libraries, of continually importing RDA-based records into the AACR2 compliant ILS is untenable and unsustainable in the long run.

RDA has been deemed to be beneficial in terms of providing better guidance to the description of information resources in all formats and enhancing their visibility and discoverability by users. This, coupled with the fact that the standard has clearly come to stay implies that Ghanaian university libraries, at the very least, ought to be readying themselves towards RDA implementation. The RDA standard cannot be said to enjoy widespread use on the African continent, it is only South Africa that is leading the way in terms of extent of implementation.

Though local studies on RDA (Monyela, 2020; Ifijeh, Segun-Adeniran, and Igbinola, 2019; Van Rensburg, 2017; Oguntayo and Adeleke, 2016) abound, these studies do not discuss the standard from the readiness and standpoint and side-steps the cataloguing of activities undertaken in readying libraries for implementing the RDA standard.

After close to a decade of little activity, in terms of RDA implementation, at Ghanaian university libraries, save for the University of Education, Winneba libraries, the stage of non-implementation, where the vast majority of libraries are currently at ought to necessarily be truncated to usher in the preparatory stage for RDA implementation. For this to materialise, local Ghanaian literature on the subject, such as this current study, are required to offer guidance and serve as reference cases for prospective implementers of the standard in Ghana. The transition to the preparatory stage will likely engender a more impactful conversation and change the narrative towards the full implementation of the standard in Ghanaian university libraries. To this end, the paper aimed to determine the extent of readiness of Ghanaian university libraries to adopt and implement RDA.

Objectives of the Study

The study sought to:

1. find out the importance of planning and preparation in RDA adoption and implementation.
2. determine the range of activities undertaken by libraries in readying themselves for RDA adoption and implementation.
3. establish the appropriateness of these activities undertaken to ready libraries for RDA implementation.
4. establish the extent of readiness of Ghanaian university libraries to adopt and implement RDA as a cataloguing standard.

Literature Review

The readiness stage connotes a stage where libraries, having made a decision to adopt RDA, undertake a series of activities to set themselves up in anticipation of a full implementation of the standard. These activities, which usually are the planning and preparatory works, are geared towards ensuring a smooth implementation. To put the need for planning in context, Kalwara, Dale and Coleman (2017) draw readers' attention to the two years the Library of Congress spent in transitioning to full implementation. Cakmak (2018:32) in his account of RDA implementation in Turkey observed that the preparatory and planning stages related to implementing the RDA standard involved improving the prevailing computer infrastructure, organising staff capacity building programmes, creating RDA awareness among library professionals, and developing policies to guide the transition process.

Building the capacities of librarians in RDA places a drain on the already perilous financial positions of libraries (Ifijeh, Segun-Adeniran, and Igbinola, 2019:123). The subscription of the RDA Toolkit and the acquisition of training materials presents another financial investment decision for managers of libraries. The subscription which is quoted in United States dollars present most management teams with important investment decisions owing to the weak financial positions of libraries and exacerbated by the deteriorating exchange rates against major foreign currencies. The adoption of ICT in most university libraries in Ghana is evidenced by the usage of ILS and this represents an earlier investment that has proven handy in the current circumstances. The cataloguing modules and the MARC 21 framework that accompanies them, are easily made compatible with the RDA standard and as such, will save these libraries some financial investment. Ahonsi (2014) also identifies computer infrastructure and Internet connectivity as a logistical investment that ought to be made before RDA can be adopted and implemented. The impediment of limited financial resources in libraries is widespread and has led libraries to consider innovative solutions, such as consortium building, to tackle this challenge. Oehlschlager (2012) reveals an instance in Britain, where a collaboration between the British Library and the Chartered Institute of Library and Information Professionals (CILIP) led to the two working together to train cataloguers on RDA.

Oliver (2010) identifies training and capacity as key components in the transition from AACR2 to RDA. Much as AACR2 and RDA have fundamental similarities, these commonalities are not all encompassing, given the models that anchor RDA

and the distinct set of vocabulary and concepts they introduce into the cataloguing practice. The changes in the approach to dealing with contents and carriers, and MARC 21, occasioned by the RDA standard, represent genuine aspects of the new standard that require extensive training and capacity building among cataloguers. Ifijeh, Segun-Adeniran and Igbinola (2019) came to the same conclusion that cataloguers and librarians need training on both the theoretical knowledge and hands-on application of the RDA rules but contends that the training options open to librarians in Nigeria seems to be in-country workshops, seminars and conferences where specialists are requested to provide instructions and train cataloguers on the subject. The authors, however, catalogue a host of challenges militating against these RDA training programmes. They identify the fee-based nature of these programmes, lack of finance to sponsor librarians to attend these capacity building programmes, inadequate facilities and computer infrastructure and ultimately the challenge of getting qualified local RDA experts to train librarians as factors inhibiting capacity building in RDA in Nigeria.

The literature is pervasive with assertions regarding the training of cataloguers on RDA before implementation was rolled out in many libraries (Ducheva and Pennington 2017; Jin and Sandberg, 2014). Cakmak (2018) predicates that successful RDA implementation in libraries is mostly contingent on a deliberate set of planning and decision-making phases that would encompass improving required infrastructure and capacity building. John-Okeke (2019), in aligning with this point of view, opine that building capacities and training cataloguing librarians in emerging standards are best undertaken by national bibliographic authorities like national libraries. Cakmak (2018) notes the effort of the Turkey National Library, who spearheaded the RDA initiative by bringing together scholars, cataloguing librarians and decision makers to a common platform to facilitate discussions on terminological studies, development of national authority files, infrastructure developments, training and instruction exercises, and awareness creation events. In South Africa's case, the National Library's Bibliographic Services Programme was mandated to constitute a committee, tasked to educate the cataloguing community of South Africa on the new RDA standard after the initial publication of the draft RDA 2008 (Monyela 2020, Ahonsi 2014).

The enrolment of librarians in library schools, and their monitoring of the trends in contemporary research in the field, attending webinars, conferences, workshops and library association programmes, have also been touted as avenues for training and capacity building of librarians in RDA (Oguntayo and Adeleke 2016; Sanner 2012). The provision of education on the RDA standard represents a prime area, where library schools can direct their focus, to assist libraries in Ghana and the entire continent, to adopt and implement the RDA standard. The continued maintenance of AACR2 in the curricula of library schools on the African continent is a contributing factor to the persistent reliance on the AACR2 standard by libraries (Oguntayo and Adeleke, 2016).

Research Methodology

This study adopted a mixed methods approach by deploying surveys and case studies as research designs for a better chance of exploring the issues from both staff and management perspectives. In a census mode, the study surveyed 45 cataloguing staff at the operational level and 17 cataloguing staff at the policy and management level in the study's quantitative and qualitative phases respectively. At the operational level are staff involved in the daily cataloguing activity and mandated with bibliographic entry while at the policy level are the managers and decision makers of the cataloguing units and departments. The respondents and participants of the study were drawn from 9 public university libraries, namely University of Ghana (UG-13); Kwame Nkrumah University of Science and Technology (KNUST-12); University of Cape Coast (UCC-18); University of Professional Studies (UPS-4); University of Education, Winneba (UEW-10); University of Development Studies (UDS-8); University of Mines and Technology (UMaT-4); University of Health and Allied Sciences (UHAS-8) and University of Energy and Natural Resources (UENR-3).

Closed and open-ended questionnaire was provided to the 45 cataloguing staff at the operational level, while the 17 cataloguing staff at the policy level underwent an interview session guided by an

interview guide. The quantitative data for study was gathered between April and May 2023 via electronic and print mediums, while the interview sessions were a mixture of face to face and telephone interviews. Both data sets were then cleaned to eliminate glaring errors and inconsistencies before they were analysed. The quantitative data were analysed with SPSS, while the qualitative data were analysed through a thematic content analysis. The analysed results from the quantitative and qualitative phases were then presented descriptively and narratively in a mixed manner representative of the study's adopted convergent parallel mixed methods design.

Results

The researcher in this section sought, through a variety of questioning, to determine how ready the Ghanaian university libraries were, to adopting and implementing RDA and how they were likely to plan and prepare for any future implementation if any.

Demographics

The demographics offers an insight into the profile of the cataloguing practitioners, whose responses and opinions form the crux of the study and helps place the study in proper context.

Table 1: Demographic characteristics of Respondents

Cataloguing staff at operational level (N=45)		
Gender	**N**	**%**
Male	19	42.2
Female	26	57.8
Age		
21-40	6	13.3
31-40	26	57.8
41-50	12	26.7
51-60	1	2.2
Level of education		
Doctorate degree	2	4.4
Master's degree	22	49.0
Bachelor's degree	19	42.2
HND/Diploma	2	4.4
Years of working experience in cataloguing unit, section or department		
0-2 years	16	35.6
3-5 years	15	33.3
6-10 years	9	20.0
11-15 years	3	6.7
16 years and above	2	4.4

From the quantitative perspective, Table 1, above, shows a relatively youthful workforce in the cataloguing department of Ghana's public academic libraries. The youthful workforce notwithstanding, the level of education appears quite high with postgraduate and bachelor's degree emerging as the highest level of education among these cataloguing practitioners. The cataloguing staff were deemed however to be relatively inexperienced with only 31.1% of them having in excess of six years' experience.

From the qualitative phase of the study, seventeen (17) participants tagged from cataloguer (CAT) 1 to CAT 17, in various capacities, such as university librarians (UL), head cataloguers (HC) and deputy head cataloguers (DHC), participated in the interview sessions. The females constituted the majority (9) of these participants with the remaining 8 being males. Again, the majority of the participants were found to be in the 36 to 40 years age bracket, and most of these participants have a master's degree as their current level of education.

Importance of Preparing and Planning to Adopt Implement RDA

The quite considerable nature of the RDA implementation initiative makes the planning for such a project imperative. As a result, the respondents were asked to rate how important the preparation and planning for the adoption and implementation of RDA is, through the use of a five-point Likert scale, ranging from extremely important (5); very important (4); important (3); slightly important (2) to not important (1). The findings revealed that, for the majority of respondents, planning is rated as extremely important in the adoption and implementation (x=4.44), subscription of RDA (x=4.38), usage of RDA (x=4.36) and evaluation of RDA (x=4.24). The data is presented in table 2.

Table 2: Importance of preparing and planning in different stages of RDA implementation

RDA implementation stages	Ratings					Weighted mean
	5	4	3	2	1	
Adoption and implementation	31(69%)	9(20%)	1(2%)	2(4%)	2(4%)	4.44
Subscription of RDA	26(58%)	14(31%)	2(4%)	2(4%)	1(2%)	4.38
Using RDA	27(60%)	12(27%)	2(4%)	3(7%)	1(2%)	4.36
Evaluation of RDA	24(53%)	12(27%)	6(13%)	2(4%)	1(2%)	4.24

In their view, the planning and preparation for RDA implementation is significant. These participants, speaking from a management and policy standpoint, revealed that planning permits libraries which intend to implement RDA in the future to budget for the resource implications and court the support and buy-in of the necessary stakeholders. In this regard, some of the participants opined as follows:

CAT 10 (Head Cataloguer): *"Preparing and readying our library for RDA was important. We needed to put things in place in order to have a coordinated implementation. The decision to go for RDA was not a straightforward one because there were a few dissenting voices. We had to prepare for a period of time, learn a bit, provide education and convince important stakeholders like the library committee and university management".*

CAT 16 (University Librarian): *"I believe in a library preparing and readying itself for adopting or implementing any innovation, not just RDA.*

You need to prepare in terms of the manpower, the people who are going to use the standard, to do the description. Is there any need for training? Is any software or technology required for this standard? Do your current systems support the standard you intend to implement? Is an upgrade of the current system needed? What are the financial implications? These, are some of the teething questions I believe one can ask in the course of readying oneself before adopting or implementing an innovation like RDA".

While the importance of planning and preparation for future RDA implementation was universally endorsed by many participants, the benefits and challenges of the preparatory period was a theme that also emerged from the discussions. Participants (CAT 3, 7, 8 and 11) were of the opinion that preparatory periods engender cost savings, risk reduction and learning opportunities. In this regard, the following remarks were made:

When participants were probed on the challenges of the preparatory stage, they had this to say:

CAT 5 (Deputy Head Cataloguer): "*Yes, there are challenges to the preparatory stage. I know, because I faced something similar when advocating for the collaboration with RDA implementing libraries. The mere allocation of scarce resources to initiatives, which are yet to materialise, was not attractive to some management members".*

CAT 9 (University Librarian): "*The major challenge of this preparatory period, I have to say, was understanding the application of the standard to an extent where one can train others, especially in the absence of comprehensive guidance and collaborations".*

Activities Undertaken by Libraries in the Preparation for RDA Adoption and Implementation

Through the findings of the study, it was established that 8 (UG, KNUST, UCC, UPSA, UDS, UMaT, UHAS, UENR) out of the 9 Ghanaian university libraries in this study have not implemented RDA as a cataloguing standard. Based on this, the researcher sought to ascertain from respondents, their views on their library's readiness or preparedness to adopt and implement RDA. Using a five-point Likert scale, the respondents were asked to rate the extent to which the RDA preparatory activities for adoption and implementation were undertaken, starting with "to a great extent" (4); "somewhat" (3); "very little" (2); "not at all" (1) to "not applicable" (N/A). The findings of the study, as shown in Table 3, revealed that the majority of the respondents, 38 (84%), indicated "non-applicable (N/A)" for all RDA preparatory activities, since their respective libraries have yet to implement RDA. The reasons for the non-implementation included the expensive nature of RDA, lack of RDA expertise and the perceived lack of significant differences between AACR2 and RDA.

It is noteworthy, however, that seven respondents (16%) rated the preparatory activities in terms of the extent to which they were undertaken in preparing towards RDA implementation. These respondents are clearly from the University of Education-Winneba (UEW), which is the sole implementing library among the 9 sites.

Table 3 reveals budgeting for the RDA project (x=4.0) and verification of the RDA compatibility of the current ILS (x=4.0) as the preparatory activities undertaken "to a great extent" at UEW. Also undertaken "to a great extent" at the UEW library were RDA preparatory activities such as staff training and capacity building (x=3.57), acquiring computer infrastructure and software (x=3.14), ensuring stable power supply (x=3.14) and subscribing to stable Internet connectivity (x=3.14). The UEW respondents, in all their entirety, identified the translation of the RDA (x=1.0) as a preparatory activity that was never undertaken, mainly because RDA is published in English. Table 3 deliberately lumps the data from both implementing and non-implementing libraries to provide a holistic picture of the views of respondents from both implementing and non-implementing libraries regarding the activities undertaken in preparing for RDA implementation in one frame. The full data is presented in table 3.

Table 3: RDA preparatory activities undertaken and their extent of engagement (N=45)

RDA preparatory activities	Ratings					Weighted mean
	4	3	2	1	N/A	
Budgeting (finance) for the RDA project	7(16%)	-	-	-	38(84%)	4.00
Acquiring computer infrastructure and related software	5(11%)	-	-	2(4%)	38(84%)	3.14
Ensuring stable power	5(11%)	-	-	2(4%)	38(84%)	3.14
Subscribing to stable internet connectivity	5(11%)	-	-	2(4%)	38(84%)	3.14
Acquisition of RDA training materials	4(9%)	-	-	3(7%)	38(84%)	2.71
Staff training and capacity building in RDA	5(11%)	1(2%)	1(2%)	-	38(84%)	3.57
Sponsoring selected staff to attend train-the-trainer RDA programs	2(4%)	2(4%)	3(7%)	-	38(84%)	2.86
Search for potential RDA experts	1(2%)	3(7%)	1(2%)	2(4%)	38(84%)	2.43
Verification of the compatibility of the current Integrated Library Systems to the RDA standard	7(16%)	-	-	-	38(84%)	4.00
Establishment of RDA governance bodies, committees and task forces	-	1(2%)	3(7%)	3(7%)	38(84%)	1.71
Commencement of translation of the RDA Toolkit into languages not available in RDA	-	-	-	7(16%)	38(84%)	1.00

The study in its qualitative phase sought to ascertain from participants, the range of activities libraries have undertaken or likely to undertake to prepare for RDA implementation. The majority of participants had little to say about the range of activities they have undertaken in preparation for RDA implementation, as these participants were from RDA non-implementing libraries. Participants from the sole RDA implementing library, by virtue of their status, addressed the question. One such participants averred that:

CAT 9 (University Librarian): *"We had a preparatory period of about six months from the time we had our first training to day one of RDA copy cataloguing and during this period, a lot of activities were undertaken towards preparing the grounds for a future take off. Some of the activities we undertook during this period included talking to library management about funding, getting a few more computers, acquiring RDA training materials from online sources mostly, ensuring internet connectivity was reliable, searching for RDA expertise and confirming that our ILMS, Virtua was RDA compliant".*

Appropriateness of Preparatory Activities Undertaken to Prepare Libraries for RDA Implementation

Although RDA has not been implemented in the majority of the libraries, it was imperative to assess respondents' views regarding the appropriateness of the various RDA preparatory activities evident from RDA literature. Concurrently, it was necessary to assess, from the perspective of the respondents of the library that has implemented RDA, the appropriateness of the preparatory activities that were undertaken, prior to RDA implementation. An assessment of the appropriateness or otherwise of RDA preparatory activities can be made by cataloguing staff with some level of experience. A five-point Likert scale was used in this regard to ascertain whether respondents found RDA preparatory activities as "absolutely appropriate" (5); "appropriate" (4); "neutral" (3); "inappropriate" (2); or "absolutely inappropriate" (1).

The findings of the study revealed that, although, the RDA preparatory activities were not applicable to most respondents (because their libraries had not implemented RDA), they were found to be appropriate on different levels in preparing towards the adoption and implementation of RDA as a cataloguing standard in university libraries in Ghana. Table 4 shows that staff training and capacity building was viewed as the most appropriate RDA preparatory activity with a mean (x=4.53). Similarly budgeting (finance) for the RDA project emerged as the second most appropriate RDA preparatory activity, at x=4.49. The respondents again identified the commencement of translation of the RDA Toolkit, into other languages that are not currently available, as the least appropriate RDA preparatory activity, with a mean of 3.02. In table 4, it is clearly shown that, on the average, over 75% of the respondents found the RDA preparatory activities to be appropriate in one form or another. It could then be deduced that these respondents agree that the preparatory activities for RDA are appropriate and should be adopted to prepare libraries for RDA implementation. Fuller details of the data can be found in table 4.

Table 4: Appropriateness of RDA preparatory activities in RDA adoption and implementation (N=45)

RDA preparatory activities	Ratings					Weighted mean
	5	4	3	2	1	
Budgeting (finance) for the RDA project	33(73%)	6(13%)	3(7%)	1(2%)	2(4%)	4.49
Acquiring computer infrastructure and related software	28(62%)	9(20%)	4(9%)	2(4%)	2(4%)	4.31
Ensuring stable power	30(67%)	8(18%)	2(4%)	3(7%)	2(4%)	4.36
Subscribing to stable internet connectivity	32(71%)	7(16%)	2(4%)	2(4%)	2(4%)	4.44
Acquisition of RDA training materials	28(62%)	10(22%)	4(9%)	1(2%)	2(4%)	4.36
Staff training and capacity building in RDA	35(78%)	4(9%)	3(7%)	1(2%)	2(4%)	4.53
Sponsoring selected staff to attend train-the-trainer RDA programs	20(44%)	18(40%)	3(7%)	2(4%)	2(4%)	4.16
Search for potential RDA experts	17(38%)	19(42%)	5(11%)	2(4%)	2(4%)	4.04
Verification of the compatibility of the current Integrated Library systems to the RDA standard	18(40%)	14(31%)	6(14%)	2(4%)	5(11%)	3.84
Establishment of RDA governance bodies, committees and task forces	10(2%)	14(31%)	14(31%)	4(9%)	3(7%)	3.53
Commencement of translation of the RDA Toolkit into languages not available in the RDA	11(24%)	8(18%)	7(16%)	9(20%)	10(22%)	3.02

When asked about the appropriateness of the preparatory activities that they undertook, one participant from the RDA implementing library made the following observation:

CAT 8 (Head Cataloguer): *"These preparatory activities provided vital information, brought the implementation into focus and contributed towards our implementation efforts. With the benefit of hindsight, I think these activities were absolutely appropriate in preparing towards RDA implementation".*

Readiness of Ghanaian Public University Libraries to Adopt and Implement RDA

On the back of the foregoing discussion, participants were asked to give their views on their libraries' state of readiness for the implementation of the RDA standard. The majority of participants, in their capacities as decision makers with regard to cataloguing in their libraries, were explicit and stated that their libraries were not ready to adopt and implement RDA. Other participants indicated their libraries were unprepared to implement RDA, due to the lack of funds for the project. In this regard, the participants commented as follows:

CAT 2 (Head Cataloguer): "*Presently, no resources are being committed to RDA and, so, I find it difficult opining that we are readying ourselves towards RDA in any way".*

CAT 16 (University Librarian): *"At the moment, no arrangements are being made to adopt the standard at the management level, but at the department discussions in that regard have commenced".*

CAT 17 (Head Cataloguer): "*As the head of Cataloguing, I can confirm that no proposal to adopt RDA has been proffered to my library management and that, currently, no arrangements are being made towards RDA adoption".*

Discussion of Findings

The importance of prior planning and preparation for RDA implementation, as established in this study reflects the position canvassed by Panchyshyn, Lambert and McCutcheon (2019) and Lee (2014). The evaluation of RDA, as a standard, is a theme that has not been explored explicitly in RDA literature, especially by libraries that have implemented RDA fully. The closest form of evaluation appears to be an attempt by scholars to juxtapose RDA records with those of AACR2 (Thuku 2016). Han, Wacker and Dartt (2011) take a different path with regard to the evaluation of RDA, by assessing the compatibility of the standard to other bibliographic frameworks such as Dublin Core and Metadata Object Description Schema (MODS). These expositions, be they explicit or implicit, are corroborated by the findings of this study, to the effect that a form of evaluation of the RDA standard is significant in the entire RDA implementation value chain.

The undertaking of preparative activities by libraries, in anticipation of RDA implementation, is a theme that readily seeps out of the RDA literature particularly from successful implementation cases (Ducheva and Pennington 2017; Lee 2014). It has been determined that the transition period to full implementation vary from library to library, with longer transition periods appearing to engender relatively higher rates of success in RDA implementation. The transition period for the UEW library was determined to be six months, which is eighteen months short of the time spent by the Library of Congress as a transition period (Kalwara, Dale and Coleman 2017). The disparity in the length of the two transition periods speaks to the mismatch in the success of RDA implementation in the two libraries.

The study identified sourcing for funding as an activity that had to be undertaken in the preparatory period by UEW. Libraries with better financial backing have been found to succeed in RDA implementation and have achieved full implementation earlier than libraries where there were limited or no financial backing. Funding, according to the participants from UEW library, was required for acquiring computers and other logistical infrastructure, to subscribe to the RDA Toolkit, for commissioning RDA experts to provide training on and organising preparations for RDA. Given the age-old budgetary concerns of libraries, globally, and African libraries, specifically, the practice of

proactively lobbying for budgetary support in anticipation of RDA implementation sounds rational as an RDA preparatory activity.

Another activity that was undertaken by the UEW library, in their preparation towards RDA implementation, was the verification of the compatibility of their existing ILMS, Virtua to RDA. The compatibility of the ILMS, currently in use in academic libraries, appear to propel RDA implementation considerably than is the case when such compatibility does not exist, and this was also alluded to by a participant from UEW. This finding reflects the position of scholars like John-Okeke (2019) and Lee (2014), who found in their studies, deliberate attempts to audit the existing ILMS for their compatibility to RDA. According to the participants, the majority of the libraries in this study have not implemented RDA, due to the incompatibility of the prevailing ILMS to RDA. This was identified as a major reason for non-implementation.

