

CONTEMPORARY ROLES OF LIBRARIANS IN NAVIGATING AND ADDRESSING ACADEMIC RESEARCH ETHICAL DILEMMAS: THE TECHNICAL UNIVERSITIES IN PERSPECTIVE

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Abstract

The polytechnics in Ghana are currently been upgraded to Technical University status. In view of this, academic research and, for that matter, compliance to research ethics has become imperative in these institutions notwithstanding concerns on ranking, funding, open scholarship, virtual research, and reputation building have also come into play. Academic writing is guided by laid down rules, standards and codes of conduct in order to uphold intellectual integrity and honesty. As such, behavioural attitudes, the ‘‘duty-based theory which complements the need for compliance to academic research policies, rules and codes of conducts has been espoused. The researchers explored the librarians’ role in support of the Technical University new road map. This is an exploratory study that adopted the quantitative method. Senior Polytechnic Librarians whose institutions had undergone the transition became the resultant respondents. A questionnaire was the instrument used for the data collection. Twenty-six responses were analysed using SPSS to ascertain the results Findings revealed a number of roles deemed traditional and contemporary. Although the librarians play crucial roles by instilling academic discipline, emerging roles and use of Information Communication Technology (ICT) applications were minimal. The study revealed plagiarism, fabrication, poor record keeping, honorary authorship, conflict of interest, duplication particularly of dissertations as some of the dilemmas of scholarly communication. Other delinquencies were data insecurity, social network abuse and issues on e-waste. It was discovered that integration of ICT has impacted on academic research and for that matter on ethics. The benefits of adhering to ethical standards promote integrity in research, impact on institution’s reputation, ranking, funding, transparency amongst others. Innovative applications, interactive and collaborative approaches, policy and compliance, sensitisation and education amongst others were recommended as remedies to manage and curtail the menace of violations of research ethics. The study ascertained the degree of awareness of these dilemmas among the librarians. It postulated vigorous ethical scrutiny and research enquiry to ensure that research findings improve human conditions both present and future. As Librarians our traditional roles are currently embedded with the new and challenging tasks.

Keywords: *Research Ethics, Ethical Dilemmas, Technical Universities, Intellectual Honesty*

Introduction

The awareness and consideration for academic research ethics among scholars have become imperative as a result of open scholarship, big data, institutional ranking, academic integrity, funding and reputation building. Academic ethics encompass human conducts, attitudes and responsibility of compliance to lay down policies, rules and codes of ethics. The study explored contemporary roles of librarians in navigating and addressing issues of academic research ethics by Senior Technical Universities' Librarians in Ghana.

Tertiary institutions have three main pillars which are teaching, research and extension services (Exner, Horsman and Reed (2017:2). Faculty, students and scholars lives are organised based on these core values and credos which are evaluated thereof. That notwithstanding, in this age of information overload, dynamics and demands, it is critical to assist academic scholars to distinguish quality information, be it in print format or electronic, especially for scholarly research purpose. Contemporary developments and free academic environments such as “open access, repositories, collaborative research, big data and social networks platforms have subjected knowledge, teaching, speaking and publishing to the norms and standards of scholarly inquiry. Honesty, objectivity, trust, legality, integrity, accountability and responsibility in conducting academic research have become the cornerstone of many academic enterprises” which include the Polytechnics, now Technical Universities (European University Institute, 2013:7).

Academic research, whether funded or unfunded, requires clearance from an ethics and integrity committee. This is especially so in the case of funded research. Publications are subject to ethical clearance and audit conditions to ensure integrity according to Weng'ua¹, Rotich and Kogos, (2017:23). This is because academic researchers are indebted to the public, sponsors, community and colleagues. Non-compliance to ethical standards is considered as serious academic misconduct and violation of laid down rules in the entire academic scope (European University Institute, 2013:7). In pursuance to this, most academic and publication institutions have instituted Research Ethics Policies and Committees to provide advice and guidance on academic research ethics. Such committees also act as liaisons to external partners on ethical issues. A number of universities currently boast of ethics committees; however, some polytechnics in Ghana are yet to establish such an important committee.