The study also revealed acquiring computer infrastructure and ensuring stable power supply and Internet connectivity, as activities that were undertaken by UEW in its preparatory period. RDA literature indicates that computer and other logistical infrastructure, such as stable power supply and internet connectivity, generally, do not present a challenge in advanced jurisdictions and as such are not flagged in the literature. On the contrary, studies conducted by Ifijeh, Segun-Adeniran and Igbinola (2019) and John-Okeke (2019), inquiring into the prospects of RDA implementation at academic libraries in Nigeria, found the acquisition of computer and logistical infrastructure as part of the preparatory activities underway at these libraries in light of a future RDA implementation and thus corroborated by this study.

Organising staff training and capacity building programmes on RDA was also part of the activities that UEW undertook in preparation for RDA implementation. The training offered to cataloguing staff of UEW during this period were largely introductory, with instructions being provided from among the senior cataloguers, who were mainly self-taught, from online sources. This situation mimics the findings of Oguntayo and Adeleke (2016), who found that, in Nigeria, organisation of introductory training programmes at academic libraries were occasionally undertaken.

At the other end of the continuum, it was established in the study, that some other activities were rarely undertaken in the course of preparing for RDA implementation. These activities include the search for potential RDA experts, establishment of RDA governance bodies, committees and taskforces and the translation of the RDA Toolkit from English into other languages.

The study revealed that in the course of preparing for RDA implementation at UEW, issues bordering on translation were never contemplated because RDA was published in English. Thus, unlike, the instance of implementation in Portuguese, Arabic and other language speaking countries (Silva, Ferreira, and Martins 2016; Pazooki, Zeinolabedini, and Arastoopoor 2014; Luo, Zhao, and Qi 2014) where implementation of the standard was preceded by translation activities, the opposite appears to have prevailed in Ghana as well as all the libraries in countries whose official languages included English.

Another preparative activity revealed by the study, but which have seldom been undertaken in the course of preparing for RDA implementation, was the establishment of RDA governance bodies, committees or taskforces. This is an activity that has been engaged to a great effect, in most successful implementation cases globally (Ducheva and Pennington 2017, Turner 2014). In Ghana's case, however, the preparatory stage of RDA implementation was not characterised by the establishment of any governance body, in the form of either a committee or taskforce. The reluctance of libraries in most African countries to explore the establishment of RDA working groups as an RDA preparatory activity is perhaps not surprising when one considers the apparent lack of expertise and knowledge in RDA, as established in this study and the broader RDA literature (Oguntayo and Adeleke 2016; Ahonsi 2014). After a decade of the standard, expertise on the standard appears not have improved significantly with implementation of the standard still low on the continent and instruction of RDA practically non-existent in the curriculum of Ghanaian library schools.

The study reveals that, to a great extent, Ghanaian public university libraries are not ready to adopt and implement the RDA standard. This was evidenced by the low awareness drive of RDA in these libraries, the basic knowledge of RDA among

cataloguing staff and supervisors alike, the absence of current and prospective investment and allocation of resources in preparation for a future RDA implementation, the lack of training opportunities in RDA, both within the university libraries and library fraternities, and the lack of RDA expertise in the Ghanaian academic library environment. This reflects the situation in many developing countries, as reported in various studies (Monyela 2020; Ifijeh, Segun-Adeniran and Igbinola 2019; John-Okeke 2019). These studies, conducted on the African continent, found most academic libraries to be unprepared for RDA implementation.

Conclusion

The study set out to establish the extent of readiness of Ghanaian academic libraries to adopt and implement RDA as their bibliographic standard. In establishing the non-preparedness of an overwhelming majority of these libraries, the importance of planning and preparing for the implementation of the standard was confirmed. The study also revealed an extensive range of RDA preparative activities that ought to be undertaken in the period prior to full adoption and implementation of the standard although the appropriateness of such activities was found to be different and influenced by culture, language and competencies.

The transition to RDA is inevitable for Ghanaian libraries, considering the significant reliance on bibliographic records created and maintained by international bibliographic utilities. The relative weak financial position of these libraries precludes an expeditious, timely and one-time migration to the RDA standard, as evidenced by the non-implementation of the standard almost a decade since its promulgation. This imperfect condition notwithstanding, Ghanaian university libraries ought to necessarily ready themselves towards RDA implementation in an attempt to approach the subject with a fair bit of proactiveness and preparedness.

Recommendations

For libraries to ready themselves for RDA implementation, it is suggested that:

- Library management of university libraries should commence conversations regarding the RDA standard and its implementation with key stakeholders such as staff, library boards or committees and the greater university management with the potential sources of financing the implementation central to these engagements.
- The Consortium of Academic and Research Libraries in Ghana (CARLIGH), Association of Higher Education Librarians and their Deputies (AHELD) and Ghana Library Association (GLA) should collaborate with international organisations to offer RDA training to cataloguers in Ghana, as was one in 2012 in partnership with INASP.
- Library management should develop an action plan for an extended RDA preparatory period, with preparatory activities, and timelines. Library management should commence the process of verifying the compatibility of their prevailing ILS to the RDA standard.
- Library management of libraries that have yet to implement RDA should open a channel of communication with the UEW library, with the goal of collaborating with them and understudying their RDA implementation methods.

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Acknowledgement Patterns in Information Science Students' Dissertations in a Nigerian University: Are there Generational Differences?

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Abstract

This study investigated generational differences in acknowledgement patterns of Information Science students' dissertations at Nigerian's premier university in the past 30 years. Acknowledgements have become commonplace in thesis and dissertations, however, with culture shifting and individuals reflecting this in their attitude, such cultural change may likely produce generational differences in acknowledgement behaviour of different disciplines. A total of 961 Information Science dissertation acknowledgements (DAs) from 1992 to 2021 at the Wilson Olabode Aiyepeku (WOA) library were examined and categorised into two generations – 1st-Gen (1992 – 2006) and 2nd-Gen (2007 – 2021). Data analysis involved descriptives and content analysis of the DAs. Results showed no significant differences in the number of individuals acknowledged by names but a decrease in the average length of DAs in the second generation. Generational differences were observed in the number of individuals acknowledged by categories and in the acknowledgement of library/librarians. Generally, 1st-Gen DAs had the tendency to acknowledge supervisors first, while 2nd-Gen DAs generally acknowledged God first. Expressions of gratitude in the 1st-Gen were more informal than among 2nd-Gen DAs. Also, 1st-Gen DAs acknowledged gratitude for technical, clerical and access types of support than 2nd-Gen DAs while the latter acknowledged moral, financial and spiritual supports than 1st-Gen DAs. The study showed a declining tendency by the students to acknowledge library/librarians. It also revealed that students in this discipline gave less recognition to data sources, as expression of gratitude for data access dropped significantly in the second generation.

Keywords: Dissertation Acknowledgements, Generational Differences, Librarian Acknowledgement, Information Science Students, Nigeria

Introduction and Literature Review

Acknowledgements are expressions of gratitude in scholarly writing for diverse contributions of colleagues, supervisors, mentors, family members and institutions (Cronin, McKenzie, Rubio and Weaver Wozniak, 1993). Such contributions could be in form of personal, financial, academic, moral, technical and even spiritual support (Adekannbi, 2023; Burnett and Raturi, 2020). About fifty years after Mackintosh (1972) investigated patterns of acknowledgements in the Sociology discipline, acknowledgement research has not received so much attention among information professionals especially when compared to the level of attention received by citations. According to Cronin, McKenzie and Rubio (1993), this is partly due to the fact that unlike citations which are formalised acknowledgements that are based on agreed stylistic conventions, acknowledgements are personal interactions between two parties and lack the "commodity status" citations have (p. 407). Notwithstanding, Mackintosh cited in Cronin (1991, p.228) explained that "lack of interest in acknowledgements does not necessarily indicate their

complete irrelevance as rewards in science", otherwise citations should also be treated accordingly. Moreover, according to Diaz-Faes and Bordons (2017), studying acknowledgements is crucial to understanding the influences, interactions and collaborations that occur within the scientific process. It reveals hidden aspect of research and the contribution of individuals deserving recognition. In addition to their serving as rewards for informal contributions, they also provide a richer picture of the social context surrounding a scholarly work (Petrovich, 2022).

The works of Blaise Cronin on acknowledgement behaviour in the last three decades generated some interest in acknowledgement research. Cronin investigated acknowledgement behaviour in various journal disciplines including chemistry (Cronin et al., 2004), psychology and philosophy (Cronin et al., 2003), humanities and social sciences (Cronin, McKenzie and Rubio, 1993), sociology (Cronin, McKenzie, Rubio and Weaver Wozniak,1993), and Information Science (Cronin, 2001). Following the work of Cronin, many other researchers have also carried out some studies on acknowledgements and most of these have focused on journal articles (Diaz-Faes and Bordons, 2014; 2017; Giannoni, 2002; Paul-Hus and Desrochers, 2019; Rattan, 2013; Tian et al., 2021; Tiew and Sen, 2002), while acknowledgement research on theses and dissertations are just gradually getting some attention. Some of these studies have exclusively focused on the socio-cultural characteristics of the acknowledgements (Adekannbi, 2023; Burnett and Raturi, 2020; Hyland, 2003; Mantai and Dowling, 2015; Scrivener, 2009), while others included their linguistic features (Afful, 2016; Afful and Mwinlaaru, 2010; Afful and Awoonor-Aziaku, 2017; Al-Ali, 2010; Nacey, 2022; Nguyen, 2017; Tang, 2021).

It is important to note that acknowledgements are crucial in theses and dissertations as much as they are in journals articles considering the fact that the former is equally a very rigorous process involving huge investments of money, time, labour and interpersonal debt (Hyland, 2003). According to Hyland (2004, p. 304), acknowledgements enable students to "achieve a sense of closure at the end of what is often a long and demanding research process". Moreover, some studies have shown that both academics (Cronin and Overfelt, 1994) and students (Bangani et al., 2020; Hyland, 2003; 2004) consider acknowledgements as valuable. Added to this is the fact that acknowledgements have become commonplace in thesis and dissertations, thus confirming its significance to disciplinary communities (Hyland, 2003). Nevertheless, studies have shown that often times students receive no training on writing acknowledgements and resort to copying acknowledgements from previous theses and dissertations (Adekannbi, 2023; Hyland, 2004; Scrivener, 2009). Other studies have also reported that while students often acknowledge the role of supervisors, other academics, family and friends, librarians have not been given so much recognition (Bangani et al., 2020; Hubbard et al., 2018).

Cronin (1991) gave six-category typology which was later modified by Cronin, Mckenzie and Rubio (1993) has been well adopted in understanding acknowledgement behaviour in academic writing. The authors identified the following categories of support in acknowledgements: technical; moral; financial; clerical; access (documents, data, samples, materials, facilities etc); and peer interactive communication. Based on this typology, some patterns in thesis and dissertation acknowledgements have been reported across disciplines and geographical locations. For example, at the institutional level, Scrivener (2009) found that gratitude for moral support constituted 65% of acknowledgements of University of Oklahoma's History doctoral students. Hyland (2003) reported that academic (45%) and moral (30%) supports were the most featured in 240 masters and doctoral dissertation acknowledgements of five Hong Kong universities' graduate students. In Australia, Mantai and Dowling (2015) examined acknowledgements in 79 PhD theses and observed that students valued social support than academic and instrumental support.

Acknowledgement behaviour reportedly differs across disciplines and geographical contexts (Cronin, 1991; Salager-Meyer et al., 2011). According to Huber (1990), academic disciplines are not just environments organised in departments for teaching and learning, but they differ in so many ways including their patterns of communication, cultural practices and preferences. Similarly, Wotring (2007) recognised the possible association between academic disciplines and some behaviour patterns.

Much earlier, Cronin (1991) noted the need to establish the degree of stylistic consistency within disciplines. Such investigation would however not be complete without an understanding of the possible changes in acknowledgement behaviour of academic disciplines over the years. However, little is known about generational differences in acknowledgement behaviour among academic disciplines. With culture shifting and individuals reflecting this in their attitude, such cultural change is expected to produce generational differences (Twenge and Donnelly, 2016), and this may likely be reflected in acknowledgement behaviour of different disciplines.

Generational differences have often been used to explain and rationalise different activities. Generations have been approximately divided into four groups namely – the Boomers (1944 – 1960), Generation X (1961 – 1979), Millennials (1980 – 1995) and Generation Z (1995 – 2012) (Twenge and Donnelly, 2016). For example, Twenge, and Donnelly (2016) reported generational differences in reasons for going to college, with the Millennials and Generation X valuing extrinsic reasons than the Boomers. Generational differences have further been investigated in education especially about learners and their use of technology (Lai and Hong, 2015; Oh and Reeves, 2014), academic achievement (Duong et al., 2016); and about academics (Kwiek, 2015; Lee and Jung, 2018; Rodriguez, 2014). Moreover, generational differences in academic disciplines cannot be ignored. Similar to biological forms of life, evolution of academic disciplines occurs in response to changes in the environment and interactions among members of the discipline (Cohen and Lloyd, 2014), hence, O'Brien (2012) emphasised the need to account for generational differences in scientific careers. The author reported generational differences in the ways cohorts of researchers communicate their research. However, Campbell et al. (2015) noted that caution should be exercised when applying these generation groups to research investigating generational differences outside the United States of America as most research on generations were done in and applied to the United States. Moreover, Reeves and Oh (2007, p.297) opined that birth year is just one of the factors considered in distinguishing among generations. The authors noted that "most experts have argued that generations are shaped much more by history than by chronological dates".

Over the years, acknowledgement behavior in the Library and Information Science (LIS) discipline has received some focus. The notion is that within the LIS research community, there is the hidden influence of scholars, peers and other individuals whose contributions cannot be revealed through citation counts (Freeman, 1998). Cronin (1991) made the first attempt to analyse acknowledgments in Information Science literature by investigating the nature of acknowledgements in the Journal of the American Society for Information Science (JASIS) between 1970–1990. Cronin et al. (1992) also carried out a 20-year analysis of four top-ranking Library and Information Science journals namely, College and Research Libraries, Information Processing and Management, Library Quarterly and Journal of Documentation. An investigation of the aggregate data from these five journals in the two studies was carried out by Cronin (2001) and compared with data from 1991 to 1999. More studies on acknowledgement behavior in the Library and Information Science discipline (Adekannbi, 2023; Cronin and Overfelt, 1994; Davis and Cronin, 1993; Noruzi and Mohammadi, 2012; Rattan, 2013; 2014) clearly confirms that the genre has not only become entrenched in scholarly communication, but is also an evidence of a "maturing appreciation" for its significance within the academia (Cronin, 2001, p.432). According to Cronin et al. (1992, p.109), "structural, cultural, organisational, behavioural and literary differences between disciplines would have an influence on acknowledgement practice". Moreover, intellectual indebtedness as reflected in acknowledgements differ over time from one discipline to another (Salager-Meyer et al., 2011).

However, not much is known about possible changes overtime in LIS acknowledgements especially with reference to thesis and dissertations, although an earlier study investigated patterns of acknowledgements in masters' dissertations in the Information Science discipline (Adekannbi, 2023). As stated by Becher and Trowler (2001), the cultural identity of a discipline can be influenced by the professional language of such discipline and dissertations and theses are useful representations of the professional language of disciplines (Parry, 1998). Acknowledgements section reveals the social

aspect of an LIS writer beyond the other pages most readers focus on and a holistic understanding of the social aspect of an LIS writer provides a richer understanding of the characteristics of the LIS discipline. But are there any significant changes in the way LIS students express gratitude in their acknowledgements?

Objectives of Study

Specifically, this study examined generational differences in the length of acknowledgements, patterns in the categories of acknowledgees, and types of support acknowledged. It is believed that findings from this study, which is being carried out in phases will provide more valuable understanding of the characteristics of LIS students and this will be a valuable addition to LIS literature.

Methodology

This current study investigated generational differences in acknowledgement patterns of Information Science students' dissertations at Nigerian's premier university in the past 30 years. These dissertations are domiciled at the Wilson Olabode Aiyepeku library at Africa Regional Centre for Information Science (now Department of Data and Information Science), in the institution. Information Science programme started in the institution at the Africa Regional Centre for Information Science in the year 1990 after the United Nations Educational, Scientific and Cultural Organization (UNESCO), supported by International Development Research Centre considered the need to establish a Centre of Excellence in information science in the English-speaking part of West Africa. The idea was for this Centre to provide training in information science and technology at the postgraduate level for university graduates in the natural and social science disciplines, which adequately prepares them for taking up careers in relevant sectors of African economies.

The population for this study is the dissertation acknowledgements section of Information Science master's students. A total of 963 dissertations (1992 – 2021) were found at the WOA library, although two of these had no acknowledgements section and were thus not included in the study. Previous studies have also noted the prevalence of the culture of including acknowledgements section in dissertations (Hubbard et al, 2018; Mohammadi and Tabari, 2013; Scrivener, 2009). The acknowledgements section as found in the dissertations in the library were all placed in the preliminary pages before the main text. This study employed bibliometric method using both quantitative and qualitative approaches, to investigate the generational differences in the acknowledgement patterns. However, it is important to note the limitation of using the widely known generation groups (the Boomers (1944 – 1960), Generation X (1961 – 1979), Millennials (1980 – 1995), Generation Z (1995 – 2012)) in carrying out this study especially since the researcher had no access to the birth dates of the students. Hence, classifying the students into these generational groups will be on the wrong assumption that all students in each graduating class were born within the same generational group. A safe option was to understand their generational differences through the years of graduation. This study considered the fact that the minimum age range in the conventional generation groups is 15 years (Millennials -1980 – 1995), hence the 961 dissertations spanning a total of 30 years were divided into two generations of 15 years each. Dissertations submitted from 1992 to 2006 were classified as *first generation*, while those from 2007 to 2021 were classified as *second generation.* As shown in Table 1, 345 dissertations were in the first generation (1st-Gen) representing 35.9% of the total master's dissertations found in the library. The total of 616 dissertations classified in the second generation (2nd-Gen) shows that enrollment in this programme has largely increased in the last 15 years.

The 961 dissertation acknowledgements (DAs) were scanned and the following data attributes were extracted from each DA: year of publication; DA length; number of acknowledgees by names; first person to be acknowledged; gratitude to supervisors and other faculty members, librarians, friends, parents, other family members and institutions; and types of support acknowledged. Individuals whose relationships with the students were not clearly defined were placed in the category 'unclassified'. This study adapted Cronin, Mckenzie and Rubio (1993) typology for the type of support captured and included a seventh category, *spiritual support* as this was found in many of the DAs. Hence, the seven

categories of support were academic, access, clerical, financial, moral, spiritual and technical.

Data collected were subjected to both qualitative (content analysis) and quantitative (descriptives) analyses. MS-Excel and SPSS were used for the quantitative analysis. Only descriptive analyses were carried out on the quantitative data because no sampling was carried out as population data was used in the study. Useful excerpts from texts were used to complement findings from the quantitative analyses. According to Mantai and Dowling (2015), qualitative analysis adds depth to findings from quantitative analyses and can reveal themes relating to the students' personal and academic journey.

Table 1: Breakdown of dissertation generations

Generation of dissertations	Frequency	Percentage
First Generation (1st-Gen)	345	35.9
Second Generation (2nd-Gen)	616	64.1
Total	961	100.0

Results

General Description of the DAs

Length of DAs

A descriptive analysis of the 961 DAs showed that the average length of DAs in the 1st-Gen (approximately 261words) was higher than the 2nd-Gen with approximately 240 words per DA (Table 2). This shows a difference of 20.05 words between the two generations.

Table 2: Descriptives of the DAs by generation

Generation	Total	Minimum	Maximum	Mean
1st-Gen	345	22	1512	261.20
2nd-Gen	616	41	704	240.15

Number of Individuals Acknowledged by Names

The descriptives as displayed in Table 3 shows a higher average of 18 individuals acknowledged by names among the 1st-Gen students compared to 17 individuals by the 2nd-Gen students. This difference of 1 is however not considered significant.

Table 3: Number of individuals acknowledged by names

Generation	Total	Minimum	Maximum	Total No. of Individuals	Mean
1st-Gen	345	1	166	6,296	18.25
2nd-Gen	616	0	85	10,152	16.48

Generational Differences In Groups Of Individuals And Organisations Acknowledged by Names

Individuals

Figure 1 reveals a breakdown of the categories of acknowledgees by names across both generations. Almost 50% of individuals acknowledged by names in the 1st-Gen DAs were friends. This generation also had higher percentages of administrative staff, programme related and unclassified individuals acknowledged relative to the total number of acknowledgees. However, the 2nd-Gen DAs had higher percentage of academic staff and family members acknowledged by names.

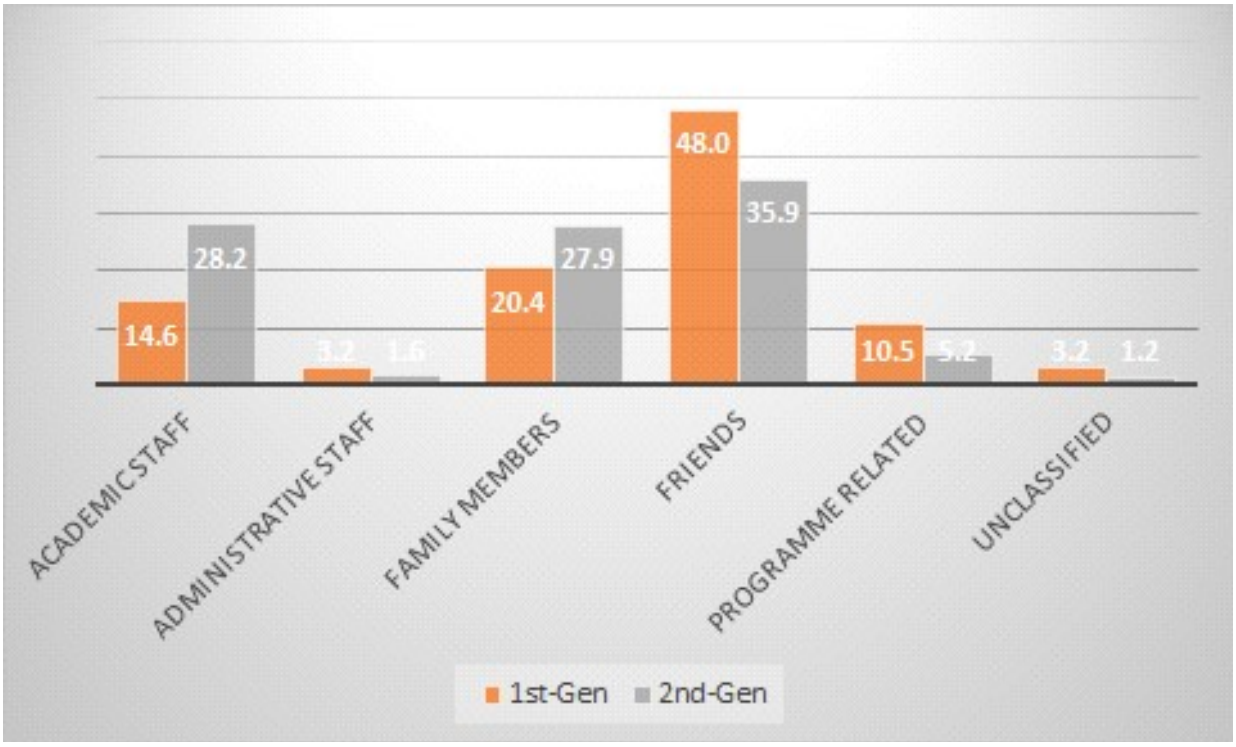

Figure 1: Categories of acknowledgees by names

Table 4 reveals the breakdown in the average number of individuals in these categories acknowledged by their names. As shown, the 1st-Gen DAs acknowledged more administrative staff, friends, programme related and unclassified individuals by names, whereas the 2nd-Gen DAs acknowledged more academics and family members by names

Table 4: Breakdown of categories

Categories	Generation	Total No. of Individuals	Mean	Std Deviation
Academic staff	1st-Gen	917	2.66	2.139
	2nd-Gen	2,860	4.64	3.254
Administrative staff	1st-Gen	204	0.59	1.530
	2nd-Gen	167	0.27	0.840
Family members	1st-Gen	1,286	3.73	4.256
	2nd-Gen	2,828	4.59	3.585
Friends	1st-Gen	3,023	8.76	13.522
	2nd-Gen	3,646	5.92	6.656
Programme related	1st-Gen	664	1.92	3.138
	2nd-Gen	528	0.86	1.973
Unclassified	1st-Gen	202	0.59	2.080
	2nd-Gen	123	0.20	1.043

Organisations

A total of 353 organisations were acknowledged in the 961 DAs and 88.4% of these were classified as directly related to the students' academic activities as these organisations were largely acknowledged for data collection, funding and few others were the students' employers. The remaining 11.6% were mostly religious organisations. As shown in Table 5, 66.0% of the organisations acknowledged and directly related to the programme were acknowledged in the 1st-Gen DAs which is quite high considering the low population of DAs in this generation. This means that although the population of 2nd-Gen DAs were quite higher, they acknowledged fewer directly related organisations.

Table 5: Acknowledgement of organisations

Category	1st-GenFrequency	2nd-GenFrequency	Total
Directly related	206 (66.0%)	106 (34.0%)	312 (100.0%)
Indirectly related	18 (43.9%)	23 (56.1%)	41 (100.0%)
Total	224	129	353

Acknowledgement of librarians

Acknowledgements to librarians were seen in only 124 of the 961 DAs, representing 12.9% of the DAs. A breakdown into generations showed that 61.3% of these were acknowledged in the 1st-Gen DAs. Of the 616 2nd-Gen DAs, only 48 contained acknowledgements to librarians. Table 6 shows the tendency for 1st-Gen DAs to acknowledge librarians than the 2nd-Gen DAs.

Table 6: Generation of dissertation * Acknowledgement of librarian Crosstabulation

			Acknowledgement of librarian		
			Yes	No	Total
Generation of dissertation	First generation dissertations	Count	76	269	345
		Expected Count	44.5	300.5	345.0
		% of Total	7.9%	28.0%	35.9%
	Second generation dissertations	Count	48	568	616
		Expected Count	79.5	536.5	616.0
		% of Total	5.0%	59.1%	64.1%
Total		Count	124	837	961
		Expected Count	124.0	837.0	961.0
		% of Total	12.9%	87.1%	100.0%

The acknowledgements were mostly made to the librarians at the Wilson Olabode Aiyepeku Library (formerly called ARCIS library), while in very few DAs, librarians in other libraries in the institution were also acknowledged. Content analysis of the 124 DAs which contained acknowledgements to librarians showed that 54.0% mentioned the librarians in a general group of administrative staff, 31.5% were special mentions without specifying any library assistance or services rendered. In this latter category, the students expressed gratitude for the librarians' 'cooperation', 'selfless assistance', 'friendliness'.

> *My gratitude goes to Mrs___ for her selfless assistance and readiness to help at all times in the library.*

> *I also appreciate the full cooperation of all ARCIS staff particularly the librarian Mrs. ____ for her friendliness*

> *Many thanks to the staff of ARCIS library _____ and _____for their cooperation and understanding during the data gathering exercise.*

In 14.5% of DAs which contained acknowledgements to library, specific library assistance rendered to students were mentioned such as reference services, access to newspapers, past students' projects and journals as shown below.

> *I sincerely appreciate the librarian at the ARCIS library _____for her untiring efforts by advising on how to get reference materials for this project.*

> *I am particularly grateful to the entire staff of IITA Library and especially Mr.__, for his kind assistance. They were all very nice. I am equally grateful to Mrs__ , Reference Librarian at the Kenneth Dike Library of the University*

of Ibadan for her helpful assistance in locating and using copies of Bibliography of Agriculture in that library.

I am appreciative of the tremendous support of the ARCIS librarian, Mrs. _____ who kept the work going by allowing me uninterrupted access to the newspapers in the library.

First Acknowledged

Crosstabulation was used to show the generational difference in the 'first acknowledged' in the DAs. Table 7 shows the tendency for 1st-Gen DAs to acknowledge their supervisors first, while 2nd-Gen DAs had the tendency to acknowledge God first. These differences are quite high when the expected counts are compared with the observed counts.

Table 7: Generation of dissertations * First Acknowledged Crosstabulation

			First Acknowledged					
			Supervisor	**Parents**	**Spouse**	**God**	**Others**	**Total**
Generation of DAs	1st-Gen	Count	128	6	1	201	9	345
		Expected Count	77.9	8.3	1.1	251.7	6.1	345.0
		% of Total	13.3%	0.6%	0.1%	20.9%	0.9%	35.9%
	2nd-Gen	Count	89	17	2	500	8	616
		Expected Count	139.1	14.7	1.9	449.3	10.9	616.0
		% of Total	9.3%	1.8%	0.2%	52.0%	0.8%	64.1%
Total		Count	217	23	3	701	17	961
		Expected Count	217.0	23.0	3.0	701.0	17.0	961.0
		% of Total	22.6%	2.4%	0.3%	72.9%	1.8%	100.0%

Moreover, content analysis of the DAs shows a striking contrast in the formality of expressions used in acknowledgements to supervisors. Among the 1st-Gen DAs, quite a number of DAs contained expressions that were informal. The use of words such as "brother" and "friend" was observed among some of the 1st-Gen DAs as shown below:

I am also deeply grateful to my supervisor Dr.__ who apart from being my supervisor, is a friend and a big brother. I thank him very much for his "Anyway, and Pam Pam Pam".

I am grateful to my supervisor, Dr__. …. Sir, I will miss your "ok", "anyway" and your usual "uh" during lecture periods.

I would like to thank and acknowledge my supervisor and friend, Dr____. ... Gratitude also goes to my second supervisor, Mr. ___. He got me into this "mess".

In contrast, expressions of gratitude used in most 2nd-Gen DAs were more formal and it was common to see supervisors referred to as fathers, mothers among the 2nd-Gen DAs.

My profound gratitude goes to my supervisor, Prof__ whose academic inputs and impact helped in restructuring the objectives and content of this study.

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My sincere appreciation goes to my highly respected supervisor, Professor_____ for his relentless support and guidance. Your contribution and constructive criticism have pushed me to expend such efforts I have exerted to make this work as original as it can be.

I wish to express my heartfelt appreciation to my able supervisor, Dr._____ for his fatherly role, conscientious attention, professional and thorough supervision all through my research.

Types of Support Acknowledged

Figure 2 presents the generational distribution of types of support acknowledged in the DAs. Moral support was the highest in both generations with the percentage in 2nd-Gen DAs being slightly higher. In both generations, family members and friends were mostly thanked for moral support. Acknowledgements for financial support was higher among the 2nd-Gen DAs (19.7%) compared with 1st-Gen DAs that had 16.0%. However, content analysis of the DAs showed a difference in the acknowledgees that received this gratitude. Among the 1st-Gen DAs, acknowledgees of financial support included both family members and funding organisations, especially International Development Research Center (IDRC) as shown in some expressions below:

My profound gratitude goes to Professor____ , who nominated me for Canada's International Development Research Center (IDRC) Scholarship which has enabled me to go through this programme. I cannot but be grateful to my mother, Mrs___ for her love, care, financial and spiritual support throughout my stay at ARCIS.

I am grateful to the International Development Research Center that provided the funding through the IDRC Bursary award that enabled me undertake the Masters programme in Information Science. This study is a direct result of this Bursary……I am also sincerely grateful to Mr___ for providing funds for mailing the completed questionnaires to me in Ibadan.

However, among 2nd-Gen DAs, most acknowledgees of financial support were parents and other family members. It appeared that funding by IDRC had been discontinued during this period as there was not a single reference to IDRC scholarship in the DAs.

Gratitude for spiritual support was higher among 2nd-Gen DAs (19.7%), although it should be noted that in both generations, this gratitude was mostly given to parents and family members, while in few cases religious affiliations. Gratitude for access to data, technical and clerical supports were the lowest in both generations, although a far less recognition for these categories was observed among 2nd-Gen DAs. Some expressions showing gratitude for these types of support are shown below:

Worthy of mention is Mr__ for teaching me programming and rendering help where and when necessary despite his tight schedule.

My sincere appreciation goes to the Management and Staff of _____ for allowing me to use the facilities of this great institution for this study.

I appreciate the members of Nigerian Union of Teachers, _____ State for their support during the interview sessions and assistance given towards the completion of this project.

My profound gratitude goes to my darling husband _____ who patiently proofread my work; words cannot express his manner of person, his love and moral support.

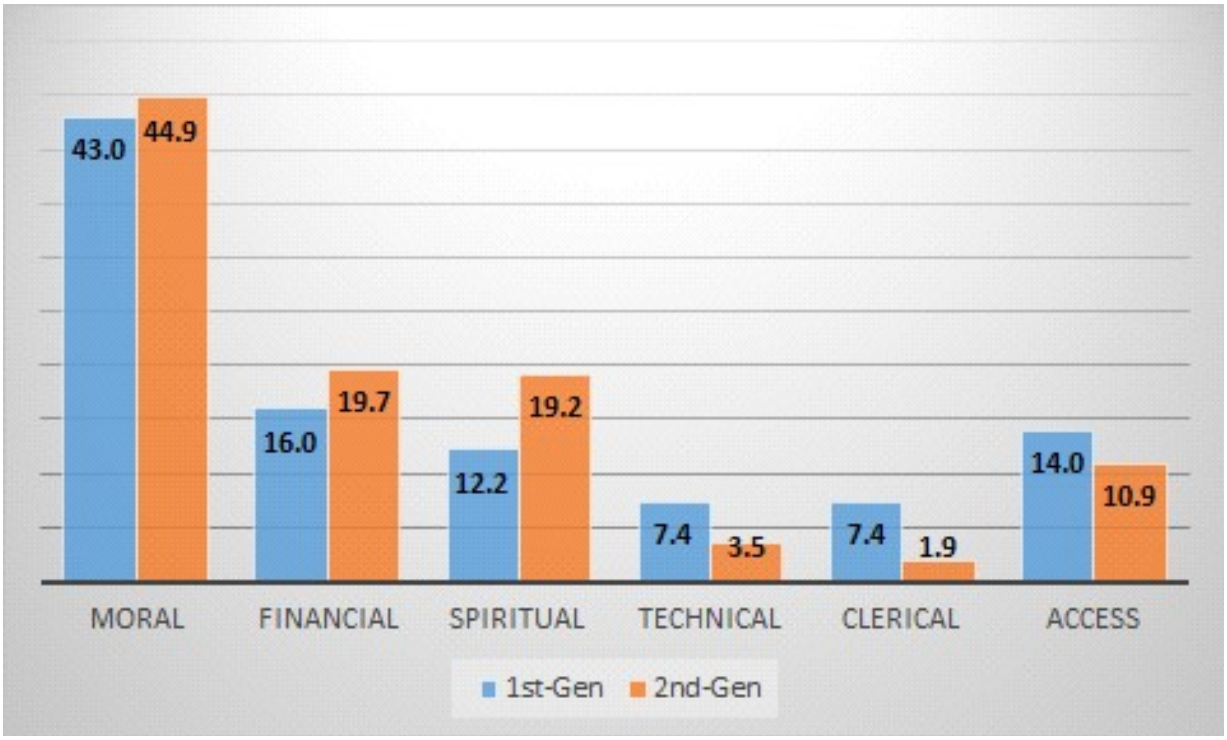

Figure 2: Generational distribution of types of support acknowledged

Discussion of Findings

A total of 961 DAs written over a period of 30 years by Information Science students at University of Ibadan, Nigeria's premier university, was investigated in order to examine generational differences in their acknowledgement behaviour with respect to the length of DAs, categories and number of persons acknowledged, first to be acknowledged, acknowledgement of librarians and types of support acknowledged. The DAs were categorised into two generations: 1st-Gen (1992 to 2006) and 2nd-Gen (2007 to 2021). The study found no significant generational difference in the number of individuals acknowledged by names, but the difference in the average length of DAs was over 20 words as the 1st-Gen DAs contained longer texts. However, a breakdown of acknowledgees by categories showed statistically significant generational differences in the average number of individuals acknowledged. The 1st-Gen DAs acknowledged more friends, administrative staff, programme related and unclassified individuals by names, whereas the 2nd-Gen DAs acknowledged more academics and family members by names. A striking limitation of this study is the dearth of existing studies for comparison due to the study's novelty. However, this current study which found a decrease in the average number of words in the DAs seem to contradict an earlier study by Lou et al. (2019) which examined 2,328 academic papers of 53 Chinese Information Scientists in order to understand the generational differences in their academic writing pattern. Among other findings, the study showed that the number of words used have increased generation after generation. It should however be noted that the study used scientists born between 1930s and 1980s and this may likely have contributed to the contradiction found between Lou et al. (2019) and this current study which must have included students born much later. Added to this is the fact that while the current study examined dissertation acknowledgements, Lou et al. (2019) findings were based on academic articles written by the information scientists, which can thus explain the contradiction in research findings.

A significant difference was observed in the 'first acknowledged' in the DAs. The tendency to acknowledge supervisors first was observed more among the 1st-Gen DAs, compared to the 2nd-Gen

DAs which showed the tendency to acknowledge God first. Moreover, some differences in the formality of expressions used in acknowledgements to supervisors was also noted. While some casualness was observed in expressions used to eulogise supervisors by some 1st-Gen DAs, most acknowledgements made to supervisors in 2nd-Gen DAs were largely formal in their expressions. This observation on the face value could suggest that the students in the 1st-Gen had a freer and more relaxed relationship with their supervisors compared to students in the 2nd-Gen. However, another likely explanation is that most students in the 2nd-Gen extended the general formality involved in writing a dissertation to writing the acknowledgements section. Content analysis showed that this formality was not only peculiar to the gratitude expressed to supervisors but observed generally in most paragraphs in the DAs. Similar to this finding, Lou et al. (2019) also noted a change in writing patterns of academic papers across generations of Chinese Information Scientists. The authors reported an increasing tendency for Information scientists to adopt a more standardised pattern of writing and be more careful in their choice of expressions.

A major finding in this study is the association between generation of DAs and acknowledgement of librarians. Although the 1st-Gen DAs were only about 36% of the total DAs, it was interesting to note that over 60% of acknowledgements to library/librarian were made by 1st-Gen DAs. The implication of this is that the acknowledgement of librarians by students in this discipline appear to be decreasing as the years pass by. Although no known study has investigated generational differences in acknowledgement of librarians, few such as Hubbard et al. (2018) and Bangani et al. (2020) have recently analysed acknowledgements of librarians in theses and dissertations and reported low acknowledgements of libraries and librarians in these publications. Arriving at a reason for this declining recognition accorded librarians by students in the population of the current study appears herculean. On the one hand, it might be plausible to conclude that the increasing reliance on electronic resources which most students have access to online without the mediation of any library staff might be responsible for the declining recognition given to librarians. It thus appears that libraries are used more as locations for reading and less for access to academic resources. Perhaps it can also be reasoned that LIS students do not usually require library assistance as they might be more independent in using library resources as compared to students from other disciplines. On the other hand, the extremely low acknowledgements to library/librarians generally observed among 2nd-Gen DAs might reveal the need for librarians in the 21st century to continue to work towards sustaining their relevance in academic activities. More than a decade ago, Melchionda (2007) expressed that the explosion of the Internet posed a threat to the role of academic librarians as many library patrons had access to digital resources from their homes and not exclusively at the libraries. This trend keeps increasing as the information explosion, evolution of various information technologies and social media have created a new generation of library users who require information and other services beyond what exists in the traditional book and shelf libraries. Hence, librarians also need to keep improving in their professional skills in order to meet the needs of this new community of library users and sustain their relevance. Noteworthy, Mwaniki (2017) emphasised the need to improve the quality of teaching in library and information science programs in line with the continuous technological changes in the world as there will continue to be new competencies needed to meet the growing needs of this generation of library users today and in the future. However, the reality with most libraries at public universities in Nigeria at the moment is that lack of funds and infrastructural enablers specifically, power supply and Internet facilities have reduced the functions of academic libraries to simply buildings that store books and journals which are often times outdated. Many librarians are thus limited in fully carrying out their roles which with the evolution of new technologies include offering more interactive user services in addition to enabling access to electronic information resources.

For types of support acknowledged, statistically significant generational differences were observed. Moral, financial and spiritual supports were the most recognised with the 2nd-Gen DAs expressing them more than the 1st-Gen DAs. In both generations, recognition for moral support was given largely to family members and friends. Burnett and Raturi (2020) reported similar findings from analysis of

acknowledgement sections of postgraduate Education students of the University of the South Pacific. The authors reported that most acknowledgements contained extensive network of family and friends being thanked for moral support than academics. Access to data, technical and clerical supports were the least recognised in both generations, but more gratitude for these support types was observed among 1st-Gen DAs. This is quite worrisome considering the fact that the dissertation topics showed that most of the dissertations were written based on data collected from individuals, communities and organisations at different levels. This result suggests a decline in students' recognition of the role of providers of research data and contrasts findings from a previous related study. For example, Hyland (2004) examined the 240 acknowledgement sections of five Hong Kong universities graduate students' dissertations in six disciplines. The four support types investigated were access to data, financial, technical and clerical supports. Findings showed that gratitude for access to data constituted more than 50% of the gratitude expressed for all the support types. This is quite understandable as the obvious truth is that without the cooperation of those studied or those who provided data for the study, the dissertation writing could not have been successful. Acknowledgement of data sources should not be limited to scholarly works cited in the dissertation. The acknowledgements section provides avenue for recognition of individuals, communities, institutions and organisations who provided data for the dissertation. Findings from the current study however tends to show the increasing tendency for students to distance themselves from sources of data collection. Hence, this might portray the students in both generations and more in the second generation as individuals who see mainly themselves, the faculty members as well as family and friends playing the most important roles in the successful completion of their dissertations and academic programme.

Conclusion

This study examined a total of 961 DAs of Information Science graduates of Africa Regional Centre for Information Science, University of Ibadan. Findings from quantitative analyses showed no significant generational differences in number of individuals acknowledged by names but a decrease in the average length of DAs in the second generation. They however showed that 1st-Gen DAs acknowledged more friends, administrative staff, programme related and unclassified individuals by names, whereas the 2nd-Gen DAs acknowledged more academics and family members by names. The tendency to acknowledge supervisors first was also observed more among the 1st-Gen DAs, while 2nd-Gen DAs showed the tendency to acknowledge God first. This study also reported on the tendency for 2nd-Gen DAs to be more formal in their expressions of gratitude. Two major findings from this study are to a large extent disturbing. The first one is the decreasing recognition of library/librarians. Findings from this study suggest that students are somewhat disconnected from the library during their programme and this appeared to have worsened in the second generation. It is not clear whether this is a reflection of the level of impact of librarians on the students' academic activities during their programme or a reflection of lack of gratitude on the part of the students. However, as discussed in the previous section, it might be that LIS students do not usually require library assistance and might be more independent in using library resources compared to students from other disciplines. Notwithstanding, this is an aspect that requires further investigation in order to provide a better understanding of the impact of library/librarians on graduate students of Information Science discipline. Secondly, it was worrisome to observe a decreasing tendency to acknowledge data sources in DAs as acknowledgements given for access to data dropped from 14% in the first generation to about 11% in the second generation despite most of the dissertations being outcome of research conducted on various individuals, communities, institutions and organisations. Granted, the acknowledgement section is generally personal to the students and not usually reviewed by dissertation committee, however, it is important that students be helped to appreciate the importance of recognising data sources. Such recognition should not be limited to cited scholarly studies but should include sources of data collected through questionnaire, interviews, focus group discussions and other data that have led to the successful writing of the dissertation. Moreover, the Centre's manual of

style can be revised to address this aspect as acknowledgement of data sources should be a norm in scholarly writing. This study suggests further studies comparing acknowledgement patterns in Information Science dissertations at institutional, regional and international levels. This could drive a more holistic description of acknowledgement behaviour in the Information Science discipline.

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Correlational Impact of Personal Factors on Library Use among Undergraduates in Nigerian Universities

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Abstract

Personal factors explicate the reason undergraduates behave differently when they are apparently undergoing the same experiences which has correlate impact on the use of their university libraries. This study therefore investigated the correlational impact of personal factors (age, gender, academic discipline, type of secondary school attended, level of study, previous library experiences and level of awareness) on library use by the undergraduates. Descriptive survey of the correlational type was adopted. Multistage sampling procedures through purposive sampling method were used to select five conventional federal universities and three homogenous faculties. Two departments common to the faculties were also purposively selected, while five percent of 200 to 400 level undergraduates (797) were selected from a total population of 116, 213. Instruments used were Personal factors (previous library skills (r=0.85) awareness of library resources and services (r=0.93).Data were analysed using descriptive statistics, Pearson's product moment correlation and Multiple regression at 0.05 level of significance. All Personal factors showed positive significant relationships with library use except gender and level of study (academic discipline r=.08, type of secondary school attended r=.09, previous library skills r=.33, level of awareness of library resources and services r=.24, gender r=-.01 and level of study r=-.06). The result indicates that Age (â = .014, p>.05), gender (â = .012, p>.05), academic discipline (â = .045, p>.05) and level of study (â = .022, p>.05) had no significant relative contribution while type of secondary school attended (â = .068, p<.05), previous library experience (â = .198, p<.05) and level of awareness (â = .213, p<.05) had significant relative contribution. Personal factors determined library use by the undergraduates in federal universities in the North-central, Nigeria. Therefore, the stakeholders in the university library should create awareness about the importance of library through current awareness programmes in order to increase library use.

Keywords: Personal factors, Correlational Impact, Library Use among Undergraduates, Undergraduates in Nigerian Universities

Introduction

Personal factors are characteristic of undergraduates which may influence their use of the university libraries. Researchers have identified various

characteristics which could contribute to the personal factors of undergraduates that could possibly affect the use of their university libraries. These factors consist of age, gender, type of secondary school attended, level of study, academic discipline, level of awareness of library resources and services, inadequate knowledge and skills of library resources. Mason (2010) explained that undergraduates are admitted for different courses as a result their information needs, personal goals, expectations and interest differs. Nonetheless, one trait that will be shared by them is the necessity to use their respective university library for different academic activities such as; project writing, access to reserve readings, completing class assignments, seminar presentations and writing research papers.

Personal factors explain the reason different people conduct themselves differently even when seemingly in the same condition, having similar experiences. Personal factors are characteristics that are inherent in and peculiar to undergraduates and these may influence their use of the university libraries. These personal factors are multifaceted and are not limited to a single variable or discrete entity. The personal factors that may contribute to the undergraduates' level of use of their university library are type of secondary school attended, discipline, gender, age, level of study, previous library experience and level of awareness of library resources and services among many others. Omehia; Obi and Okon (2008) opined that undergraduates' characteristics which are also personal factors have effects on their usage of library materials and services. Age, academic disciplines and level of study are significant determinants of library use by undergraduates.