Ethics has been explained to connote the moral standard that guides one's action. They are rules which distinguish between right and wrong. Bothma, Cosijn, Fourie and Penzhorn (2014, 137) define ethics as “a branch of philosophy that deals with human conduct and character in distinguishing right from wrong.” The paradigm shift in research has necessitated the need to

educate researchers on ethical standards. Undertaking academic research has become mandatory among scholars in Ghana and this includes the Technical Universities. Considering Ghana's education policy of accrediting the award of degrees to them, there is the need to revisit and be alerted on some ethical implications in academic research.

The study adopted the Duty-based Theory (Fallies, 2007:28). This theory hypothesises that human behaviour is regulated by laid down rules. This framework considers ethical action as one perpetuated from duty, that is, "it is done precisely because it is our obligation to perform the action". (The application of this framework makes it obligatory for scholars to abide by academic research ethics (Brown University, 2015: 7). "Thus it is not only right to do it, but that it is wrong not to do it irrespective of the environment." This is the basis for academic research policies, rules, code of conducts, ethics committees, informed consent of parties involved in research, respect for confidentiality and anonymity, amongst others

Road Map of Technical Universities' Education in Ghana

Polytechnics are found in each of the ten administrative regions of Ghana. They operate under the guide of an Act of Parliament, Act 745, to provide tertiary education in Ghana (Nyako, 2011). The Polytechnics are mandated to train middle level managers in the areas of Applied Science, Engineering Technology, Applied Business and Art to serve manpower needs of the country according to Kutsanedzie, Achio & Mensah (2013). Further, the upgrading of the Polytechnics to autonomous degree-awarding institutions have brought about a paradigm shift in the curriculum and research focus, hence the call for conformity to research ethics (Agyefi-Mensah & Edu-Buandoh, 2014). The review of the curriculum and current research focus have created gaps in research, thus leading to ethical scepticism and enquiry.

The new roadmap was enshrined in the 2013 "State of the Nation Address" to convert Polytechnics into Technical Universities. It is expected that students in the Technical Universities will be trained to acquire high level practical and technical skills to drive the country's economic and national development agenda. The Technical Universities, according to the Ministry of Education (2014:1), have the mandate to:

- i. Contribute to raising the quality and competitiveness of the Ghanaian workforce by providing opportunities for working employees to upgrade their skills and acquire new skills.
- ii. Reduce the admission pressures on the traditional universities,
- iii. Provide progression avenues for technical and vocational students.

iv. Advance in research to inform policies

The Technical Universities are mandated to produce publications that meet both local and international standards; hence, there is the need for librarians to create the needed awareness to faculty and students on academic ethics. Developments such as inventions and innovation, which fall within their domain are subject to some level of ethical compliance called intellectual property and patent rights.

Objectives of the Study

This study explored academic research ethical dilemmas, assessed the impact of ethical compliance on research, identified the various tools and applications and the extent to which librarians have integrated such tools to control the menace of ethical violations. Again, it assessed the awareness and preparedness of senior polytechnic librarians in support of the new paradigm. The findings of the study are expected to help librarians understand the various ethical dilemmas and ways to control or eliminate them. It will serve as a policy guide to decision makers in making appropriate decisions, policies and codes concerning ethical compliance.

Statement of Problem

Academic research ethics has become a contemporary issue of concern in tertiary institutions worldwide. This is because of its implications on ranking, funding, visibility, reputation and integrity of research in these institutions. Research has revealed the rise in ethical misconduct among scholars. Such misconduct, according to Totolo (2015), includes plagiarism, conflict of interest, duplication, fabrication amongst others. With regard to the conversion of the polytechnics in Ghana to Technical Universities, it is envisaged to trigger research gaps. Inversely, limited attention has been given to addressing ethical issues in research, intellectual property protection and awareness.

Radical changes in Information and Communication Technology (ICT) as an enabling tool within the academic sphere, coupled with such phenomena as Big data, data mining, open access, mobile application, repositories, open education and electronic document production as well as current paradigm in academics and research such as joint or collaborative research, virtual and community engagement pose significant diverse challenges and ethical implications to researchers (Cherinet, 2018; Roger and Duranti 2017). These include social network abuse,

data insecurity, cybercrime and plagiarism that are experienced among tertiary establishments (Dadzie, 2011).

The challenge of funding academic research currently experienced by the institutions has been corroborated by Weng'ua Rotich and Kogos (2017:26) and Resnik (2015:2). Research proposals have declined due to lack of credibility and academic integrity in satisfying funding partners. With regards to the conversion of the polytechnics in Ghana to Technical Universities, it is envisaged to trigger research gaps. Inversely, limited attention has been given to addressing ethical issues, intellectual property and awareness. The mandate to create the needed advocacy on academic research ethics to faculty and students falls within the scope of the librarians and this study seeks to investigate their preparedness in navigating and addressing such issues.

Research Questions

The following were the research questions this study attempted to answer.

- i. What are the roles of the Technical University librarians in research?
- ii. What are the importance of academic research ethics compliance in the Technical Universities?
- iii. Are Senior Librarians across the Technical Universities aware of ethical responsibilities towards scholarship?
- iv. What are some of the components of ethical misconduct in the Technical Universities?
- v. Are there measures in place to detect, control and eliminate the menace of violation of research ethics in the Technical Universities?

Literature Review

Importance of Ethics to Academic Scholarship

A number of tertiary institutions worldwide value deduced ethical norms to constrain the impact on academic research abuse and negligence. Therefore, the Polytechnics which have been upgraded to the status of Technical Universities ought to be mindful of ethical standards which are the cornerstone of any academic institution. The benefit of ethical compliance among other things address as the challenge of funding research that confronts tertiary institutions which include Polytechnics in Ghana. Researchers are obligated to the community thus “public responsibility” in addition to the research output in addressing societal needs. The society reciprocally supports and funds academic research as a part of social responsibility

mandate, provided the research conforms to ethical standards and codes of conduct (Resnik, 2015:2).

Again, reputation and ranking of institutions are subjected to research ethical compliance. Non-compliance to academic ethics can tarnish the reputation and this may affect the ranking of the academic institution (Asia Pacific International College, 2017:2). The transition of the Polytechnics to degree awarding entities is open to competition which entails being ranked among others academic and research institutions. Among the checklist for the ranking adherence to research ethics and compliance, openness in research, originality, objectivity and integrity.

Ethics compliance fosters justice, dignity and worth of the human person in scholarship (Capurro, 2008:1162). There is the assurance of authenticity of the publication produced. There is always reliability and validity in the publications produced (Macfarlane, 2009:1). On the other hand, individuals with varying characters might have certain limitations considering the current changes in technology and intelligence. It promotes accountability, being held accountable for the authenticity of the work produced, be it errors or goodwill, amongst others. The sources of the research are usually disclosed and accounted for. Authors are held answerable and responsible for their actions.

Contemporary Roles of Librarians in Academic Research

Librarians, as part of their traditional roles increase access to information, deliver information literacy, digitise resources, render Author Aid Services, market and promote resources, establish and manage institutional repository and also collaborate with partners. Librarians play diverse roles in the research life cycle process. According to Pienaar and Van Deventer (2009:3), librarians promote collaborations among research teams, facilitate data collection, create knowledge and disseminate it among scholars.

However, the dynamics and demands in academic research have triggered emergent, blended roles and developments by librarians according to Cherinet, (2018:93). These roles include establishment of Virtual Research Environment (VRE), Alert and Tagging Services, Research Data Management, Data visualization services, Literature gap analysis, promotion of Personal Information Management (PIM) practices, discovery and measurement of research impact (Brydges and Clarke: 2015) and financial management among others. These evolving and variegated roles have not gained the needed recognition and attention in Africa as indicated by Hart and Kleinveldt (2011:37) and corroborated by Mchombu and Maggy (2015:115) as a result of low penetration of ICT applications and skills. Therefore, an analysis and synergy of

the competencies, passion and professionalism of librarians are required to address the changing desires of researchers.