Daramola (2013) explained that gender difference has been a major phenomenon, which has been the centre of heated public discussion in all areas of life, ranging from political to good governance, health, social, education, religion and economics. In the area of education, gender difference has been documented in relations to teaching practice, skills acquisition, professional developments, classroom interaction and information literacy behaviour among others. Regardless of the range of research on gender matters, substantial transformation in relations to gender equivalence and accessibility to resources is still very inadequate. Research findings in Nigerian university libraries on gender differences in library use are still not many. In the same vein, Moser (2011), described gender as a socially created relationship between male and female and should be dominant in development programmes. Although male and female students are both trained in the same schools nevertheless their experiences differ greatly.

Ajayi and Ogunyemi (2011) stated that as level of study of undergraduates increase, library use increases. Library use by undergraduates increase at every successive year and there is a substantial association between academic level of students and library information resources usage. Substantial variances exist in the degree to which information materials were consulted by undergraduates at different academic levels. Library resources use increased as they move higher in their level of studies, the undergraduates at upper years spent more time in the library compared to their counterparts at lower levels of study (Agboola and Bamigboye, 2011). Undergraduates in higher level of studies tend to utilise the library materials more than those at the lower levels. This could be ascribed to the point that the higher level undergraduates have more academic responsibility and also the years of experience in the university have exposed them to the importance of library use to their academic success (Omehia; Obi and Okon 2008).

Academic disciplines of undergraduates have significant influence on the use of library materials and services. According to Omehia et al, (2008), undergraduates in the Humanities and Social Sciences are regular library users; conversely, undergraduates in the department of Arts recorded a higher frequency of library use compare to their counterparts in the departments of Sciences. Academic disciplines of the undergraduates have been found to influence their utilisation of library materials and services. Bridges (2008) reported that engineering students at the undergraduates' level were almost certainly not using resources at the virtual library compared to undergraduates in the College of Liberal Arts. O'Brien and Symons (2005) reported that science undergraduates were least expected to use the academic library's databases compared to social sciences and humanities undergraduates. However, undergraduates in the humanities department used books more than

undergraduates in other disciplines. In contrast, science undergraduates are less likely than humanities, social sciences, and professional studies undergraduates to consult with an academic reference librarian.

Many secondary or high school leavers gained admission into universities annually. There are variances in their library experiences which depend on the location and the type of secondary school they attended, the magnitude and status of the institution, their passion and intelligent quotients levels. The level of preparedness and readiness by most of the undergraduates gaining admission into the university is inadequate for the rigorous academic work. This may stem largely from lack of experience with complex academic libraries, such as university libraries and cannot comprehend how university library works and do not possess the essential skills required for a meaningful research (Mason, 2010).

Researches have revealed that the previous library experience of most undergraduates is that they are technology savvy. They have strong preferences for information on the Internet and books from their individual library instead of patronising their university libraries. Many of the undergraduates lack awareness of electronic resources before gaining admission to the university where they learnt about electronic resources and begin to use them for their academic tasks. Many undergraduates can benefit immensely from different programmes and training made available by their university library to acquire skills on the usage of library resources and services. It was however noted that the students who attended secondary schools that have school library, who have been trained, could access and use information resources effectively (Cribb and Holt, 2012). Most of these undergraduates are technology savvy as they believed that information from the Internet could meet their information needs. They invariably transfer the erroneous belief to their academic activities in the universities which have negative influence on the usage of their university libraries.

Awareness level of library materials and services is another personal factor that impacts library usage by undergraduates. Undergraduates have affirmed that they need more awareness of resources and services available in their university libraries.

Undergraduates are also unaware of academic reference librarians' educational backgrounds and expertise and how they can directly assist them (Asher; Duke and Green, 2010). Undergraduates lack awareness of the university library's online databases and other online information sources. Consequently, this makes them pay for access to online journal articles that are freely available to them via their university library (Vondracek, 2007). When undergraduates are acquainted with the available library materials and services, they may be encouraged to use them. Subsequently, once they know the benefits of the library, this would allow them to have a good perception, thus further increasing the tendency of future usage of library materials and services (Teoh and Tan, 2011).

Statement of the Problem

University libraries are established to support teaching, learning, research and also to meet their institutions' missions and goals. Thus, the stakeholders in the universities libraries expended a lot of funds on library resources and services. The stakeholders aimed to increase knowledge base and improve on national development through the contributory efforts of university libraries in meeting the information needs of the university communities. The investment could be justified, if the level of library use is increased. Nevertheless, literature and observation have indicated that there is underutilisation of library resources and services in most university libraries in Nigeria.

Despite all the advantages associated with the use of university libraries, studies have shown that their use by undergraduates in Nigeria is not as high as expected. The reasons for the underutilisation of library resources and services may not be unconnected with personal factors of undergraduates. Nevertheless, if the likely impediment to library use like personal factors is removed or brought to the barest minimum, there may be an increase in library patronage. Against this background, this study examined the correlational impact of personal factors on library use among undergraduates in Nigerian universities in North-central, Nigeria.

Research Questions

The study sought answers to the following research questions:

1. What are the personal factors of the undergraduates in federal universities in North-central, Nigeria?
2. What is the correctional impact of personal factors on library use among undergraduates in North-central, Nigeria?

Hypothesis

1. There is no significant relationship between personal factors and library use among undergraduates in North-central, Nigeria
2. There is no significant relative contribution of personal factors to library use by undergraduates in North-central, Nigeria

Literature Review

Stone and Collins (2013) did a research at the University of Huddersfield to find out if demographic characteristics such as age, gender, ethnicity and country of origin have an influence on library use by the undergraduates; the findings revealed that there is a relationship between demographic characteristics and library use. The library use by mature students is higher than their colleagues who are not mature and there is a minute but significant difference in their use of library. Specifically, e-resources were highly used outside the school premises and low usage of the campus-based library while country of residence is more essential than ethnicity in its relationship with library use. There is a major difference which is very significant in the synergy between the results of students who are of Chinese ethnicity and students who reside in China. There is useful evidence revealed by the study that affirmed that there is a relationship between demographic variables and numerous dimensions of library use among the respondents. Most of the times, the influence of the demographic variables is insignificant, but it may however show some level of significant on library usage by the students.

Back home in Nigeria, Daramola (2013) investigates gender differences in the usage of academic resources at the Federal University of Technology Akure University Library, Nigeria. Results from the research showed differences in gender, age, marital status, internet access, and use of advisory services in the library. The results showed that married women used the library resources less than their male counterparts even though they fall within the same age cohorts. Likewise, young and mature males used internet facilities, electronic books and reference sources more than females. There was evidence from the findings that there is no significant difference in the use of textbooks and library loans by both males and females. In contrast, most females used advisory services compared to their male counterparts. Fiction and nonfiction magazines were utilised more by females than males. The researcher recommended that females be conversant with internet facilities to move with the recent ICT wave to bridge the gap between males' and females' differences in using information resources.

Tella and Mutula (2008) researched gender differences in computer literacy among undergraduates and its effect on library use at the University of Botswana, South Africa and opined that students with advanced computer skills were more disposed to access and make use of library facilities. They further reported differences in computer literacy of female and male undergraduates at the University of Botswana. Similarly, Steinerova and Susol (2007) investigated the information behaviour of students and lecturers in sixteen academic libraries in Slovakia. The findings revealed that men preferred to use the Internet as the primary source of information. Men also emphasised free electronic resources more than women, who regularly use licensed resources. Likewise, Manda and Mulkangara (2007) also reported a relationship between gender and the use of e-resources in a study done at the University of Dares, Salaam, Tanzania, and that male postgraduate students tend to use e-resources more than their female counterparts. The findings further revealed that although there was control in the students' attitude towards using and training e-resources, the association between gender and e-resources was upheld.

Bassi and Camble (2011) investigated gender differences in the use of electronic resources in university libraries in Adamawa state Nigeria revealed that the purpose of use of electronic resources differ between male and female students. The most common purposes of use are for research, assignments, and writing of project/thesis/dissertation while every user requires specific resources to meet

his or her information needs. The study also revealed that search skills were majorly acquired by students of both gender through friends, classmates and library instructions. This could be the reason why gender could not be a factor that determines the way students acquire search skills, since students relate and share their experiences with friends and classmates. However, the findings indicated that there is difference in the attitudes of students towards the use of electronics resources between both genders, the female students do not use e-resources as much as their male counterparts.

Emiri (2015) conducted research on the effect of demographic factors on the use of online public access catalogue (OPAC) by undergraduates in two universities in Southern Nigeria. The findings revealed that there are more female users of the OPAC compared to their male colleagues. Undergraduates who have advanced in their level of study (300-400 level) could use OPAC more than others who are at the lower level of study, this could be because these higher level students are more conversant with OPAC and have used more years in the university. There are no significant differences in the effect of demographic factors such as age, gender and study level in the OPAC usage in the two universities. Sivathaasan (2013) also surveyed to ascertain if there is any significant variance between the personal factors of undergraduates and the use of library facilities in the main library of the University of Jaffina, Sri Lanka. The results indicated that personal factors such as gender and year of study have a negative relationship with the use of library facilities. On the contrary, subject discipline is positively associated. The results showed that there is no significant difference between gender, level of study and subject specialisation in the use of library facilities. The statistics showed no significant variance between the perception of male and female students involving the library facilities available at the main university library; however, the male respondents used the library facilities more than their female counterparts. There is no significant variation in the use of library facilities between 200-level and 300-level students. The results showed no significant difference between students' subject disciplines (finance, accounting, marketing and human resources management) and the use of library facilities. Averagely, students studying human resources management affirmed that they enjoyed library facilities more than those studying other disciplines.

Quadri (2013) examined the effect of demographic factors on the use of online library resources by undergraduates in two private universities in south west, Nigeria. The findings indicated that there is a significant correlation between the undergraduate level of study in both universities and the usage of online library resources. The relationship between the gender of the undergraduates in Babcock and Redeemer universities and the use of online library resources was very weak. The result on the age of the undergraduates in both universities and the use of online library resources indicated a highly significant level of correlation. However, there was a feeble relationship between the religious conviction of the undergraduates in both universities and the usage of online library resources.

Fati and Adetimirin (2015) studied OPAC awareness as a factor influencing OPAC use by undergraduates in two federal universities in South-West Nigeria. The results indicated that most of the undergraduates had a high level of OPAC awareness. It was also established that despite the fact that the respondents had a high level of OPAC awareness, the use of the OPAC by the students is very low as the preponderance of the respondents did not use the library OPAC at all. The study's result further showed a significant modest positive correlation between undergraduates' OPAC awareness and their usage of OPAC.

Anyaoku (2015) carried out a survey to evaluate undergraduates' awareness and use of medical library resources in the College of Health Sciences, Nnamdi Azikiwe University, Nigeria. The findings indicated that majority of the respondents affirmed that the main purpose of the library is in the provision of information and research resources. This can be regarded as good and positive perception from the students for the reason that they described the Medical Library's main functions correctly. There is high awareness of print resources compare to other information resources in the library while a high percentage of the respondents affirmed that they are aware of the availability of books in the library. Similarly, a high number of the respondents were also aware of the availability of journals, newspapers and

encyclopedia in the Medical Library. However, there is generally poor awareness of the availability of electronic resources in the Medical Library with about 60% of the respondents affirming that they are not aware or sure that electronic resources exist in the Library.

Alade, Iyoro and Amusa (2014) investigated the library usage characteristics of undergraduates in a Nigerian university and established that prior knowledge and skill in the use of library at school or college level have positive influence on undergraduate library use. The respondents' school library use has fairly significant effect on the respondents' use of academic library in their institution. One hundred and seventy three respondents (52%) confirmed this. However, 121 respondents (37%) reported that school library uses have influence on their use of library, and 38 respondents (11%) indicated it has any influence. The findings further revealed that another factor that could positively influence use of university library by undergraduates is library instruction or user education programme. They concluded their study by affirming that school library use experience and library instruction programmes positively influence library use of the undergraduates which implies that these two factors were positively disposed to in the study. Bridges (2008) also examined the relationship between undergraduates' academic disciplines and library use. The findings of this research offered insights about the comparisons of undergraduates by academic disciplines and their library use. The findings indicated that even though engineering students did not show any difference from their counterparts in other departments in their use of the physical library, they were probably likely to make use of the online library resources less when likened to other students from the department of liberal arts. The findings revealed that engineering students do not receive as many assignments that require virtual library use of journals and databases when compared with liberal arts students, who are often engaged in extensive researching and subsequent writing of papers. The study also revealed that comparing students of agricultural science department with their counterparts in science, health and human science, and liberal arts are probably less likely to use the physical library.

Methodology

The study adopted the descriptive survey of the correlational type. The population of the study consists of all the undergraduates in all the federal universities in North-central, Nigeria. (Table 1). The primary sampling units are all the seven federal universities in the North-Central geo-political zone in Nigeria. Multistage sampling technique was adopted for this study. Four stages were involved. First stage was to purposively select the five conventional universities in the zone, namely: University of Jos, University of Abuja, University of Ilorin, Federal University, Lafia and Federal University, Lokoja. Conventional universities were selected to enable the researcher to select homogenous faculties and departments. Purposive sampling technique enables researchers to use their research experiences, preference or verdict in selecting the sample they think could represent the population. (Welman, Kruger and Mitchell, 2005).

The second stage was to select homogenous faculties in all the five conventional federal universities in the zone. Purposive sampling method was adopted to select three homogenous faculties from the five federal universities namely; Science, Humanities/Art and Social Science. Thus, making a total number of three faculties. (Table 2). The third stage was to select two departments from each of the three faculties using purposive sampling techniques. The departments are; Chemistry and Microbiology from Faculty of Science, English and History from Faculty of Humanities/Art, Political Science and Economics from Faculty of Social Science respectively. Thus, making a total number of six departments selected purposively.

The second stage was to select homogenous faculties in all the five conventional federal universities in the North-Central, Nigeria. (Table 1.). Random sampling method was adopted to select three homogenous faculties from the federal universities namely; Science, Humanities/Art and Social Science. Thus, making a total number of three faculties. The third stage was to select two departments from each of the three faculties using random sampling method. The fourth stage which is the final stage was the selection of five percentage (5%) of the total estimated population of the

undergraduates from each department in the faculties selected.

Therefore, the sample size is seven hundred and ninety-seven (797).

The questionnaire was collated, coded and analysed. The Statistical Packaged for Social Sciences (SPSS) was used for the data analysis. Descriptive statistics such as percentage mean and standard deviation were used to analyse research questions. Hypotheses were tested using inferential statistics like correlational analysis and multiple regression analysis.

Table 1: Population of the study

S/N	University	Acronym	Year of Estb.	Type	No of Under-graduates
1	University of Ilorin, Ilorin	UNILORIN	1975	Conventional	20,084
2	University of Jos, Plateau	UNIJOS	1975	Conventional	18,733
3	Federal University of Technology, Minna, Niger	FUTM	1983	Specialised	13,000
4	Federal University of Agriculture Makurdi, Benue	FUAM	1988	Specialised	13,137
5	University of Abuja, Abuja	UNIABUJA	I988	Conventional	40,000
6	Federal University, Lafia, Nasarawa	FULAFIA	2011	Conventional	7409
7	Federal University, Lokoja, Kogi	FULOKOJA	2011	Conventional	3450
	TOTAL				**116,213**

Source: Universities websites

Table 2: Sample size

S/N	University	No. of Under-graduates	Science		Social Sciences		Humanities /Art		Total	Sample size 5%
			Chemi-stry	Micro-biology	Political Science	Econo-mics	English	History		
1	UNILORIN	20,084	624	650	652	758	843	651	4178	208
2	UNI JOS	18,733	316	470	582	702	750	250	3070	154
3	UNIABUJA	49,436	811	871	1,127	1,027	1,092	1,072	6000	300
4	FULAFIA	7409	200	256	345	278	286	120	1485	75
5	FULOKOJA	3450	152	202	266	214	202	164	1,200	60
	TOTAL	**116,213**							**15,933**	**797**

Source: University Websites, Academic Planning Units

Data Analysis and Interpretation

Research questions 1 and 2: What are the personal factors of the undergraduates and their correctional impact of personal factors on library use among undergraduates in federal Universities in North-central, Nigeria?

The result of the personal factors of the undergraduates is presented in Tables 3, 4, 5 and 6 respectively. In order to ascertain the personal factors of undergraduates, the respondents were asked to indicate the name of institution attended, faculty, academic discipline, level, type of secondary school attended, age and gender. The personal factors of the respondents are also expanded in the study to include previous library experience/skills and level of awareness of library resources and services. Table 8 presents the results on faculty, academic discipline, level of study, gender, type of secondary school attended and age.

Table 3: Personal factors of undergraduates in federal universities in North-central, Nigeria

Personal factors	Indicators	UNIJOS		UNILORIN		FULOKOJA		FULAFIA		UNIABUJA	
		F	%	F	%	F	%	F	%	F	%
Faculty	Science	57	42.5	80	40.8	22	39.3	29	39.2	91	34.3
	Social Science	35	26.1	59	30.1	19	33.9	26	35.1	72	27.2
	Arts	42	31.3	57	29.1	15	26.8	19	25.7	102	38.5
Academic Discipline	Microbiology	25	18.7	29	14.8	16	28.6	8	10.8	66	24.9
	Economics	19	14.2	33	16.8	8	14.3	13	17.6	23	8.7
	History and Intl Stud.	25	18.7	30	15.3	1	1.8	13	17.6	15	5.7
	English	24	17.9	42	21.4	12	21.4	11	14.9	62	23.4
	Pol. Science	22	16.4	31	15.8	112	21.4	15	20.3	35	13.2
	Chemistry	19	14.2	31	15.8	7	12.5	14	18.9	64	24.2
Level of study	200 level	44	32.8	61	31.1	44	78.6	23	31.1	68	25.7
	300 level	44	32.8	66	33.7	5	8.9	30	40.5	105	39.6
	400 level	46	34.3	69	35.2	7	12.5	21	28.4	92	34.7
Gender	Male	69	51.5	90	45.9	31	55.4	34	45.9	144	54.3
	Female	65	48.5	106	54.1	25	44.6	40	54.1	121	45.7
Type of Secondary School attended	Private	93	69.4	101	51.5	19	33.9	38	51.4	112	42.3
	Public	41	30.6	95	48.5	37	66.1	36	48.6	153	57.7
Age	15-20 years	33	24.6	91	46.4	21	37.5	7	9.5	23	8.7
	21-25 years	77	57.5	83	42.3	29	51.8	44	59.5	147	55.5
	26-30 years	24	17.9	22	11.2	6	10.7	23	31.1	95	35.8

University of Abuja had the highest number of respondents with 102 (38.5%) from Faculty of Arts while Faculty of Social Sciences had the lowest with 72 (27.2%). University of Ilorin, University of Jos, Federal university of Lokoja and Lafia had their highest number of respondents from Faculty of Science and had their lowest from Faculty of Arts except for University of Jos where Faculty of Social Sciences was the lowest.

University of Jos and University of Ilorin had their highest number of students from 400 levels, and their lowest from 200 levels. Federal University Lafia and University of Abuja had their highest number of students in 300 levels and their lowest in 400 levels and 200 levels respectively while Federal University Lokoja had the highest number of students from 200 level and lowest from 300 levels. University of Jos, Federal University Lokoja and University of Abuja had more male students than their female counterparts while University of Ilorin and Federal University Lafia had more female students than male in the study. Majority of the students in University of Jos, University of Ilorin and Federal University Lafia attended private school before their transition into university, while majority of the students from Federal University Lokoja and University of Abuja attended public schools.

Majority of the undergraduates from University of Jos, Federal University Lokoja, Federal University Lafia and University of Abuja were from age cohort of 21-25 years while a lesser percentage was from age cohort of 15-20 years except for Lokoja with age cohort of 26-30 years. University of Ilorin had a greater number of students from age cohort of 15-20 years (younger) and lesser percentage from the age cohort.

Table 4a: Previous Library Experiences/Skills of Undergraduates in Federal Universities in North-central, Nigeria

	F %	F %	F %	F %		
Previous Library experiences/skills	**NLM**	**NVM**	**SLM**	**VME**	$\bar{x}$	S.D
	F %	**F %**	**F %**	**F %**		
I have the necessary skills for finding academic resources in the library	69 9.5	160 22.1	263 36.3	233 32.1	2.91	.96
I have necessary skills for using the e-library resources	91 12.6	155 21.4	239 33.0	240 33.1	2.87	1.02
I can use the OPAC correctly before coming to the university	175 24.1	148 20.4	184 25.4	218 30.1	2.61	1.15
My university library is the first library I have ever used	220 30.3	140 19.3	202 27.9	163 22.5	2.42	1.14
The secondary school I attended does not have a school library	246 33.9	145 20.0	178 24.6	156 21.5	2.34	1.16
I have never used a library before coming to the university	278 38.3	126 17.4	185 25.5	136 18.8	2.25	1.15
Weighted $\bar{x}$ = 2.57						

Key: NLM = Not Like Me NVM = Not Very Much Like Me SLM = Somewhat Like Me VME = Very Much Like Me

Table 4a shows the result on previous library experiences/skills of undergraduates in federal universities in North-central, Nigeria. It reveals that majority of the undergraduates have necessary skills for finding academic resources in the library with a mean score of ($\bar{x}$ = 2.91) while few of them indicated that they have never used a library before coming to the university.
(= 2.25). However, a considerable number of the undergraduates affirmed that the secondary school they attended does not have a school library (= 2.34).

Table 4b: Level of the undergraduates' ability to define and articulate information needed
Maximum score = 16, Classification = High, Moderate, Low

Universities	Interval	Range	Level	Frequency (%)	
University of Jos	1-5		Low	6	4.5
N = 134	6-10		Moderate	16	11.9
	11-16	**12.54**	High	112	83.6
University of Ilorin	1-5		Low	9	4.6
N = 196	6-10		Moderate	60	30.6
	11-16	**11.40**	High	127	64.8
Federal N = 56	1-5		Low	-	
University Lokoja	6-10		Moderate	8	14.3
	11-16	**12.79**	High	48	85.7
Federal N = 56	1-5		Low	4	5.4
University Lafia	6-10		Moderate	20	27.0
	11-16	**11.30**	High	50	67.6
University of Abuja	1-5		Low	17	6.4
N = 265	6-10		Moderate	74	27.9
	11-16	**11.42**	High	174	65.7

Table 5 presents the result on test of norms on previous library experiences/skills of the undergraduates in federal universities in North-central, Nigeria.