Budgeting and prioritizing has also become key components of the librarian's role. According to Shun (2016:682) libraries continually experience reduction of budgetary allocation necessitating them to prioritise. A study by Gabbay and Shoham (2017:3) revealed a claim by faculty members that librarians disproportionally divide budget to support teaching more than research. The effect of this results in faculty members distancing themselves from the use of the library during research. It is within this context, that the study explores the current roles of librarians support for academic research, their cognizance on academic research ethics, and ways to address them.

Research Methodology

This is an exploratory study which adopted the case study approach using Polytechnic Librarians whose institutions had undergone the transition to Technical University status. Preliminary investigations carried out by the researchers revealed that though there were research departments where research ethics need to be practiced by researchers, the onus of training and empowering researchers on ethics sit well with librarians. A questionnaire was the instrument used for the data collection. The questions were emailed to some respondents, affording them the opportunity to access them remotely and at convenient times. The researchers personally distributed those of Accra and Koforidua Technical Universities thereby providing the researchers a direct engagement with respondents.

Research Population

Seven (7) out of the ten (10) Polytechnics have been upgraded to Technical University status (National Council for Tertiary Education 2016; Ghana News Agency (2016). Twenty- six (26) librarians became the resultant population due to non-availability of some respondents at the time of the study. Majority of the libraries had at least three Master's degree holders for the position of professional librarian (Table 1)

Table 1: Respondents Across the Regions

Respondents	Total Number of Library Staff (Professionals and Para-Professionals)	Total Professionals
Accra Polytechnic	11	5
Kumasi Polytechnic	11	5
Tamale Polytechnic	12	3
Sunyani Polytechnic	20	3
Takoradi Polytechnic	25	5
Ho Polytechnic	9	3
Koforidua Polytechnic	10	5
Total	98	29

Source: Field Survey(2017)

Results

Librarians' Role in Academic Research

Librarians possess the credo, the techniques, knowledge and skills in providing information that supports research activities in higher education institutions. Library professionals were discovered to play crucial roles that support research in diverse ways. The study revealed the traditional roles performed by the Librarians as follows: Eighty-nine (89%) of librarians increase access to information, 81.4% support marketing and publicity of scholarly materials, 74% institutional repository (IR), 70.3% indulge in networking and collaboration, 67% focus on information literacy, 59.2% are concerned with digital curation and preservation, 55.5% Authod Aid services amongst others.

Majority of the respondents attested to the above roles. On the contrary, 51.8% were concerned with Research Data Management (RDM). Fewer Librarians(44.4%) were concerned with academic identity management, 37% reviewed literature and identified gaps, far fewer number (33.3%) supported Virtual Research Environment (VRE), whiles 33.3% were involved in Alert /tagging services. Data Visualisation and Personal Information Management (PIM) services recorded minimal endorsement among respondents with a rating of 22.2%. The former roles directly support teaching activities, whiles the latter roles address research needs and control of ethical dilemmas by ensuring that researchers access and utilise authentic information.

Table 2: Roles of Academic Research

Roles played by librarians to support academic research	Rating %				
List of Roles	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
Increased access to information	89%	11%			
Marketing of library resources and services	81.4%	14.8%	3.7%		
Institutional repository (IR) managers	74%	22.2%	3.7%		
Networking and collaboration	70.3%	26%		3.7%	
Promote Information Literacy	67%	26%	3.7%	3.7%	
Digital Curation and preservation managers	59.2%	22%	18.5%		
Author Aid Services	55.5%	22%	18.5%	3.7%	
Research Data Management (RDM) managers	51.8%	26%	22.2%		
Academic identity management	44.4%	37%	14.8%	3.7%	
Literature gap analysis	37%	14.8%	44.4%	3.7%	
Virtual Research Environment (VRE) Managers	33.3%	37.3%	22%	7.4%	
Alert /tagging Services (articles and grants)	33.3%	14.8%	51.8%		
Data visualisation	22.2%	22.2%	44.4%	7.4%	
Promote Personal Information Management (PIM) practices	22.2%	3.7%	74%		
Other (specify)					

Source: Field Survey (2017)

Importance of Academic Research Ethics and Its Impact on Scholarship

Researchers of today are obliged to include a variety of metrics in their application for grants, funding and promotion hence ethical compliance plays a crucial role. Researchers have the obligation to respect the trust placed in them by their colleagues, the public and themselves. Ethics, according to Mikesell, Bromley and Khodyakov (2013:1), protects researchers and

scholars from certain obligations that promote quality research. It also controls abuse of usage of scholarship. Issues of accountability, ownership and originality are considered as some of the impact on research (Kamat, 2006:10).

The findings of the study revealed the following as some of the impact of ethics on scholarship: Elimination of plagiarism was strongly endorsed by 81.4% of the respondents; Enhances Accountability (70.3%), Ensures integrity(66.6%); Promotes transparency (62.9%); Promotes standardization (62.9%), Openness in research (55.5%), Rights to anonymity (51.8%), Source of funding support (48.1%), Enhances institution's reputation (44.4%) and Promotes continuity in research (40.7%). The study revealed minimal awareness about the importance of ethical compliance with respect to funding, reputation and ranking and continuity of research which explicitly point out about the methodology involved in carrying out research.

Components of Ethical Misconducts /Dilemmas

The researchers explored some of the ethical dilemmas known by the respondents. The Table 4 below gives the rating. Plagiarism recorded the highest form of academic misconduct, this was strongly agreed by (88.8%) of the librarians. Studies have revealed conducts that are considered as breaches to academic research. Mikesell, Bromley and Khodyakov (2013) in exploring the ethical concerns associated with 'Community-Based Participatory Research (CBPR) with regard to ethical compliance define ethics as norms for conduct that distinguish between acceptable and unacceptable behaviour, which plays a vital role in research.

Academic dishonesty rated (66.6%), data manipulation (59.2%), fabrication (51.8%), examination/assignment malpractice (48.1%), conflict of interest (40.7%), poor record keeping (33.3%), author inflation /honorary authorship (33.3%), Salami publications (29.6%), and ghost authorship (29.6%).

Table 4: Ethical dilemmas

	Rating%				
Misconduct/Dilemmas	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
Plagiarism	88.8%	7.4%			3.7%
Academic Dishonesty	66.6%	22.2%	7.4%		3.7%
Data manipulation	59.2%	25.9%	11.1%	3.7%	

Fabrication	51.8%	29.6%	11.1%	3.7%	3.7%
Examination Malpractice	48.1%	29.6%	11.1%	11.1%	
Conflict of interest	40.7%	40.7%	11.1%	3.7%	3.7%
Poor record keeping	33.3%	44.4%	11.1%	7.4%	3.7%
Author Inflation / honorary authorship	33.3%	22%	37.3%	7.4%	
Salami Publication	29.6%	48.1%	22.2%		3.7%
Ghost Authorship	29.6%	25.9%	33.3%	7.4%	
Other (specify)					

Source: Field Survey (2017)

Control of Ethical Dilemmas by Librarians

This section presents the responses on measures to control and curb ethical menace. Majority of the respondents (84.2%) indicated the use of plagiarism detectors such as TurnItIn, Plagscan, Viper and Copy leaks. Information literacy was proposed by (81.4%), compliance to fair use and copy right recorded (77.7% whiles the establishment of Academic Ethics Committees recorded (62.9%). In addition to these were the use of referencing managers such as Mendeley, Zotero, Endnote and Refworks which assist in compiling references used with a rating of (59.2%). The establishment of academic writing centres was minimally endorsed by (48.1%) with Promotion on Personal Information Management (PIM) recording (33.3%).