Table 5: Test of norm on previous Library Experiences/Skills of Undergraduates in Federal Universities in North-central, Nigeria

Grand mean = 48.08, Maximum score = 24 Interval = $\frac{24}{3} = 8$, Classification = High, Moderate, Low

Interval	Range	Level	Frequency	Percentage
1-8		Low	25	3.4
9-16		**Moderate**	405	55.9
17-24		High	295	40.7

Table 6: Level of Awareness of Library Resources and Services of the Undergraduates in Federal Universities in North-central, Nigeria

	F	%	F	%	F	%	F	%		
Library resources and services	**NA**		**A**		**HA**		**VHA**		$\bar{x}$	**S.D**
Books	51	7.0	72	9.9	180	24.8	422	58.2	3.34	.92
Journals	64	8.8	136	18.8	246	33.9	279	38.5	3.02	.96
Newspaper	91	12.6	138	19.0	204	28.1	292	40.3	2.96	1.05
Reference materials	103	14.2	159	21.9	230	31.7	233	32.1	2.82	1.04
Reserved Book Section	124	17.1	148	20.4	226	31.2	227	31.3	2.77	1.07
Photocopy services	149	20.6	126	17.4	201	27.7	249	34.3	2.76	1.13
Help desk	144	19.9	161	22.2	198	27.3	222	30.6	2.69	1.11
Electronic books	158	21.8	172	23.7	197	27.2	198	27.3	2.60	1.11
Thesis/dissertation/ projects	147	20.3	174	24.0	225	31.0	179	24.7	2.60	1.07
Online database	173	23.9	156	21.5	202	27.9	194	26.8	2.58	1.12
Lamination and binding	179	24.7	161	22.2	183	25.2	202	27.9	2.56	1.14
Current awareness	160	22.1	179	24.7	208	28.7	178	24.6	2.56	1.09
Electronic journals	182	25.1	164	22.6	195	26.9	184	25.4	2.53	1.12
Loaning services	193	26.6	148	20.4	204	28.1	180	24.8	2.51	1.13
Remote accessibility of library resources	174	24.0	173	23.9	226	31.2	152	21.0	2.49	1.07
Indexes/abstracts	189	26.1	157	21.7	218	30.1	161	22.2	2.48	1.10
Research question CD ROM resources	203	28.0	150	20.7	220	30.3	152	21.0	2.44	1.11
Institutional repository	208	28.7	176	24.3	201	27.7	140	19.3	2.38	1.09
Weighed $\bar{x}$ = 2.67										

Weighed = 2.67

Key: NA = Not Aware A = Aware HA = Highly Aware VHS = Very Highly Aware

Table 6, indicates the level of awareness of library resources and services of the undergraduates in federal universities North-central Nigeria. The result shows that majority of the undergraduates are highly aware of the library resources and services. The result also indicate that they are mostly aware of books (422 (58.2%) with the highest mean score $\bar{x}$ = 3.34. However, there is a low level of awareness of institutional repository as indicated by the result (140 (19.3%) with the least mean =2.38. Inference to be drawn from the result is that most undergraduates have high level of awareness of books (= 3.34), journals (= 3.02), newspapers (= 2.96), reference materials (=2.82), reserved book section (= 2.77) and photocopy services (= 2.76).

Table 7: Test of norm on the level of Awareness of Library Resources and Services

Grand mean = 48.08, Maximum score = 72 Interval = $\frac{72}{3} = 24$, Classification = High, Moderate, Low

Interval	Range	Level	Frequency	Percentage
1-36		Low	106	14.6
37-72	48.08	High	619	85.4

The hypothesis guided the conduct of this study was tested at 0.05 level of significance. The relationship between the variables were tested generally across the five universities which indicated if the hypotheses were to be rejected or accepted based on the Pearson Product Moment Correlation (PPMC) results.

Hypothesis 1: There is no significant relationship between Personal Factors and library use by undergraduates in Federal Universities in North-central, Nigeria.

Result of hypothesis one is presented in tables 7 and 8, each indicator of personal factors was tested on library use.

Table 8 presents the Pearson Product Moment Correlation (PPMC) result showing the relationship between personal factors and library use of undergraduates in federal universities in North-central, Nigeria.

Table 8: Relationship between Personal Factors and Library use by the undergraduates

	1	2	3	4	5	6	7	8	$\bar{x}$	S.D
1	1								59.72	22.81
2	.032 (.396)	1							22.97	3.45
3	-.009 (.805)	-.034 (.359)	1						1.49	0.50
4	.006 (.861)	.024 (.516)	.029 (.436)	1					5.07	2.80
5	.090* (.016)	.094* (.011)	.048 (.194)	.063 (.089)	1				1.50	0.50
6	.061 (.098)	.148** (.000)	.076* (.041)	-.070 (.060)	-.041 (.273)	1			2.31	0.94
7	.327** (.000)	-.036 (.332)	-.079* (.034)	-.052 (.162)	.059 (.113)	.118** (.001)	1		15.40	4.11
8	.237** (.000)	-.085* (.023)	.046 (.216)	.036 (.331)	-.035 (.348)	-.063 (.092)	.232** (.000)	1	48.08	11.30

*Sig at .05 level, **Sig. at .01 level

Key

1 = Library use
2 = Age
3 = Gender
4 = Academic discipline (Department)
5 = Type of secondary school attended
6 = Level of study
7 = Previous library experience
8 = Level of awareness of library resources

Table 8 reveals that there were positive significant relationships between library use and academic discipline (r = .083*, p(.025)<.05),Type of secondary school attended (r = .090*<.05, p(.016)<.05), previous library experience (r = .327**, p(.000)<.05) and level of awareness of library resources and services (r = .237**, p(.000)<.05). However, there was no significant relationships with gender (r = -.009, p(.805)>.05) and level of study (r = .061, p(.098)>.05) respectively.

Table 9 presents the summary result of the relationship between personal factors and library use by the undergraduates in federal universities in North-central, Nigeria.

Table 9: Summary of the Relationship between Personal Factors and Library Use by the Undergraduates

Variable	Mean	Std. Dev.	N	R	p-value	Remark
Library Use	59.7172	22.8143				
			725	.330**	.000	Sig.
Personal Factors	96.2083	13.4676				

** Sig at 0.1 level

Table 9 indicates that there was a positive significant relationship between personal factors and library use by undergraduates in Federal Universities in North-Central, Nigeria (r = .330**, N= 725, p <.05). Therefore, the null hypothesis is rejected.

Hypothesis 2: There is no significant relative contribution of personal factors to library use by undergraduates in North-central, Nigeria

Table 10: Relative contribution of Personal Factors on Library Use by the Undergraduates

Model	Unstandardized Coefficient		Stand. Coefficient	T	Sig. p
	B	Std. Error	Beta Contribution		
(Constant)	2.092	8.946		.234	.815
Age	9.516E-02	.226	.014	.421	.674
Gender	.724	1.541	.016	.470	.638
Academic Discipline	.373	.288	.043	1.294	.196
Type of Secondary School	3.063	1.532	.067	1.999	.046
Level	1.696	.949	.060	1.787	.074
Previous Library Experience	1.112	.202	.200	5.503	.000
Level of Awareness	.433	.082	.214	5.259	.000
	-1.631	.338	-.211	-4.831	.000

Table 10 reveals the relative contribution of the independent variables to the dependent variable. The result indicates that Age (â = .014, p>.05), gender (â = .012, p>.05), academic discipline (â = .045, p>.05) and level of study (â = .022, p>.05) had no significant relative contribution while type of secondary school attended (â = .068, p<.05), previous library experience (â = .198, p<.05) and level of awareness (â = .213, p<.05) had significant relative contribution to library use by the undergraduates.

Discussion of the Findings

Personal Factors of the Undergraduates

Personal factors identified in the study are academic discipline, age, gender, level of study, previous library experiences/skills and level of awareness of library resources and services. The findings revealed that academic discipline, type of secondary school attended, previous library experiences/skills and level of awareness of library resources and services influence library use by the undergraduates while age, gender and level of study do not influence library use.

This finding is in tandem with the conclusion of the findings by Bridges (2008) that asserted that academic discipline influence library use by undergraduates. In the same vein, Vodracek (2007) and Toner (2008) also opined that lack of awareness of library resources and services have negative influence on library use. On the contrary, Islam (2011) asserted that level of study, academic discipline, age and gender of undergraduates in a higher learning institution in Malaysia were found to be significant in the effectiveness of the library use. Ajayi and Ogunyemi (2011) opined that as level of study of undergraduates increases, library use increases. The researcher therefore concluded that level of study have significant relationship with the library use by the undergraduates. At variant with the findings of this study, is a study done by Pembee (2014) on influence of demographic characteristics of undergraduates on library use in Kabarak University, a private Christian university in Kenya which affirmed that there was not enough evidence to conclude that demographic characteristics of the undergraduates influenced library information system usage.

Conclusion and Recommendations

The findings of this study have shown that personal factors contribute to the level of use of university libraries by undergraduates. Majority of the undergraduates rarely use the library, they rely mostly on their lecture notes and handouts given to them by their lecturers. The result of the analysis showed that many of the undergraduates went to secondary schools that had no functional school libraries as such; they have not acquired the necessary skills to use their university library. The above findings are in line with the earlier studies that there was underutilisation of library resources and services by undergraduates. Many of the undergraduates, who use the libraries, come there only occasionally, especially during an examination. Consequently, an influx of the undergraduates is observed at such times.

The implication of this study is that undergraduates are not using library resources and services as expected. In view of this, it's recommended that the management of the libraries should create awareness on the availability of library resources and services. Undergraduates should also be trained on how to use the available library resources and services. This will invariably enable librarians to take into consideration and plan for the experiences, needs and expectations of the undergraduates which will inform them of how to provide and improve their services. It will also serve as a pointer to the undergraduates the importance of library use to their academic success and achievements.

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Framework to Infuse Data Science in the Archives and Records Management Curriculum in South Africa

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Abstract

Current trends in technology dictate how archives and records management fraternity should take action to remain relevant in the industry. The mode of operation illustrates that current business strategies intend to go fully online without any physical records to be managed. Records practitioners are thus systematically becoming irrelevant and unemployable. This study sought to investigate a framework to infuse data science into archives and records management curriculum in South Africa. This qualitative study relied on literature review to explore a framework to infuse data science into the archives and records management curriculum in South Africa. The study discovered that archives and records management education is still lagging technology; this may result in candidates with impressive qualifications but dated knowledge and expertise. The study recommended an infusion of data science into the archives and records management curriculum, using the proposed framework to guide the process. It is hoped that this will enable institutions of higher learning to upskill students in line with the growth in technology and modus operandi.

Keywords: Data Science, Archives and Records Management, Records Practitioners, Curriculum, South Africa

Introduction and background

The archival profession, just like any other profession, is believed to be threatened by the way technology is growing, not just in South Africa but across the entire Eastern and Southern Africa Branch of the International Council on Archives (ESARBICA) (Garaba, 2015) and throughout the world. Several scholars such as Usman (2021), Mosweu and Cheterera-Zambuko (2021), Modiba, Ngoepe and Ngulube (2019) and Ngoepe (2016), broadly explained how disruptive technology had left archives and records professionals with no choice but to embrace technological development in order to improve the quality of service. This advancement in technology requires archives and records management (ARM) training institutions to ensure they offer an ARM curriculum designed to respond meaningfully to industry needs. Surprisingly, Katuu (2022) reports that insufficient effort is made by ARM institutions in Africa since they have not featured technology in their curriculum. In designing the ARM curriculum, attention should focus on transformation and decolonisation in education, in general, which has captured the recent interest of many scholars, including Motala, Sayed and de Kock (2021), as well as Cherington, Botha and Kleet (2018). Saurombe (2018) claims the inability to decolonise education is part of the structural problems hindering curricula designs that address societal needs. According to Saurombe (2018), the higher education curriculum's transformation is a matter that needs buy-in from all stakeholders rather than being left to academics only.

The poor state of records management in South Africa's public sector has been under scrutiny for quite some time, with several scholars (Marutha, 2019; Masuku and Ngulube, 2019; Mosweu, 2019; Netshakhuma, 2019; Ngoepe, 2016; Katuu, 2015; Saurombe and Ngulube, 2016) stating that the situation is compounded by a lack of skills and the appointment of officials without relevant qualifications and experience. One would argue that the root cause of this unfortunate trend might be centralised on the quality of education that professionals receive, which needs to be thoroughly interrogated with a common view to find solutions. Ngoepe and Katuu (2017) concur that research and training in ARM has not received the required attention in many sub-Saharan African countries. This view is confirmed in a study by Onyancha, Ngoepe and Maluleka (2015), who found only a small portion of institutions offer ARM qualifications in sub-Saharan Africa. Of the 26 universities in South Africa, only 10 offer Library and Information Service education and training, and of these, only four offer ARM education and training. The higher education institutions (HEIs) in South Africa that offer education and training in ARM are the University of South Africa (Unisa), University of Fort Hare (UFH), University of Zululand (Unizulu), and the University of Johannesburg (UJ) (Onyancha, Ngoepe and Maluleka, 2015; Khayundi, 2011).

Experts in the area of ARM further lament that graduate-level education is characterised by several challenges such as "poor quality of education materials and outdated programmes and education approach based on the mode of learning which encourages memorization as opposed to critical thinking, problem solving and creativity" (Katuu, 2009). Education and training is the only available tool to empower archivists and records professionals to cope with the challenges associated with governance and trust in dealing with digital records (Ngoepe and Katuu, 2017). Eastwood (2017) is thus correct to suggest that archival education goes a long way in what he best categorises as a "cultivation of archivist's mode of thinking", which influences everything the archivists do in pursuance of their business activities.

The greatest challenge that the archival profession is confronted with is the appointment of records management officials without relevant qualifications. For example, in a survey to investigate medical records' role in the provision of public healthcare services in the Limpopo province of South Africa, it was found that 70% of the respondents had never attended a single formal records management training session (Marutha and Ngoepe, 2017). Given all the obvious challenges that the archival profession in southern Africa is facing, it is thus critical to investigate the role and responsibilities expected to be fulfilled by educational institutions. Wamukoya (2015) asserts that higher education institutions can play a significant role in attracting young people by revamping academic challenges and entrenching technology-oriented courses, as this will go a long way in fostering new skills and competencies.

Challenges in Archival Education and Training in Southern Africa

Several scholars, including Mosweu (2019), Katuu (2015), and Katuu and Ngoepe (2015), emphasise various challenges in ARM education and training in southern Africa. There seems to be a consensus amongst researchers that the problems archival professionals face are similar in all southern African countries, where the archival curriculum surprisingly appears unstandardised despite efforts to collectively deal with similar problems in the profession. For example, Khumalo and Baloyi (2019) mention the appointment of unqualified personnel to records management positions in the public sector in the ESARBICA as one of the reasons for consistent poor record management. In support, Mosweu (2019) is of the view that records and archives professionals in the ESARBICA region have not received the required education and training due to inadequate funds. Most public entities in the ESARBICA do not prioritise education and training when making decisions on budget allocations. The lack of standardised archival curricula offered by African countries also necessitated the International Council on Archives' (ICA) strategy to prioritise education and training in Africa, as already indicated earlier.

It is evident that challenges in the records and archives profession are common in the ESARBICA regions, justifying the ICA's call to standardise archival education in South Africa. Garaba (2015) calls for a transformation of archival education and training in ESARBICA on the basis that there is

obvious evidence the region is unable to produce "fully grounded" information professionals. According to Garaba (2015), the digital technology component is not adequately featured in the curriculum, which presents numerous challenges for graduates confronting 21st-century realities. This stance is also confirmed by Ngoepe and Katuu (2017), who concur that the curricula of South African universities offering ARM education and training do not embrace digital records in the same comprehensive manner as universities in countries such as Canada and Australia. Duranti (2007) postulates that archivists need continuing education to acquire new skills and keep abreast of developments in the field.

Therefore, it cannot be business as usual for ARM professionals who continue to learn archival theories meant for the traditional management of records. Marciano, Lemieux, Hedges, Esteva, Underwood, Kurtz and Conrad (2018) state that traditional archival science should be reviewed with the intention to merge computer science or data science with archival science in order to respond positively to the needs of the large data environment. Indeed, Mosweu and Ngoepe (2019) are correct to suggest that the digital age requires a skilled and knowledgeable workforce with the capabilities to ensure the proper management of digital records. A study by the InterPARES Trust highlights some of the archives and education programmes offered by various universities in Africa (Katuu and Ngoepe, 2015).

Inclusion of data science

One of the key elements that is not covered or included in information and records management is data science. Simplilearn (2021) underscores that data science is one of the most-needed subjects in the industry today, considering the high production of data, which comes in large volumes and at high speed. Data science has started frequenting the industry's daily agenda in their regular meetings with the intention to implement it for growing their business and production (Simplilearn, 2021). Oracle (2021) claims there has been a shortage of data science professionals since the concept was discovered in early 2008, as presented in several journal publications, including "The data science" by the International Council for Science. Sharma (2020) views data science as "the future of Artificial Intelligence", while Oracle (2021) sees it as "a subset of artificial intelligence" together with machine learning.

Data science is related to a multidisciplinary field, as it is "a blend of various tools, algorithms, and machine-learning principles with the goal to discover hidden patterns from the raw data" (Sharma, 2020). This implies that any information related to research is covered in the data science functions or subject matters. These include records management, archives management, information management or information science, computer science, big data management, the Internet of things, information and knowledge governance, and digital curatorship, to list a few. For instance, Oracle (2021) emphasises that "data science combines multiple fields including statistics, scientific methods, and data analysis to extract value from data". According to Simplilearn (2021), data science is "the domain of study that deals with vast volumes of data using modern tools and techniques to find unseen patterns, derive meaningful information, and make business decisions". The Sol Plaatjie University (2021) explains that data science is a solution to the problems attached to big data with the integration of fields from multi-disciplines, using "scientific methods, processes, algorithms and systems to extract knowledge and insights from structured and unstructured data". It further states that it is meant to address the challenges pertaining to skills shortages in the industry (Sol Plaatjie University, 2021). The Sol Plaatjie University offers a Bachelor of Science in Data Science degree with a strong mathematics, statistics and computers science core. According to Sol Plaatjie (2021), the degree is designed to produce graduates who are highly qualified and skilled to confront challenges faced by the industry.

Sharma (2020) and Simplilearn (2021) further mention that data science involves looking at different angles of data history processing, data exploratory analysis, and the application of machines that are advanced enough to learn algorithms and zoom into future incidents. Data scientists are thereby able to make decisions and predictions from "predictive causal analytics, prescriptive analytics (predictive plus decision science) and machine learning" (Sharma, 2020). Simplilearn (2021) states that data science illuminates the key causes of problems, promotes an exploration of data, ensures

data modelling with algorithms, and visually communicates and shares data graphically using dashboards, tables and many more. Advanced technology is required for data processing and analyses because, unlike in the past, most current data are not structured or are partially structured and difficult to process and analyse using our ancient traditional modes (Sharma, 2020). There are several matters that may result in data science not being functional, such as data scientists not working efficiently due to difficulties in accessing data, usable machine learning not being accessible to application developers, IT administrators spending too much time on support, and business managers not being focused on data science (Oracle, 2021).

Moreover, Oracle (2021) emphasises that data science is still a very young speciality emanating from fields such as "statistical analysis and data mining". In support, Simplilearn (2021) claims it is a prerequisite to understanding concepts such as machine learning, modelling, statistics, programming and databases when learning data science. Candidates will need to familiarise themselves with data analysis, data warehousing, data visualisation, and machine learning. Oracle (2021) further shows that 'data scientist' is the title for people practicing data science in the organisation or information industry, and these individuals are typically multi-skilled in analysing data from different sources, such as smartphones, customers, websites, and sensors, amongst others. Business managers, IT managers and data science managers are the overseers of data science processes (Oracle, 2021). Some of their duties include data analysis, data preparation for analysis, data exploration, and visualisation with language of programming (Oracle, 2021). Sharma (2020) further explains the role of data scientists as follows: Data scientists are those who crack complex data problems with their strong expertise in certain scientific disciplines. They work with several elements related to mathematics, statistics, computer science, and many more (though they may not be experts in all these fields). They make significant use of the latest technologies in finding solutions and reaching conclusions that are crucial for an organisation's growth and development. Data scientists present data in a more useful form than the raw data available to them in structured as well as unstructured forms.

Contribution of Professional Associations

Professional associations in many countries around the world have been instrumental in influencing several aspects and people's perceptions of the profession. While Mojapelo and Ngoepe (2022) listed several professional associations that contribute to the archival profession, the current study was only interested in archival education and training. Mojapelo and Ngoepe (2022) are of the view that professional associations can make a meaningful contribution toward curriculum development at institutions of higher learning, particularly because some of these institutions are members of such associations. Ultimately, professional associations' involvement will ensure that the curriculum is aligned with the actual societal needs. In the case of South Africa, the Higher Education Act (No. 101 of 1997) stipulates that all HEIs must provide education and training that promote the development of appropriate skills and innovations to meet the country's economic and development needs. In South Africa, currently, there is one professional association by the name of the South African Society of Archivists (SASA) advocating for ARM, including education (SASA, 2021). SASA is using conferences, workshops, and academic articles to promote ARM education (Mojapelo and Ngoepe, 2022). At the regional level, ESARBICA is one of the regional branches of ICA in Africa, like the Caribbean Regional Branch (CARBICA), the Central Africa Regional Branch (CENARBICA), and the West African Regional Branch (WARBICA) (ICA, 2016).

Research Problem

The National Development Plan lists quality education as one of the country's non-negotiable goals (National Planning Commission, 2014). With the rate at which technology is significantly impacting the work of ARM professionals, there is a need for institutions of higher learning to produce graduates with the necessary skills to confront industry needs. Indeed Ngoepe, Jacobs and Mojapelo (2022) are correct to say African countries require higher education institutions that are responsive to real problems facing professionals and consistently review their programmes to accommodate new developments. After seeing a similar need to develop new skills, Europe initiated the European Data Science

Academy (EDSA) project, which aimed to bridge the data science gap (Mikroyannidis, Domingue, Bachler and Quick, 2018). The EDSA project ran between 2015 and 2018 and developed learning materials necessary to close skills gaps in data science in the European Union. Currently, academic institutions in South Africa are entrusted with the responsibility of producing graduates who are capacitated to render proper and efficient records management. The question of whether academic institutions are able to fulfil this requirement is answered in this study.

According to Katuu (2022), institutions offering formal ARM qualifications in South Africa include University of South Africa, University of Fort Hare, University of Johannesburg, University of KwaZulu-Natal, and University of Zululand. Data science does not feature as a module in the ARM programmes offered by the aforementioned universities, but the researchers acknowledge Unisa's introduction of a digital records curation qualification. It offers graduates the opportunity to take advantage of technology to introduce innovation in their workspaces (Ngoepe, Jacobs and Mojapelo, 2022). The government is also looking for data-driven methodologies and relevant tools to render efficient public services (Marivate and Moorosi, 2018).

Research purpose and objectives

The purpose of the study was to investigate a framework to infuse data science in the ARM curriculum in South Africa. The study's specific objectives were to:

- explore how data science may be infused into ARM qualifications in South Africa, and
- propose a framework to guide the infusion of data science as a standing module for ARM qualifications in South Africa.

Methodology

This qualitative study relied on a literature review to explore a framework to infuse data science in the ARM curriculum in South Africa. Universities used as the population of the study are the universities listed by Onyancha, Ngoepe and Maluleka (2015) and Khayundi (2011) as institution offering ARM programmes namely: University of South Africa (Unisa), University of Fort Hare (UFH), University of Zululand (Unizulu) and the University of Johannesburg (UJ).

In identifying appropriate literature, the researchers used key concepts from the title of the study to search for literature through the Google search engine. The search engine provided substantial results with summaries of the content and links to appropriate web addresses. Some links in the results led the researchers to websites and journal databases with relevant articles. These were opened and reviewed for discussion in the study. This process allowed the researchers to review the results until saturation was achieved, when the researchers determined they reviewed sufficient sources or there were no additional relevant sources in the list of results. The researchers were satisfied with the amount of information uncovered, and this led to a discussion on the findings from the reviewed literature. The researchers were able to discuss the findings, make recommendations and offer concluding remarks for the study.

Research Findings

The following presents research findings obtained from the literature.

Infusion of Data Science in ARM Curriculum

Based on the literature, the following institutions in South Africa offer education and training in ARM: University of South Africa, University of Fort Hare, University of Zululand, and the University of Johannesburg (Onyancha, Ngoepe and Maluleka, 2015; Khayundi, 2011). Each institution will be discussed separately.