Discussion of Findings

It was discovered that the traditional roles were being performed by majority of the librarians to support research but those roles do not fully track and address diverse dilemmas which have emerged resulting from advancement in technology and the research landscape (Bell,2016). Majority of the librarians (67%) endorsed information literacy, but this was debunked by Cordell (2013:178) pointing out that digital literacy instead of information literacy served as preventive strategy by impacting on behavioural change in this technological era. Librarians, advancing on this emerging role will address issues which pertain to data security, social network abuse, e-waste among others.

Literature Gap Analysis is one of the roles performed by librarians in the advanced world to assess the library's collection in relation to research instead of solely reading and weeding the

shelves. Findings from the study revealed that majority of the librarians were not aware of this phenomenon. Citing Turcios, Agawal and Watkins (2014:475) and Grant, (2009:96) identifying gaps in literature enables librarians and researchers to know “how much literature exists, the subject coverage and to identify trends particularly on electronic resources”. It also promotes article evaluation, ethical sourcing in research, proper citation network analysis and systematic literature review according to Kim, Colicchia and Menachof (2016:1). However (37%) of the librarians attested to this role of managing research data or Research Data Management (RDM) was alluded to by Chad and Enright (2014:150). It is an emergent role where librarians play critical roles in the research cycle consisting of a number of different activities in the data life cycle. According to Cox and Pinfield (2013:1) it involves the “design and creation of research data, storage, security, preservation, retrieval, sharing, and reuse, as well as the technical capabilities, ethical considerations, legal issues and governance frameworks”. The ethical consideration implies integrated measures established to control and detect plagiarism, establish informed consent, referencing and mitigate the challenge of keeping data among others. Considering its enormous benefits, practicing and integrating RDM enables researchers and librarians “monitor publication activity, expenditure on publication, monitor compliance with funders’ requirement which includes ethical standards (Chad & Enright 2014:150). In spite of its impact on research, minimal awareness (51.8%) was recorded among the Technical University Librarians. This is a holistic and innovative approach which ought to be adopted by Technical University Librarians in the research landscape.

Technical University Librarians as, part of their mandate, are to establish strategies and suitable ambience for learning, research and studies. JISC (2016) therefore recognises Virtual Research Environment (VRE) to encompass research tools, interoperable frameworks and strategies which enable researchers to customise research. These environments are mostly managed by librarians to support research collaboration and standards among scholars and publications. Unfortunately, the scenario in the Technical Universities in Ghana is different. Only about thirty-three (33.3%) of respondents strongly agreed to this. A study by Pienaar and Smith (2008:8) corroborated among others things that the University of Pretoria Library was one of the few libraries which has advanced and integrated it. The benefit of this cannot be underestimated since it promotes transparency and addresses the menace of fabrication. Alerts and tagging services (journals, articles and grants) facilitate in securing current literature needed for one’s research. It provides updates on trends, emerging and up -to -date publications, for example, the table of content of books and journals. Researchers and librarians

of the University of Melbourne (2017) receive current feeds which include “citations, conference alerts, table of contents alert, bookmarks and RSS feeds”. Despite its importance of notifying researchers about the sources of information and current topics relevant to one’s interest, it facilitates citation and compilation of bibliographies used, alleviate plagiarism, duplication, and use of predatory journals and other ethical dilemmas. Unfortunately, this study recorded minimal awareness (33.3%) among respondents. This was corroborated by Baro, Idiodi and Godfrey (2013:170) among librarians in University Libraries in Nigeria.