University of South Africa

Apart from being the first public institution to teach exclusively by means of distance learning in South Africa (Unisa, 2023), Unisa is also a leading institution in the provision of education and training for records professionals in South Africa. According to Ngoepe, Maluleka and Onyancha (2014), Unisa was the leading institution in ARM research in 2014, and the reason for this was discovered to be because the institution offers ARM qualifications. In terms of qualification listing on the university website, Unisa offers ARM qualifications from undergraduate to postgraduate level. Formal ARM qualifications offered by Unisa are as follows: Bachelor of Arts

(Major in ARM); Bachelor of Arts Honours in ARM; Master of Information Science and Doctor of Philosophy in Information Science. In terms of the curriculum for each qualification level, there is no infusion of data science. Although Ngoepe, Jacobs and Mojapelo (2022) share that the honours in ARM at Unisa cover aspects such as diplomacy, digital forensics, knowledge governance and data curatorship which is in line with the content recommended by InterPARES Trust. Unisa's ARM honours programme was informed by the research by the InterPARES Trust through Team Africa, which recommended that the International Council on Archives (ICA), through its Africa Programme, must develop standard study material to be used by African countries with a view to standardise records management curriculum across Africa (Katuu, 2018).

University of Fort Hare

Just like Unisa, UFH offers ARM as a postgraduate diploma. Much as the module entails Information and Communication technologies – it is mainly focused on traditional records management. Most of the information technology modules are electives (UFH, 2023) as opposed to being compulsory which means students can use their intuition to decide which one they would like to take. Some of the modules offered entails preservation and curation; archival theories and principles; and archives administration. Based on details provided above, UFH does not offer programme of modules in data science.

University of Zululand

According to Ocholla (Ocholla and Botha, 2007), the following are some of the qualifications offered by Unizulu: Bachelor of Arts in Library and Information; Honours Bachelor of Library and Information Science; Masters in Library and Information Science and PhD in Library and Information Science. Unizulu offers a records management as a module within a broad undergraduate qualification in Information Science (Shongwe and Ocholla, 2011). The Bachelor of Arts in Information Science, which is the entry level for information science programmes, offers the students with knowledge, skills and attitude for information and knowledge management. Students who are enrolling for the programme are also equipped with records management and archival knowledge skills (Unizulu, 2023). As per the course outline, students will also be exposed to electronic records management (Unizulu 2023).

University of Johannesburg

University of Johannesburg offers a qualification in information management which is under College of Business and Economics, Department of Information and Knowledge Management. According to University of Johannesburg (2023), this qualification provides students with intellectual competencies and practical skills in the acquisition, analysis, interpretation and application of information management principles in different settings. For one to be admitted into the qualification, you need to have obtained 50% in English, 50% in Mathematics or 70% in Mathematics literacy. Although the undergraduate qualification doesn't offer anything related to data science, it is acknowledged that honours programme does offer content on data science. The honours programmne prepares students to be Business Analysts and Web Content Managers. Some of the modules offered at honours level are: Business Intelligence; Competitive Intelligence; Knowledge Management and Web and Intranet Management. At the undergraduate, some of the modules include: information management, social media management and business management.

Discussion and Recommendations

Based on the results obtained from various university websites, it is clear that data science has not been infused in various ARM curriculum. It is vital to have necessary skills to infuse data science into ARM curriculum and practices. Gone are the days when records practitioners' and archivists' responsibilities were limited to maintaining information materials and controlling access. It is high time that information professionals like records managers, archivists, and librarians get involved in organisational planning, improvement, management, and growth. As information professionals, records managers and archivists must acquire skills that will contribute to management planning and the development of the institution to which they belong. Infusing data science into the curriculum will enable them to acquire skills and expertise that will make them competent in interpreting the current data contained in the records

within their custody. They must be able to predict or foresee the future of their organisations in terms of different functions, whether positive or negative. With this information and expertise, records practitioners will also be able to serve in the role of management advisors. This kind of specialisation may lead to the profession and practitioners gaining recognition within the organisation, especially from management. The appointment professional records practitioners and having this kind of function in organisation's organogram may be a priority for many organisations. These individuals may substantially assist leaders without extensive information analysis skills to make information based-decisions.

More importantly, data science's infusion into the curriculum may lead to archives, records and information professionals remaining relevant within their field of expertise. Current trends in technology mean skills in filing and retrieving paper-based information will no longer be relevant and will become a thing of the past. Therefore, it is important that the ARM curriculum also reshape professionals' responsibilities in the forms of technology that dictate the new ways of doing things. It is very important to understand that with the current technology, depending on the nature of systems, data will be born into the system as administrative activities are being discharged automatically, and systems may automatically do many other records management administration such as capturing, classification and arrangements, protection with safety and security measures built into the system, metadata creation, access control and distribution, as well as disposition according to the value in different records as programmed.

Figure 1 provides a framework to illustrate how data science may be infused into the ARM curriculum or qualification in South Africa. Nevertheless, it takes considerable effort for the institutions of higher learning to successfully establish data science-infused ARM qualifications. The findings revealed that institutions offering ARM have not infused data science in their curriculum which eventually limits records and information professionals in terms of skills and knowledge. Students needs to gain insights into vast amount of data their prospective companies would be generating. Data science is regarded as a scarce skill in South Africa.

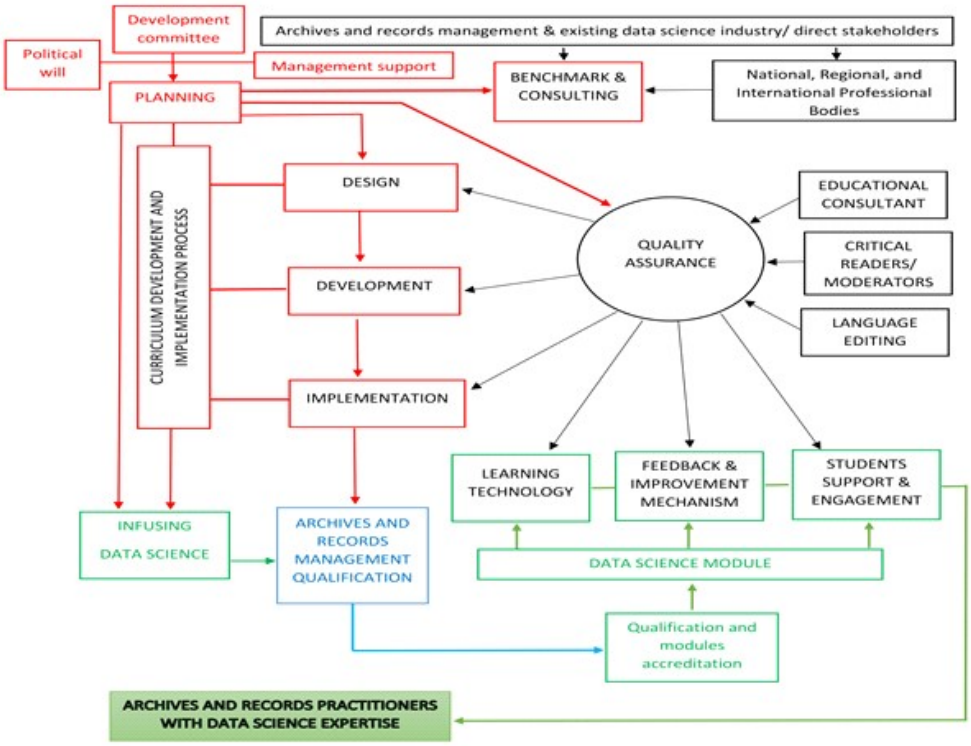

Figure 1: Framework to infuse data science in the archives and records management curriculum in South Africa

Looking at the framework demonstrated in Figure 1, the process may commence with planning, as illustrated in the red interconnections. The institution will start by establishing a working committee comprising diverse specialists to commence with the development or review of the curriculum with the intention to incorporate data science. The working committee should be headed by a senior academic staff member appointed by the head of the ARM department within the institution. This group of experts may include archives, records and information professionals, curriculum development experts and many others so that they close any existing gaps during the development process. In order for this team to succeed in their task from planning to implementation, they will need management support from within the institution, as well as political will from within and external from the department of higher education and training. The committee will start by planning their benchmark and consulting with groups of experts from professional bodies, industry, and direct stakeholders. These groups have expertise and background in ARM as well as science and technology. Their role is advisory regarding the content and implementation of the curriculum. The team will also need to plan quality assurance measures in terms of module design, development and implementation to be discharged during the development and implementation process. This will entail educational consultants, critical readers or moderators and language editors being involved during the design, development and implementation processes.

The second next step will be curriculum development and implementation. The team will start the hands-on activities of designing, developing and implementing the module using assigned academic professionals involved in teaching and learning. During this process, the team will consider strategies to infuse data science into the ARM qualification either as a standalone module or in different related modules already in the curriculum. Prior to implementing the module and/or qualification, the institution should obtain accreditation from appropriate government bodies within the country, such as the South African Qualification Authority (SAQA) in terms of the South African government. Upon obtaining accreditation, the institution may start rolling out the new qualification to students, preferably using current modes of teaching and learning based on technological trends. Institutions may need to acquire appropriate technologies to render teaching and learning to students. Appropriate technology should enable student-lecturer interaction, with the lecturer being able to guide students with feedback and mechanisms to improve their performance. Generally, the system must enable both the learner and lecturer to engage with each other as a form of student support. This process will promote archives and records practitioners who are equipped with data science expertise in line with the current trends in technology.

Conclusion

In conclusion, data science appears to be a very serious and urgent requirement to address the skills and expertise gaps amongst archives and records practitioners. In the current situation, institutions of higher learning offering ARM seem ignorant about their shortcomings. Challenges also result from the gap in interactions between education providers and industry professionals who attain employees or candidates with skills gaps that require further development by the employer or industry. It is also crucial that institutions of higher learning plan their curriculum wisely to avoid gaps in their end-product, since this will not help their students. If institutions of higher learning do not take this seriously, the industry will eventually race ahead of them and their products as students become unemployable. For instance, ARM practitioners will still be equipped with ancient modus operandi that includes physically filing and disposing of records while the industry is now fully electronic. Instead, now that technology is able to perform all physical responsibilities, practitioners should be able to assign themselves to data analysis and interpretation roles to guide management in future decision-making, problem-solving, and during business planning. Moreover, it is hoped that the generic framework provided in Figure 1 will help institutions of higher learning in infusing data science into the ARM curriculum in South Africa and across the globe.

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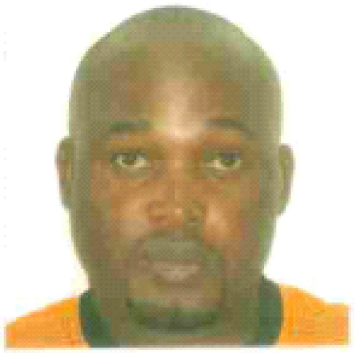

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Research Data Management Competencies for Academic Libraries: Perspectives from Two Universities in South Africa

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Abstract

The rapid pace of technological change has significantly transformed the librarianship profession, impacting the required competencies for professionals working in library and information services (LIS). As new roles emerge within academic libraries, librarians need to assess their current knowledge and skills as well as identify additional knowledge and skills needed to adapt to evolving roles and responsibilities. This paper reports findings of a study conducted at two university libraries in South Africa. The objective of the study was to identify the competencies necessary for academic librarians in providing research data management services (RDM). While previous studies have explored the knowledge and skills required for academic librarians in Southern Africa and globally, there is a research gap concerning the specific competencies necessary for RDM. This study employed semi-structured interviews with librarians from two selected university libraries, using purposive sampling. The research also included document reviews and content analysis of relevant academic library job advertisements. The study's findings highlight key competencies such as information and data management practices, repository management, data curation, data collection management, understanding funders' policies, research methods and processes, as well as ICT and digitization skills. The findings also highlight the importance of robust training and self-development through online courses, webinars, and freely available materials as strategies to support RDM.

Keywords: Academic Libraries, Competencies, Research Data Management Services, South Africa

Introduction

Libraries organise information for easy retrieval, but the rise of vast amounts of data in the digital age has led academic libraries to adapt by developing electronic research collections, digital publications, and open access initiatives. However, managing the increasing volume of born-digital data has presented a challenge for libraries (Cox and Verbaan, 2018).

As the role of libraries has changed, there has been a growing demand for research data management services, prompting libraries to plan for these services. (Borghi et al.,2018). For example, the National Research Foundation (NRF) in South Africa requires grant recipients to make their research output openly accessible thus emphasising the need for libraries to provide research data management services (National Research Foundation, 2015). Since many academic libraries are preparing or may have already begun to implement research support services, it is important to ascertain whether libraries have the competency requirements to be able to provide research data management (RDM) services and whether libraries have opportunities for librarians to gain research data management skills (Cox and Verbaan,2018)

While it may be argued that libraries would be better suited to manage large amounts of data due to their traditional roles of organising information, this

may not necessarily be the case as there is no certainty that academic libraries are ready to embark on this task. To have a meaningful impact in data science and open science, academic librarians can provide valuable assistance and support. However, they may need to enhance their expertise and skill sets in order to do so (Federer et al., 2020). Frederick and Run (2019) argue that providing RDM services may be seen as merely an extension to the libraries existing work. However, Joo and Schmidt (2021) point out that "subject knowledge is critical to be able to assist researchers with locating and using data sets". The question as to whether academic libraries have the necessary knowledge, skills and experience to be able to transition effectively into these new roles required research into this area. Hence the purpose of this paper is to report on a study that enquired into the competency requirements of academic librarians for research data management services.

Research problem

Academic librarians in their support of institutional research are aware that there is increasing demand by universities and research councils to make research data openly available. Therefore, there is a need to investigate the research 'problem' of required competencies for academic librarians in providing research data management services. Studies have been conducted, both in Southern Africa (for example, Beitz, Dharmawardena and Searle, 2012; Raju, 2014; Johnson, 2016; Nkuebe, 2016; Chiware 2020) and globally (for example, Nonthacumjane, 2011; Blakiston, 2011; Brown, Wolski and Richardson, 2015; Tang and Hu 2019), on the knowledge and skills requirements for academic librarians but not with a specific focus on competencies required for RDM academic library services in the South African context. The objective of the study was to identify, using two South African academic libraries (that is, the Mangosuthu University of Technology (MUT) and the University of KwaZulu-Natal (UKZN) libraries) as case studies, the competency requirements of academic librarians in providing research data management services.

The following research questions were used to address this objective:

RQ1: What knowledge, skills and other competencies do librarians at MUT and UKZN currently possess to support research data management services?

RQ2: What knowledge, skills and other competencies do academic librarians require in order to effectively provide research data management services to their research communities?

RQ3: What strategies are required to ensure that academic librarians are equipped with the necessary knowledge, skills and other competencies in order for them to effectively provide research data management services to the library's research communities?

The focus of this paper will be on RQ2 with brief references to RQ1 and RQ3.

Literature Review

Huang et al. (2020) observe that there has been growth in the support for open research. Davis and Cross (2015) state that a set of core competencies have begun to emerge for library support of research data and these competencies may be used to audit data management plan review services to be able to enhance these core competencies among academic librarians. According to Chiware (2020), research data management is evolving in South Africa, as is elsewhere in the world. This is because there were early adopters in the higher education and research sectors who began developing RDM guidelines and policies. A study by Cox et al. (2017) which looked at RDM activities in higher education libraries internationally showed that libraries were more focused on advisory and consultancy aspects such as data management plans and training. Cox et al. (2019) further argue that the major challenge when it comes to the implementation of RDM services, is the lack of skills. Kahn et al. (2014) looked at whether South African higher education institutions were ready for RDM and they confirmed then that while South African higher education institutions were ready for RDM, there was still a challenge of RDM skills shortage. This was more recently supported by findings in Chiware's (2020) study which found that there was limited skilled personnel to run research

data management services in South African academic and research libraries.

The study also revealed that there was still a lack of service development as libraries were more focused on advisory and consultancy aspects, as mentioned earlier. Tenopir et al. (2017) also attest to this by stating that libraries tend to focus more on consultative service rather than technical service. This was also found in a study by Faniel and Connaway (2018) who interviewed US-based library professionals about their experiences and goals with research data management and found services provided to researchers were consultation and education related. Chigwada, Chiparausha and Kasiroori (2017), in a study looking at RDM in research institutions in Zimbabwe had similar findings in that they found that there was also no centralised RDM service provided; and they observed issues with regards to lack of institutional guidelines, lack of technology, lack of infrastructure and lack of funding. Cox et al. (2019) are also in agreement with other literature that the major challenge when it comes to the implementation of RDM services is the lack of skills but also includes the debate of who should be involved in RDM services and the issue of acceptance of the service by researchers. Sanjeeva (2018) who looked at the new role for libraries in RDM also noted that there has been a 'great debate' about RDM and who should take the lead in the institution among the IT department, research administrators and librarians. Sanjeeva (2018) concluded that it is not a matter of who leads but all about collaboration amongst these departments to fulfil institutional needs. Libraries will have to collaborate and be team members in starting RDM services in their institutions (Sanjeeva, 2018). Universities and university research libraries, according to Kim (2021), are unquestionably examples of collaboration in action. libraries provide a wide range of services to meet the diverse needs of their users. They have developed an internal and external structure for addressing stakeholders' needs and working as team members because they are a part of the university and its organizational culture. In order to be successful in meeting the needs of their users and supporting the university's aims and objectives, they also regularly collaborate with other units on campus, particularly where there are strong shared interests and activities. Mush, Pienaar and Van Deventer (2020) also conclude that research data management is a collaborative effort, and various research stakeholders all have roles to play in providing effective research data management services. Mthembu and Ocholla (2022) agree, believing that capacity building will accelerate collaboration between departments and institutions, as well as highlight their role in the research process. They discovered a lack of capacity building programs to develop RDM skills in their study. The benefit of RDM in an institution is its impact on the university's visibility and there is also a strong connection between RDM services and the open access agenda that libraries have been promoting (Ng'eno and Mutula 2018).

According to Koltay (2019) libraries have been involved in information literacy and thus it should not be an unusual task for them to provide data literacy. Tang and Hu (2019) point out that US librarians have already begun to include in their reference and consultation services information and advice on issues related to data management; they are adding on to their existing training, matters related to open access and other academic communication, including copyright and intellectual property, metadata and technical standards, data archiving and preservation. Academic librarians can easily transit to helping users with managing data because they have been providing similar services. Dora and Kumar (2015) further state that librarians are already skilled experts in metadata, curation of data, and archiving and preservation and this makes it easier for them to simply add research data management to their role.

Research data sets are unique to the library collection; however, they do overlap with activities and interests that already exist in the library. For instance, academic libraries are already advocating for open access and are leading in the establishment of institutional repositories (Lee and Stvilia, 2017). Lafferty-Hess et al. (2020) opine that institutional repositories are a good place to start when it comes to data curation; many university libraries have been depositing research outputs in such repositories and this is now becoming more common in academic library work. Martin-Melon, Hernández-Pérez and Martínez-Cardama (2023) found that the most requested services were for librarians to assist in identifying datasets for students, they will be advising researchers on data analysis and data manipulation

and assisting researchers with data plans and in creating websites where the data will be made accessible. Fu, Blackson and Valentino's (2023) study suggested that it will be very effective if the library did not only just play a role in making data available but that it should also include a role in providing web applications that will enable data visualization or exploration. Therefore, librarians will have to gain skills in identifying such applications.

A study by Shelly and Jackson (2018) used content analysis to look into the role of libraries in supporting RDM in 13 Australian universities. The study found that there was a need for RDM advice and practical suggestions for researchers, particularly in the areas of metadata creation and data loading into repositories. Other studies (Dressel, 2017; Matlatse et al., 2018; Vilar and Zabukovec, 2019) too have reported important developments with RDM services offered by academic libraries. According to Ohaji, Chawner and Yoong (2019) librarians will play a major role in curating and managing research data. Tammaro et al. (2019) examined relevant job listings to explore data curation librarian responsibilities. They found that common responsibilities included instruction, reference, outreach, access, preservation, policy, data management, system design and research support. The study being reported in this paper also used content analysis of job advertisement to determine the competencies required for RDM services.

Joo and Schmidt (2021) found that the top three categories of knowledge and skills include developing and teaching instructional content related to data services, data management planning and data ethics. Participants also identified data structure, data citations and data repositories as important knowledge requirements for RDM. According to Hamad et al. (2021) knowledge of metadata standards plays an important role in discovery, storage, access and preservation of data. A study by Masinde, Chen and Muthee (2021) found that researchers also lacked skills in metadata creation and would require assistance with this from the library. In their study, Singh, Bharti and Madalli (2022) discovered that IT and technical skills, as well as knowledge of various research methods and the research lifecycle, are the most desired skills for professionals involved in RDM services. Academic libraries and librarians will have to have knowledge and skills for website design and understanding in using internal and external links to provide access to tools that help researchers manage data. In the study by Yoon and Schultz (2017), where content analysis of 185 US library websites was undertaken, it was found that most libraries had websites, but these websites did not clearly explain what RDM is and the scope of RDM services was not clearly explained. Additionally, Hswe and Holt (2011) reported that library data management planning websites merely provided links to the resources of other institutions; this means that libraries were, at the time, still lacking in creating their own content for RDM. A few years later this was corroborated by Yoon and Shultz (2017) who found that libraries were simply providing links to RDM websites. The study by Fu, Blackson and Valentino (2023) found that libraries will have to provide access to data by using repositories to deposit data, and therefore a knowledge of evaluating different repositories and how they work and function is important. Chigwada, Chiparausha and Kasiroori (2017) explain that to achieve data collection, libraries will have to partner with researchers in the very early planning stages of research. Chiware and Becker (2018) emphasise that the major role for librarians that will assist in the in standardised services of research data, is the formulation of an RDM policy for the institution.

According to Barbrow, Brush and Goldman (2017), libraries have little experience in managing research data at any stage of the research life cycle, and therefore to help them gain the skills required, libraries will have to educate themselves through training. In support of this Goben and Raszewski (2015) claim that libraries which seek to render RDM services should look to expand in the "foundational resources and information about the network of librarians exploring data, [and] support the stamen of professional development". Similarly, Wittenberg, Sackmann and Jaffe (2018) point out that a domain-based librarian training programme is one way for subject librarians to improve their data service capacities. Singh, Bharti and Madalli (2022), who in their study evaluated RDM services in academic libraries, mentioned that as part of their staff development programs, Indian academic libraries encourage their professionals to participate in webinars, online tutorials, seminars, conferences, and workshops, as well as courses related to RDM.

Goben and Raszewski (2015) have recorded a webliography for libraries to self-educate themselves on research data management; the webliography includes foundational material, current awareness, and social media. The University of North Carolina (2020) developed a data science framework where they propose reskilling for subject librarian in tier stages based on the data services that they will be providing. This could be recommended for academic libraries which are looking to develop competencies in RDM. Wittenberg, Sackmann and Jaffe (2018) state that many higher education institutions can provide training for RDM and provide website links and institutional support that outline best practices in RDM.

It is evident that the literature is rich in deliberations on competencies required by academic librarians to effectively provide RDM services, as well as in discussions about opportunities for academic librarians to acquire the necessary knowledge and skills for providing RDM services.

Methodology

This study adopted a qualitative research approach, located within an interpretive paradigm to understand the competency requirements of academic librarians in providing research data management services in two particular university settings. A multiple case study design (Yin, 2018) was adopted using university libraries of two South African higher education institutions (MUT and UKZN). The primary method of data collection was semi-structured interviews with purposively selected academic librarians from the two research sites. Content analysis of academic library job advertisements with RDM responsibilities (n=31 out of a total of 171 academic library job advertisements) for the three-year period 2019 to 2022, was used as a supplementary method to obtain insight into the competencies required for academic library RDM services. Purposively selected librarians (n=10) participated in the study based on their capacity to contribute rich data that addressed the study's research questions. Thematic content analysis, which is used to present themes that relate to data collected (Erlingsson and Brysiewicz 2017; Braun and Clarke, 2022), was conducted. The researcher identified categories of themes based on respondents' knowledge and skills in RDM and from supplementary data collected via relevant job advertisements. The data was analysed using Excel and displayed in graphs and tables using descriptive statistics to capture frequency counts and percentage distributions, where applicable.

Findings and Discussions

While most interview respondents' job titles were Subject Librarians, the content analysis of job advertisements revealed a variety of job titles involving RDM services with Faculty Librarian being the more common job title (see Fig. 1). RDM services in academic libraries appear to be spread across a variety of professional job titles. RDM related posts often asked for a professional qualification in library and information science (LIS) which in South Africa could either be a four-year undergraduate degree or a three-year bachelor's degree plus a one-year postgraduate professional diploma in LIS. Some of the advertisements also mentioned an IT qualifications background as an advantage. As academic libraries move deeper into the age of the fourth industrial revolution (4IR), perhaps an advanced research degree should be a requirement for RDM services. There is support for this from Chiware and Becker (2018) who, in undertaking a South African study, established that most participants in the study who were involved in offering RDM services had a Masters or Honours degree. This is also evident in an international study by Tammaro et al. (2019: 97) which found that though most participants who worked with RDM were not in possession of a master's in LIS, they, however, had "advanced industry degrees" and prior research experience. Their study stressed the importance of knowledge of the research process in research data management and, it should be noted, that advanced degrees and research experience do tend to bring greater knowledge about the research process.

Fig. 1: Job titles from RDM related job advertisements (N=31)

In South Africa, there are three types of universities. Traditional universities refer to the older established universities in South Africa, prior to the higher education restructuring exercise following the establishment of a new democratic order in 1994. These universities are more research focused and offer degrees up to doctoral level (Ocholla and Ocholla, 2020). Universities of technology in South Africa are known to specialise in technology-oriented qualifications for skills-based vocational positions and comprehensive universities are new institutional types in the South African higher education system, offering a mixture of both technology-oriented and traditional theoretical and philosophically based qualifications (Kele and Mzileni, 2021). Fig. 2 illustrates that most of the RDM related positions in this study's content analysis of job advertisements were located in traditional universities (71% as opposed to 23% for universities of technology). This is likely because these universities are more research-focused and hence the need for RDM services in their university libraries. A similar situation is likely to play itself out in other parts of the world, irrespective of the nomenclature used to describe various types of higher education institutions.

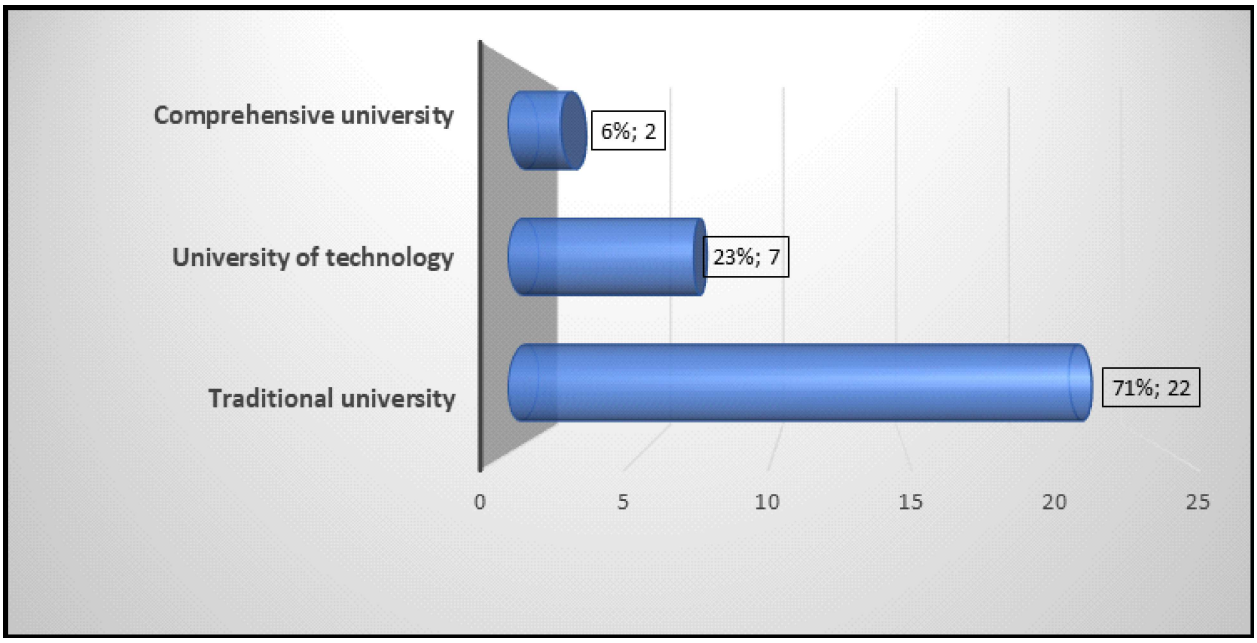

Fig. 2: Type of higher education institution within which the RDM related post is advertised (N=31)

Interviewed academic librarians were asked what knowledge (that is, theoretical and practical understanding of a subject gained through formal education or experience) they believed academic librarians at MUT/UKZN required to effectively provide RDM services to their research communities. Their responses are captured in Table 1 where 9 out of the 10 interviewed librarians emphasised knowledge of: Information and data management practices; Data centres, repositories and collections; and Data curation. The content analysis of job advertisements revealed the most required knowledge set for RDM services to be Research methods (68% of RDM related job advertisements), the Research process (65%) and Scholarly communication (52%) (see Table 2). In a large-scale study of 240 librarians across five continents, Tang and Hu (2019) made similar findings where almost 23% of librarians indicated that advanced data management skills involving research knowledge were necessary to curate and manage datasets.

Table 1: Knowledge requirements for RDM services from interviewed librarians (N=10)

Knowledge areas identified	Frequency
Information and data management practices	9
Data centres, repositories and collections	9
Data curation	9
Managing data collections	7
Funders' policies	7
Data publication requirements of journals	6
Licensing and intellectual property	4

Table 2: Knowledge requirements for RDM services from job advertisements analysed (N=31)

Knowledge requirements	Frequency	Percentage
Research methods	21	68%
Research process	20	65%
Scholarly communication	16	52%
Data sources	8	26%
Data curation	8	26%
ICTs and e-services	5	16%
Marketing methods	2	6%

Relevant verbatim responses from interviewed librarians regarding knowledge requirements for RDM services, included:

> *"Knowledge on how to do data management plans so they can take this to researchers, how to store data in its different formats and it's important for librarians to be aware of the different data that is collected in different fields."*

> *"Librarian must have knowledge on how to manage data collections."*

> *"I think librarians will need to be aware of the funders' policies and requirements; data centres; how to create data management plans; how data is published and how data must be cited."*

A question on what skills (that is, the ability to perform a task well) they thought academic librarians at MUT/UKZN required to effectively provide RDM services to their research communities, was posed to interviewed librarians. ICT skills (reported by 10 of the 10 respondents); Digitization, and Preparing datasets for deposit (both mentioned by 8 of the 10 interviewees) as key skill set requirements, were identified by the responding librarians – see Fig. 3. A librarian commented that, *"Librarians will have to have ICT skills as well as skills on digitization"*. Noteworthy skills that emerged from the job advertisement content analysis included: Digital literacy and instructional design skills (52%); Institutional repository and metadata skills (48%); and Data and information literacy skills (45%) – see Fig. 4. While not high in the frequency counts, Data curation skills (see Fig. 4) also featured significantly in the job advertisement content analysis. In the job advertisements analysis, bibliometrics skills surfaced as a skills requirement for RDM services, but did not feature as a prominent skill set among the interviewees. These skills were also mentioned as prominent skills required for RDM in the following studies: Ohaji, Chawner and Yoong 2019; and Brochu and Burns, 2018. Tang and Hu (2019) add that librarians must be proficient in data management.

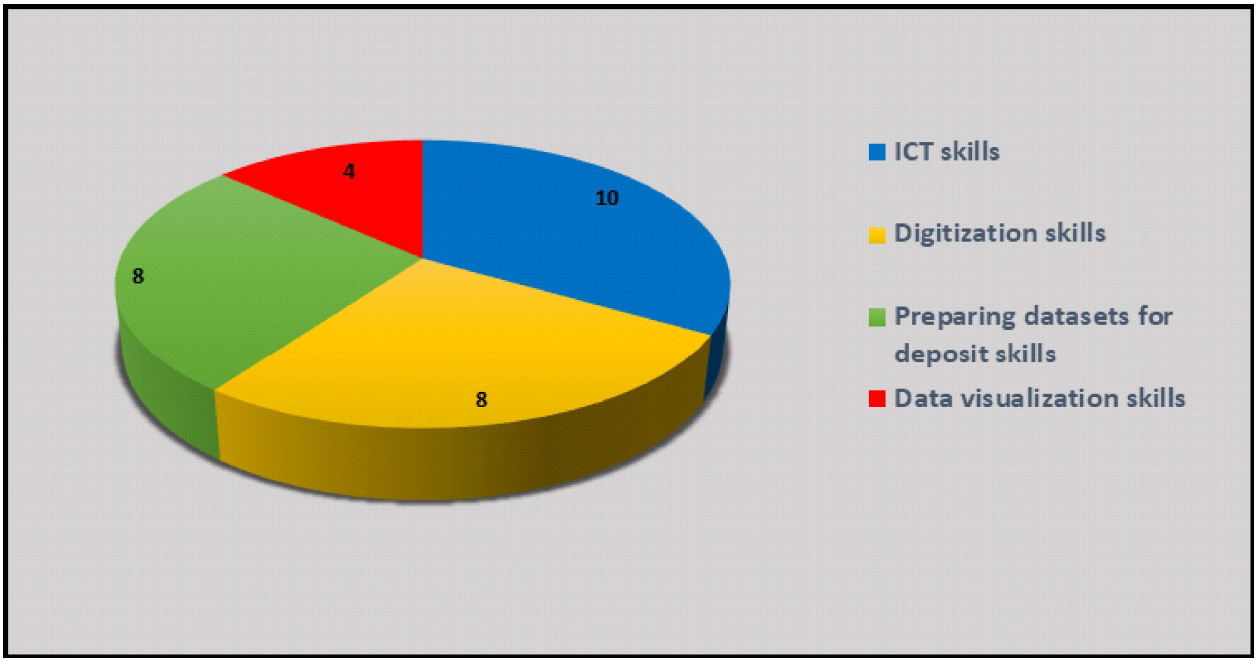

Fig. 3: Skills required by MUT/UKZN academic librarians to effectively provide RDM services as identified by interviewed librarians (N=10)

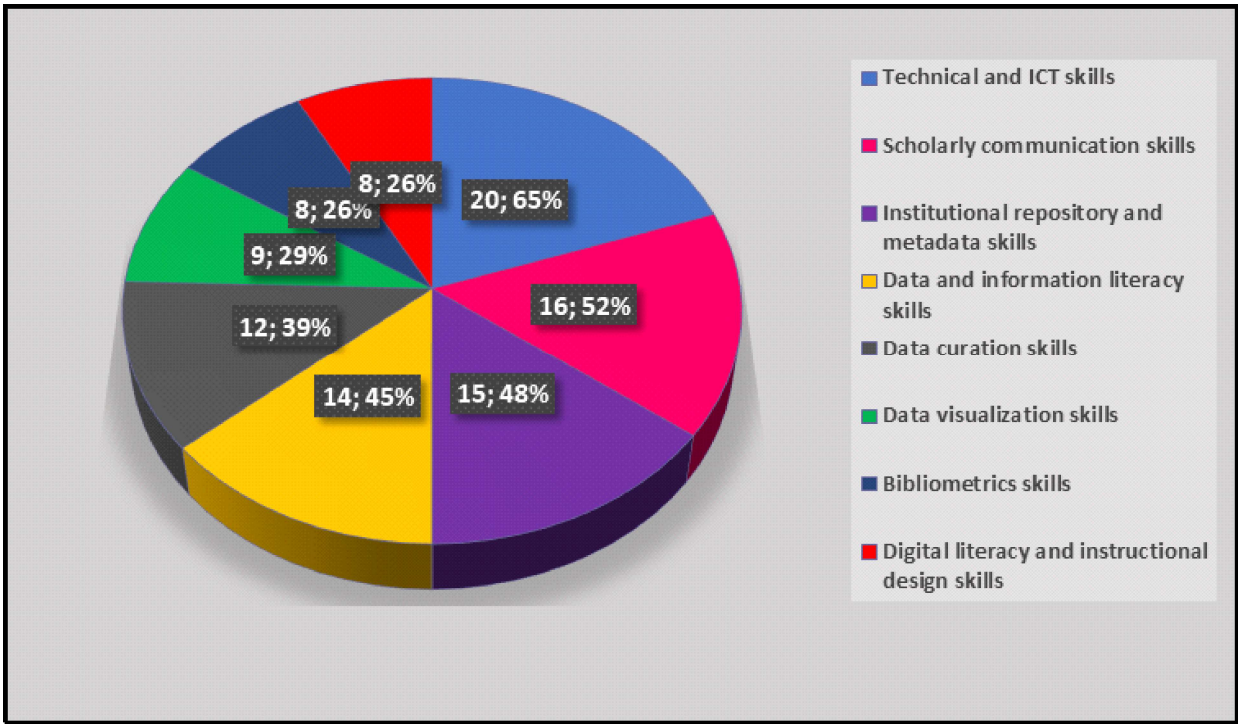

Fig. 4: Skills requirements for RDM services from job advertisement analysis (N=31)

The study also probed librarians' personal attributes required for provision of RDM services. Interviewees identified attributes such as being flexible, tech-savvy, willing to learn, and being able to adapt to change as being significant to work in this emerging field. These personal attributes are also highlighted in the literature, for example, Ohaji, Chawner and Yoong (2019), where adaptability and flexibility are noted as being likely attributes required for RDM. This is correlated by Federer (2018) who emphasises that soft skills such as eagerness to learn are encouraged for RDM services.

It would seem from these findings on knowledge, skills and attributes from the two cases (MUT and UKZN) that there are a number of competencies needed for RDM services. The most dominant knowledge sets that emerged from this study include knowledge of: Information and data management practices; Data centres, repositories and collections; Data curation; Managing data collections; Funders' policies; Research methods; and Research processes. Dominant skillsets required for RDM services that emerged from the study include ICT skills; Digitization skills; and Preparing of datasets for deposit. Dominant personal attributes (or 'other competencies') emerging from the study include: Flexibility; Adaptability; Being tech-savvy; and A willingness for continuous learning.

Interviewed academic librarians were asked to draw from their experiences with research communities served by MUT/UKZN Libraries to identify strategies that they believed would need to be put in place to ensure that academic librarians at these institutions are equipped with the necessary knowledge, skills and other competencies in order for them to effectively provide research data management services to the library's research communities. Interviewed librarians believe training, support and collaboration with other departments are key strategies to ensure librarians have the necessary competencies to effectively provide RDM services. Some useful responses included:

> *"Training and benchmarking are needed especially from the universities that already have an understanding of data management."*

> *"Robust training is needed in the area of RDM so that librarians can be able to facilitate RDM services."*

> *"Training for librarians is required to train and support researchers in RDM. Librarians should also work closely with other support services including technical services and research officers to ensure that the terminologies and practices are relevant to the researcher and the field in which they work."*

> *"Libraries will need to work with IT services and legal advisor to understand the legal implications of making data available."*

> *"It is important for academic libraries to have a clear project plan on how they will implement research data management involving all stakeholders."*

Librarian respondents in the study indicated that for RDM to be successful libraries should be institutional role-players. This is supported by Perrier, Blondal, and MacDonald (2018). It emerged from the study that academic libraries need robust training and benchmarking for librarians to ensure they remain up to date in a rapidly evolving field such as RDM. Such support will enable academic libraries to successfully implement RDM services. Similar observations were noted by Wittenberg, Sackmann and Jaffe (2018) about academic libraries' support for professional development through training programmes, workshops and conferences, suggesting a commitment to developing librarians individually. Data collection development policies will have to be in place to address licensing issues. Policies will also assist researchers with guidelines on creating their data management plans (DMPs). Wittenberg, Sackmann and Jaffe (2018), and Rod, Zhou and Rousseau (2023) elaborate on the institutional role that the organisation should play in providing RDM services, and these include guidelines and policies, infrastructure and funding, data storage, and intellectual property support. Such support will enable academic libraries to successfully implement RDM services.

Academic librarians need to be equipped with the necessary knowledge, skills and other competencies to effectively provide RDM services to their research communities. In summary, this means having robust training (in the form of institution sponsored training programmes, workshops and conferences) as well as self-development via online courses, webinars and other materials freely available online. A key strategy may also include the library becoming a key institutional role-player in the implementation of the institution's RDM.

Conclusion and Recommendations

The findings of this study indicated dominant competencies required by academic librarians to effectively provide RDM services to their research communities. These knowledge sets include knowledge of Information and data management practices; Data centres, repositories and collections; data curation; managing data collections; funders' policies; research methods; and research processes. Dominant skillsets required for RDM services that emerged from the study include ICT skills; Digitization skills; and Preparing of datasets for deposit. Dominant personal attributes (or 'other competencies') emerging from the study include flexibility; adaptability; being tech-savvy; and a willingness for continuous learning. An important finding from the study is that a LIS professional wishing to engage in RDM is not expected to possess all of these and other relevant competencies. Hence the need for LIS professionals engaged in RDM to work as a team, both in terms of current skills possession as well as future learnings for efficient RDM services to research communities.

Findings also revealed that strategies to support and reskill for RDM include robust training and self-development via online courses, webinars and other materials freely available online, and institutional support; and collaboration with other campus departments such as IT and the research office who also possess competencies relevant to supporting RDM services offered by the library.

Based on the findings, this paper recommends that strong training should be provided for academic librarians to upskill and close the gap between current competency possession and required competencies. To identify campus roles and responsibilities and for proper workflow in RDM implementation by the academic library and its campus associates, institutional support in the form of policy formulation, guidelines provision, infrastructure, funding, and other relevant support should be provided. Collaboration and cooperation among relevant institutional partners should be implemented in order to identify campus roles and responsibilities and to ensure proper workflow in the implementation of RDM by the academic library and its campus. While this study focussed on just two academic libraries as an exploratory exercise in ascertaining academic library competency requirements for RDM services, more research is needed, possibly on a larger scale involving more academic libraries in South Africa and elsewhere for purposes of comparison and benchmarking.

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The Effect of Computer Self-Efficacy and Utilisation of Electronic Information Resources by Students of a Nigerian University

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Abstract

The study examined the effect of computer self-efficacy, college affiliation, year of study and barriers to utilisation of electronic information resources (EIRs) by students of Samuel Adegboyega University, Ogwa, Edo State, Nigeria. The study undertook quantitative research. Stratified simple random technique was used to select sample size of 200 respondents from 374 undergraduate students of Samuel Adegboyega University, across the three Colleges in the University. Structured questionnaire was used for data collection. Data were analysed using inferential statistics. The study indicated students had high-level of computer self-efficacy in relation to the utilisation of EIRs and high level of utilisation of EIR. The study showed computer self-efficacy, College and Year of study positively influenced students' utilisation of EIRs. Erratic power supply and poor internet connectivity were the barriers to effective utilisation of EIR by students.

Keywords: Computer Self-efficacy, Electronic Information Resources, Universities, Students.

Introduction

The incredible growth of electronic resources (e-resources) in the twenty-first century has profoundly altered how students and academics around the world approach finding information. Electronic information resources (EIRs) have recently become known as primary means of information sharing in universities, particularly for researchers (Lefuna, 2017). Electronic information resources are fully incorporated into our society, there is an increase in demand as regard to the utilisation of electronic information resources as the world transits to one that is dominated by technology. Most people especially students prefer using resources from the Internet for various academic and research purposes (Tariq and Zia, 2014). To improve academic and research activities that take place in higher institutions and to keep up with international trends and standards, university libraries, which serve as the hub of the institutions, have also jumped on the universal trend and started offering electronic information resources (EIRs) to their users.

Ukachi et al (2014) electronic information resources (EIRs) are type of resources that can simply be utilised via computers, tablets, and smartphones. For academic communities to receive current knowledge at the appropriate time and in the appropriate form, these resources have become essential. Electronic information resources can store information electronically, offer many concurrent users with access, make information easily accessible across geographic borders, and be accessed through electronic systems and networks. Internet resources,

CD-ROMs, e-books, e-journals, online databases, and open access catalogues (OPAC) are some examples of EIR (Mittal and Bala, 2013). Availability of EIR in higher institutions is a novel way of attaining global availability of research information (Adeniran and Onuoha, 2018). Due to financial constraints and geographic limitations, EIR offers students good opportunity to acquire scholarly knowledge that is unavailable in libraries.

Availability of several of resources had made studying easier and engaging, EIRs have the potential to expand students' learning opportunities (Olawale and Popoola, 2021). Khan (2016) asserted that as a result of the availability of hundreds of thousands of monographic resources, serials, learning tools, and databases among other things in electronic formats and the ability to access them remotely, more people are using information, literature, and information services. Furthermore, EIR are easily updated which aid research, as well as provide the benefit of quickly searching and retrieving of information resources. Librarians are working effortlessly to make more electronic information resources available to clienteles as the function of libraries evolves (Deng as cited in Ternenge, 2019).Computer self-efficacy is Imperative because it motivates effective EIR use due to increase of EIRs, asserting to the fact there is paradigm shift from print to EIR.

The term "computer self-efficacy" means what a person believes about their capacity to use computers and other software to carry out specific tasks (Ebijuwa and Mabawonku, 2019). Okuonghae et al (2021) affirmed that undergraduates` computer self-efficacy is a predator of their utilisation of electronic information resources. Similarly, Compeau and Higgins as cited in Mitra et al (2014) found that "students use of technology was influenced by their self-efficacy, and that students with higher self-efficacy used computers more frequently and had less computer-related anxiety. Students with stronger computer self-efficacy tend to see themselves as been able to use technology."

This study is based on "social cognitive theory" by Bandura (1986) Bandura asserted that "Self-efficacy" influences decision-making regarding what behaviours to engage in, the effort and perseverance put in the face of challenges, engaging in those behaviours which will eventually lead to mastery of those behaviours. When dealing with computers, those with lesser "computer self-efficacy" get irritated and worried, and they are less likely to use computers when faced with hurdles. For students to succeed, they must develop the computer self-efficacy abilities required to investigate the accessible electronic information resources. Computer self-efficacy is critical for student's to conduct effective information searches.

However, despite the numerous benefits of EIRs, observation and interactions with undergraduate students of Samuel Adegboyega University (SAU) shows a poor utilisation of EIRs by the students. This could be as a result of the students' "computer self-efficacy" and their subsequent nervousness in the utilisation of computer and other EIRs. This research studied effect of computer self-efficacy and the utilisation of electronic information resources by students of Samuel Adegboyega University (SAU), Ogwa, Edo State, Nigeria.

Objectives of the Study

The purpose of this research was to ascertain:

1. the level of computer self-efficacy of students in SAU, Ogwa Edo State, Nigeria.
2. the effect of students' college affiliation on the utilisation of electronic information resources (EIRs) in SAU, Ogwa Edo state, Nigeria.
3. the effect of students' year of study on the utilisation of Electronic Information Resources(EIRs) in SAU, Ogwa Edo state, Nigeria.
4. extent of utilisation of electronic information resources (EIR) by students in SAU, Ogwa Edo State, Nigeria.
5. challenges hindering the effective utilisation of electronic information resources (EIR) by students of SAU, Ogwa Edo State, Nigeria.

Hypotheses

Ho_1 Computer self-efficacy has no significant effect on the utilisation of EIRs by students of SAU, Ogwa Edo state, Nigeria.

Ho_2 Students' college affiliation have no significant influence on the utilisation of EIRs in SAU Ogwa, Edo state, Nigeria.

Ho_3 Students' year of study have no significant influence on the utilisation of EIRs in SAU Ogwa, Edo state, Nigeria.

Literature Review

Few researches on computer self-efficacy and the utilisation of electronic information resources have been done. A review of some of these investigations is offered in this section. Tabassum et al. (2015) for example, critically evaluated factors influencing EIR usage at Bangladesh's East-West University. The information was gathered from 119 users of the institution's digital library system using a questionnaire-based survey and observational approaches. Users' knowledge of the search domain, the quality of EIR content, system characteristics, and service quality all influenced their behavioural intention to use EIR, according to the findings. However, the study recommended that technical, physical, and intellectual infrastructure be developed in order to make EIR more accessible in university libraries. A more user-friendly interface was also suggested to keep users familiar with terminology, maintain a consistent interface style, and maintain a clear navigation flow. Sam et al., (2005) investigated "undergraduates' computer self-efficacy, computer anxiety, and attitudes toward the Internet, and discovered that the majority of the respondents had a high level of computer self-efficacy." The majority of undergraduates used the Internet for e-mail, research, and other purposes.

At Pentecost University College Ghana, Ahmadu (2013) investigated the factors that influence students' behavioural intentions to use EIR. The author looked at human, institutional, and technological elements that influence students' intentions to use EIR in their learning processes. According to the findings, students must have a favourable attitude toward educational technology in order to gain relevant insight into the adoption and integration of e-resources into their learning processes. One of the major reasons for increasing the incorporation of computers in information search has been highlighted as students' academic progress. Eyitayo (2011) conducted a study between August and October 2009 on the correlation between computer self-efficacy and the utilisation of OPAC by final year students of University of Botswana. The study revealed that the majority of undergraduates possessed a high level of computer self-efficacy in the use of the Online Public Access Catalogue.

In the Nigerian context, Sadiku and Kpakiko (2017) conducted a study in Nigerian university libraries on computer self-efficacy and the utilisation of electronic resources by students. The study took the form of a descriptive survey. A survey of students from six universities in Nigeria's six (6) geographical zones was conducted. Students were given a questionnaire to fill out on their library use, computer competency, and computer use. The information gathered was examined and compared to their computer self-efficacy ratings. According to the findings, students have a high level of computer self-efficacy and are interested in accessing the library's e-resources. Oyedapo et al. (2019) looked into the impact of computer self-efficacy on undergraduates' use of e-resources in three Nigerian institutions. The study's data gathering instrument was a questionnaire. The investigation was conducted at three federal universities. 261 of the 300 copies of the questionnaire distributed were completed and analysed, yielding an 87 percent response rate. The study found that while federal university undergraduates had a high level of self-efficacy, they used e-resources seldom.

Briz-Ponce et al. (2017) declared that "the usage of mobile phones among students has not only been experienced in the Nigerian context but also in western countries, where studies on mobile learning have been well documented." For example, a survey found that medical students in the University of Coimbra had a positive attitude towards the utilisation of mobile learning and applications. Although, the authors demonstrated that students were willing to promote its utilisation for learning, yet, they had an average willingness to adopt it due to social influence and behavioural intention, such as perception towards ease of use and the re-liableness of this technology for learning. An earlier study conducted by Gikas and Grant (2013) on students from three universities across the US, established that mobile computing devices and the use of social media provided opportunities for interaction, and collaboration, as well as allowed them to engage in content creation and communication. This result is consistent with a survey conducted among medical students at Johns Hopkins

University, which revealed that mobile technology usage improved how they learn new material and preference for classes that incorporate information technology. This means that the perceived usefulness and simplicity of usage of electronic resources such as mobile technology and the internet could enhance students' behavioural intention to use these applications for learning which in turn improves learning and inquiry.

Olawale and Popoola (2021) investigated computer self-efficacy and facilitating conditions as predictors of MBA students' behavioural intention to utilise electronic information resources in Nigerian federal universities. The study employed a cluster sampling technique and a systematic selection technique to choose 60 percent of the total population of MBA students among the 10 federal colleges that offer the degree based on probability and proportionate size. The findings revealed that MBA students in Nigerian federal universities have a high level of computer self-efficacy and favourable conditions for using electronic information resources. Odede (2015) investigated the computer capabilities and use of online information resources of library and information science undergraduates at Delta State University in Nigeria. A descriptive survey strategy was used in this investigation. The data for the study was collected using a questionnaire, and the descriptive statistical method was used to analyse the data. Simple random sampling techniques were used to determine the sample size for the study. According to the findings, 98 percent of respondents agreed that computer skills improve their use of online information resources and that their confidence in using online information resources is enhanced by their level of computer skills.

Tella et al., (2007) investigated self-efficacy and the use of electronic information as predictors of academic performance. The findings demonstrate that self-efficacy and the use of electronic information jointly predict and contribute to academic performance; respondents with high self-efficacy make better use of electronic information and have better academic performance; self-efficacy, use of electronic information, and academic performance are correlated; and the use of electronic information had a greater impact on respondents' performance in General Education subjects than other subjects. Some studies have also highlighted some challenges to EIR's successful use. For example, Ogunbodede et al., (2021) discovered that in Nigeria, electrical supply, insufficient Internet access, and a lack of adequate computer systems are among the key hurdles to successful EIR use. Inadequate information retrieval skills, poor internet access, insufficient computers, and other important impediments to the use of EIR in higher education were identified by Daramola (2016).

Methodology

The study undertook cross-sectional study using quantitative research. Descriptive survey design was utilised to ascertain the effect of computer self-efficacy and the utilisation of EIRs by students of SAU, Ogwa, Edo State, Nigeria.

Samuel Adegboyega University (SAU) is suited in Ogwa, Edo State, Nigeria, West Africa. The study population comprised of 374 undergraduate students from across the various year of study in the three colleges of Samuel Adegboyega University. The study population according to registry department of SAU can be found in Table 1.

Table 1: Population of the Study

S/N	Colleges	Year of Study				
		First	Second	Third	Fourth	Total
		Frequency	Frequency	Frequency	Frequency	
1	College of Management and social Sciences (COMASS)	53	43	40	33	174
2	College of Basic and Applied Sciences (COBAS)	36	34	31	22	124
3	College of Humanities (COHS)	21	27	19	15	70
Total		110	104	90	70	**374**

A sample size of 200 respondents was selected across the year of study from the three colleges in SAU, Ogwa, Edo. This sample size was justified by Bullen (2021) who stated that As long as 10% does not exceed 1000, 10% of the population is typically a reasonable maximum sample size. Stratified simple random technique was used to select the sample size of 200 respondents representing 53% of the population.

Table 2: Sample Size of the Study

S/N	Population of the Study						Sample Size of the Study				
	COLLEGES	YEAR OF STUDY					YEAR OF STUDY				
		First	Second	Third	Fourth	Total	First	Second	Third	Fourth	Total
1	College of Management and social Sciences (COMASS)	53	43	40	33	174	30	24	20	20	94
2	College of Basic and Applied Sciences (COBAS)	36	34	31	22	124	20	16	15	14	65
3	College of Humanities (COHS)	21	27	19	15	70	10	14	10	7	41
Total		110	104	90	70	**374**	60	54	45	41	**200**

Structured questionnaire was used to collect data questionnaire included respondent's demographic information, students' level of computer self-efficacy, level of usage of EIR and challenges facing the effective utilisation of EIRs.

Copies of the designed questionnaire were distributed by the researchers between September and October, 2022. The response format was four point's Likert scale. A four-point Likert scale of Very High, high, Low, and Very Low for research questions 1, Very High Extent, High Extent, Low Extent, and Very Low Extent for research questions 2 and Strongly Agree, Agreed, Disagree and strongly disagree for research question 3. To determine the validity of the questionnaire three experienced librarians in an academic library reviewed and approved the questionnaire. The reliability of the questionnaire was confirmed using Cronbach alpha of 0.89 which indicated high reliability. Out of the 200 questionnaire administered to students, 200 (100%) were filled, returned and found usable for data analysis.

The data was analysed at first stage using SPSS to determine the percentage, mean score and standard deviation. Regression analysis was used to test the hypotheses at 0.05 significant levels. The decision was based on mean score 2.5, this implied that any statement with mean score of 2.5 and above was agreed/high and statement with a mean score below 2.5 was disagreed/low.

Result

Table 3: Demographic of Respondents

Gender			**Age range**			**Colleges**			**Year of Study**		
Gender	**No.**	**%**	**Age**	**No.**	**%**	**Colleges**	**No.**	**%**	**Year of Study**	**No.**	**%**
Female	111	55.5	20 years and below	129	64.5	College of Management and social Sciences (COMASS)	94	47	First	60	30.0
Male	89	44.5	21-30 years	64	32.0	College of Basic and Applied Sciences (COBAS)	65	32.5	Second	54	27.0
			31-40 years	7	3.5	College of Humanities (COHS)	41	20.5	Third	45	22.5
									Fourth	41	20.5
Total	**200**	**100**	**Total**	**200**	**100**	**Total**	**200**	**100**	**Total**	**200**	**100**

Table 3 showed that the most students under study are female 111 (55.5%) while male students are 89(44.5%). Also bulk of the respondents were within the age range of 20 years of age and below (64.5%), and others were between 21-30 years (32.0%), and 3.5% are between 31-40 years of age. Further, it was also revealed that majority of the respondent were in College of Management and Social Sciences 94(47%), others were in College of Basic and Applied Sciences 65(32.5%) and College of Humanities 41(20.5%). Finally, 30.0% of Students were in first year, 27.0% were in Second year, 22.5% were in Third year, and 20.5% are in Fourth year respectively. This implies that the most respondents were first year students.

Table 4: Level of Computer self-efficacy in relation to utilisation of EIRs

S/n	Component	VL	L	H	VH	$\bar{x}$	S.D
1	I am competent in utilising electronic information resources	-	1 0.5%	61 30.5%	138 69.0%	3.7	0.476
2	I am skilled to utilise the internet to look up information and resources	7 3.5%	15 7.5%	54 27.0%	124 62.0%	3.5	0.783
3	I know how to use email for communication	7 3.5%	18 9.0%	64 32.0%	111 55.5%	3.4	0.795
4	It is very easy for me to utilise EIRs	10 5.0%	15 7.5%	60 30.0%	115 57.5%	3.4	0.833
5	I know how to utilise EIRs	4 2.0%	10 5.0%	81 40.5%	105 52.5%	3.4	0.684
6	I am not anxious when using electronic information resources	3 1.5%	13 6.5%	98 49.0%	86 43.0%	3.3	0.667
7	I can use word processor(e.g. MS word) effectively	9 4.5%	22 11.0%	61 30.5%	108 54.0%	3.3	0.847
8	I can utilise presentation software (e.g. Ms PowerPoint) for classroom delivery	10 5.0%	29 14.5%	69 34.5%	92 46.0%	3.2	0.873
9	I am skilled in organising and managing files	9 4.5%	20 10.0%	98 49.0%	73 36.5%	3.2	0.786
10	I know how to utilise electronic spread sheet effectively (e.g. MS Excel)	8 4.0%	33 16.5%	91 45.5%	68 34.0%	3.1	0.812
11	I have the ability to utilise conferencing Software (e.g. Skype, Zoom) for partnership purposes	14 7.0%	36 18.0%	77 38.5%	73 36.5%	3.1	0.909
12	I feel confident using a printer.	10 5.0%	37 18.5%	72 36.0%	81 40.5%	3.1	0.883
13	I can use blogging for personal use	16 8.0%	56 28.0%	63 31.5%	65 32.5%	2.9	0.957
14	I am skilled in using learning management system	16 8.0%	46 23.0%	62 31.0%	76 38.0%	2.9	0.967
15	I am skilled in using video editing software (e.g. Adobe premiere, Inshot etc.)	26 13.0%	63 31.5%	66 33.0%	45 22.5%	2.7	0.971
16	I am skilled in using graphic Editors (e.g. Microsoft Paint, Adobe Photoshop) effectively	20 10.0%	68 34.0%	58 29.0%	54 27.0%	2.7	0.970
17	I am skilled in using website editors (e.g. Microsoft FrontPage, and Macromedia Dreamweaver) effectively	18 9.0%	81 40.5%	57 28.5%	44 22.0%	2.6	0.925
18	I am capable in using animation software (e.g., Macromedia Flash, Author ware, and Director) effectively	24 12.0%	91 45.5%	55 27.5%	30 15.0%	2.5	0.890
Weighted Mean = 3.11							

Table 4 revealed student's levels of computer self-efficacy as regard to utilisation of EIR in SAU, Ogwa. Items 1 to 17 had mean values above t 2.5except for item 18 with a mean value of 2.5. The grand mean (3.1) is greater than the bench mark mean (2.5), thus indicated that students had a high level of computer self-efficacy.

Table 5: Extent of utilisation of EIRs

S/n	Utilisation of EIR	VLE	LE	HE	VHE	$\bar{x}$	S.D
1	I use EIR to learn, share knowledge with my friends and it assist me in my professional growth	17 8.5%	27 13.5%	54 27.0%	102 51.0%	3.2	0.974
2	I update my knowledge using EIR.	20 10.0%	20 10.0%	66 33.0%	94 47.0%	3.2	0.973
3	I use EIR in writing my assignments and reports	16 8.0%	27 13.5%	71 35.5%	86 43.0%	3.1	0.933
4	I use EIR to carry out my research activities	23 11.5%	25 12.5%	77 38.5%	75 37.5%	3.0	0.982
5	I use EIR as supplements to classroom lectures	17 8.5%	40 20.0%	70 35.0%	73 36.5%	3.0	0.954
6	I use EIR to prepare my course work	20 10.0%	45 22.5%	66 33.0%	69 34.5%	2.9	0.984
7	I use EIR as an alternate to print resources	21 10.5%	58 29.0%	57 28.5%	64 32.0%	2.8	1.001
Weighted Mean = 3.0							

Table 5 showed the extent of utilisation of EIRs by students in SAU, Ogwa. Which showed all the items listed had mean scores above the benchmark mean of 2.5 and grand mean of 3.0, thus indicating high level of utilisation of EIRs by students of SAU.

Table 6: Challenges hindering the effective utilisation of electronic information resources

S/n	Challenges	SD	D	A	SA	$\bar{x}$	S.D
1	Poor electricity supply	15 7.5%	20 10.0%	72 36.0%	93 46.5%	3.2	0.907
2	Poor internet connectivity	22 11.0%	25 12.5%	72 36.0%	81 40.5%	3.1	0.986
3	Inadequate computer systems	19 9.5%	32 16.0%	77 38.5%	72 36.0%	3.0	0.951
4	Inadequate time to search for right resources	20 10.0%	55 27.5%	74 37.0%	51 25.5%	2.8	0.941
5	Inability to use EIRs effectively	55 27.5%	44 22.0%	45 22.5%	56 28.0%	2.5	1.169
6	Phobia for usage of electronic resources	70 35.0%	45 22.5%	50 25.0%	35 17.5%	2.3	1.115
Weighted Mean = 2.80							

Table 6 revealed the challenges facing effective utilisation of EIR by students of SAU, Ogwa. "Poor electricity supply" ($\bar{x}$ =3.2) ranked highest as the major challenge hindering the effective utilisation of electronic information resources by students, others were "Poor internet connectivity" ($\bar{x}$ =3.1), "Lack of adequate computers systems" (=3.0), "Inadequate time to search for right resources" (=2.8), "Inability to use EIRs effectively" (=2.5), and lastly "Phobia for usage of electronic resources" (=2.3) respectively.

Table 7: The influence of computer self-efficacy, the effect of Students' college and students' year of study on the utilisation of EIR in SAU, Ogwa

Variables	Std. Error	Beta (β)	T	p-value	R^2	Remarks
Constant	1.067	**0.596**	21.260	<.0000	**0.352**	**Sig.**
Computer self-efficacy	0.451		56.060			
Constant	1.067	**0.333**	21.260	<.0000	**COMASS** 0.082; **COBAS** 0.111; **COHS** 0.040; **R^2 =0.233**	**Sig.**
Students' College	0.312		40.120			
Constant	1.067	**0.731**	21.260	<.0000	**First** 0.088; **Second** 0.062; **Third** 0.110; **Fourth** 0.171; **R^2 =0.431**	**Sig.**
Students' year of study	0.867		43.170			
Dependent Variable: Utilisation of Electronic Information resources						

*** Sig. at 0.05 level**

Table 7 indicated that computer self-efficacy significantly affect the Utilisation of EIR by students of SAU, Ogwa (**R^2**=0.352, **β**=0.596, **T**=56.060, **p**<0.05). Computer self-efficacy could explain 35.2% variation (R2= 0.352) in students' utilisation of EIRs at SAU, Ogwa and also Computer Self-efficacy positively influenced the utilisation of EIRs among students in the study (p= 0.596, P< 0.05).

It was further revealed that the students' college significantly affect the utilisation of EIRs in SAU, Ogwa (**R^2**=0.233, **β**=0.333, **T**=40.120, **p**<0.05. The study revealed the College students belong to could explain 23.3%(R2= 0.233) variation that is 8.2%(R2=0.082), 11.1%(R2=0.111) and 4.0% (R2=0.040) for COMASS, COBAS and COHS respectively in students' utilisation of EIRs at SAU, Ogwa and with a variation of 11.1%(R2= 0.111) it revealed that students in COBAS are mostly influenced as regards to utilisation of EIRs in SAU. Generally, Students' college moderately influenced the utilisation of EIRs among students in the study (p= 0.333, P< 0.05). The null hypothesis was rejected.

Finally, table 7 showed that students' year of study significantly affect the utilisation of EIRs in SAU, Ogwa (**R^2**=0.431, **β**=0.731, **T**=43.170, **p**<0.05). The study showed that students' year of study could explain 43.1% (R2= 0.431) variation that is 8.8%(R2=0.088), 6.2%(R2=0.062), 11% (R2= 0.110), 17.1%(R2=0.171) for first, second, third and fourth year respectively in students' utilisation of EIRs at SAU, Ogwa and with a variation of 17.1%(R2=0.171) it showed that fourth year students are mostly influenced as regards to use of EIRs in SAU. Generally, year of study highly influenced the utilisation of EIRs among students in the study (p= 0.731, P< 0.05). The null hypothesis was therefore rejected.

Hence, computer self-efficacy, Students' College and Students' year of study positively influenced the utilisation of Electronic Information Resources by students in SAU. The null hypotheses were rejected.

Discussion

The research centred on computer self-efficacy and utilisation of EIR by students of SAU, Ogwa. The findings indicated that the students had a high level of computer self-efficacy and high level utilisation of EIR and observed that poor electricity supply, poor internet connectivity, and lack of adequate computer systems were the major challenges hindering the effective utilisation of EIR by students in SAU, Ogwa.

The study discovered that high level of computer self-efficacy influenced undergraduates' utilisation of EIRs. The assertion is made based on the premise that "Computer self-efficacy is the judgments and confidence reflected in what can be done through the use of computers" (Ebijuwa and Mabawonku, 2019). This conformed to the findings of Okuonghae, Igbinovia and Adebayo (2021); Olawale and Popoola (2021) who also established high level of computer self-efficacy of students as regards to the usage of electronic information resources in Nigeria.

The study also discovered that the students had a high level of utilisation of EIR. Ndubuisi and Udo (2013) discovered that students were motivated to use EIRs in their university libraries because they found them to be more enlightening, easy to access and use, save time, more useful and less expensive. This finding is therefore not in agreement with the findings of Kodua-Ntim and Fombad (2020) and Uwandu (2022) who reported low level of utilisation of EIR among students.

Finally, the challenges hindering the utilisation of EIR, the study observed that poor electricity supply, poor internet connectivity, and inadequate computer systems were the main challenges hindering the effective utilisation of EIR by students in the study. This finding is in conforms with the findings of Ogunbodede et al.,(2021) who found that electricity supply, poor internet connectivity, and lack of adequate computer systems were some of the major challenges to the effective use of EIR in Nigeria.

The result from the hypotheses indicated that computer self-efficacy could explain 35.2% variation (R2= 0.352) in students' utilisation of EIRs at SAU, Ogwa and also Computer Self-efficacy positively influenced the utilisation of EIRs among students in the study (p= 0.596, P< 0.05). The null hypothesis is therefore rejected. This supported the findings of Oyedapo et al. (2019) who also established a significant relationship between self-efficacy and utilisation of EIR. This implies that students with high computer self-efficacy are more likely to effectively utilise EIRs.

Further, the study revealed the college students' affiliation belongs to, could explain 23.3%(R2= 0.233) variation that is 8.2%(R2=0.082), 11.1%(R2=0.111) and 4.0% (R2=0.040) for COMASS, COBAS and COHS respectively in students' utilisation of EIRs at SAU, Ogwa and with a variation of 11.1%(R2= 0.111) it revealed that students in COBAS are mostly influenced as regards to utilisation of EIRs in SAU than any other college. It was deduced that students in COBAS highly utilised EIRs in SAU, as compared to other colleges in the institution. This could be as result of the fact that students in COBAS field, are more analytical, given their science background, and also the need to use the latest findings in their field, compared to COMASS and COHS students, that deal more on historical context, which can lead to greater reliance on print resources. Generally, students' college moderately influenced the utilisation of EIRs among students in the study (p= 0.333, P< 0.05). The null hypothesis was rejected. This supported the findings of Ndubuisi and Udo (2013) that discovered the reason for the high level of usage is as a result of the student's perceived usefulness of EIR in their academics.

Also, the study showed that students' year of study could explain 43.1% (R2= 0.431) variation that is 8.8%(R2=0.088), 6.2%(R2=0.062), 11% (R2=0.110), 17.1%(R2=0.171) for first, second, third and fourth year respectively in students' utilisation of EIRs at SAU, Ogwa and with a variation of 17.1%(R2=0.171) it showed that fourth year students are mostly influenced as regards to use of EIRs in SAU. This implied that fourth year students utilise EIRs as compared to other year of students, this may be as a result of various factors such as more years spent in university and have familiarised themselves with EIRs and might have developed better search and information retrieval skills as compared to other year of studies, also final year students engage in project, term papers, seminars etc. Generally, year of study highly influenced the utilisation of EIRs among students in the study (p= 0.731, P< 0.05). The null hypothesis was therefore

rejected This is in support of Eyitayo (2011).that revealed majority of undergraduates possessed a high level of computer self-efficacy in the use of the Online Public Access Catalogue.

Finaly, computer self-efficacy, students' college affiliation and students' year of study positively influenced the utilisation of Electronic Information Resources by students in SAU. The null hypotheses were rejected.

Conclusion

The study examined computer self-efficacy and use of EIR by students of Samuel Adegboyega University, Ogwa, Edo State, Nigeria. This research work confirmed that the respondents had a high level of computer self-efficacy in the utilisation of EIRs and a high level usage of EIRs. However, poor electricity supply, poor Internet connectivity and inadequate computer systems were the major challenges hindering the effective utilisation of EIR in the study. The study also established that computer self-efficacy, discipline and year of study positively influenced the utilisation of EIR among students in the study.

In addition, the use of electronic information resources more frequently may lead to better learning results. Learning materials and information may be more widely available to students who are adept at using digital resources, which may have a good effect on their academic achievement. These findings may be applied to other higher institution of learning that have the similar teaching and learning system, tactics, and conditions. Arising from this study, it is recommended that computer self-efficacy can influence use of EIRs. Appropriate facilities must be provided for the students so that all the students can exploit the use of electronic resources, which will make the library less dependent on print resources.

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