Lately, data visualization has become one of the embedded roles performed by librarians to support research. It facilitates data communication, outlines relationships and promotes the use and reuse of data. Data visualisation enables one to identify patterns within larger data (Enago Academy 2017). It has become a key research component as a result of innovative ways of delivering research output and blended ways of learning. Citing Czuhajewski (2015) librarians at the University of Michigan Library system undertake this activity in order to present research findings in an analytical manner which controls conflict of interest. It facilitates understanding, evaluation and interpretation of data. According to Voliva (2015), the phenomenon of big data with its associated ethical dilemmas has propelled the integration of visualization in order to make meaning from data easily. In spite of its benefits, the study revealed negligible awareness among the respondents with (22.2%) strongly agreeing to this. Burton and Lyon’s (2017:33) research findings confirm this. Some of the data visualisation tools discovered include infographics and open knowledge map.

Additionally, promoting Personal Information Management (PIM) among researchers through advocacy and training is laudable to facilitate the use and reuse of scholarship. Practicing PIM, according to Fourie (2012:187), supports cognitive processes such as “thinking, problem-solving, idea generation, categorization, representation, vocabulary exploration, and visualisation”. It also serves as an avenue for researchers to provide security, and to personally protect data. However, a marginal number (22.2%) of the respondents strongly agreed to this role. Otopah and Dadzie’s (2013:142) study findings affirm this by indicating that inadequate skills is a major setback on the part of students in Ghana.

Academic identity management is considered as one of the modern perspectives that aims to promote scholarly communication, collaboration and reputation building of creators. The large amount of literature on the web makes it difficult to track creators and authors. Therefore, creating and maintaining the profile of authors has become necessary. Dilemmas such as author

inflation /honorary authorship, Salami publication and ghost authorship could be tracked. The Technical University of Munich Library (2017: 2) identified “Researcher ID, Google Scholar Citations, Scopus, Web of Science, Bepress ” as platforms that are used to assign unique identifiers to researchers for easy tracking of works. The platforms aim to increase visibility of authors, facilitate the transfer of bibliographic record, import and export of records. This study revealed far fewer, thirty–seven percent (37%) of the librarians strongly agreed to this. The findings supported that of Li, Thelwall and Giustin (2012:1) that majority of researchers and librarians were not aware of this role.

It was discovered that establishment of an Institutional Repository (IR) which showcases the research output of the institutions such as dissertations, journals, artifacts, monograph amongst others produced by the organization recorded seventy- four percent (74%) of the librarians strongly agreeing to this. However, before information in the repository is disseminated, it needs to be scrutinised ethically. Librarians, as part of their roles, are to acquire and operationalise the use of plagiarism detectors and referencing tools such as TurnItIn, Mendeley, Plagiarism Checker, Plagscan and Refworks. Some of these applications are available openly and for use.

ADDRESSING ACADEMIC RESEARCH ETHICAL DILEMMAS

The under listed recommendations and suggestions are provided as remedies to prevent and manage the menace of research misconduct. These have been categorised under: “use of innovative applications, interactive and collaborative approach, policy and compliance, intensified advocacy and education on academic research ethics, behavioural change” amongst others.

The use of innovative applications such as plagiarism detectors is recommended. These are tools used to detect the plagiarism count in publications before submission. They enable one to work on plagiarized contents before submission. Furthermore, the use of referencing tools which facilitate referencing on numerous formats and styles is recommended. Also, learning and content management applications such as integrated library system and learning management system provide one platform which enables one to carry out integrated research thereby controlling the abuse of information.

Interactive and collaborative approach encompasses research support, best practices and additional roles assumed by librarians to curb the menace of ethical violation. Studies have

revealed that one of the ways for librarians to accelerate this transformation is through collaborative action (Shun, 2016:688). Creation of Virtual Research Environments (VRE) ensures that requisite resources and facilities are available to support collaborative research. Since Librarians are recognized as stakeholders and partners in research data management, they should collaborate with virtual researchers by integrating applications such as: telephone, Web 2.0, email, instant messaging, forums, wikis, blogs, meeting tools, project management tools, video conferencing, data-based conferencing, Access, Grid, project calendars and task assignments computers for effective and collaborative research.

Furthermore, since the integration of Research Data Management by specifically adhering to the research life cycle is endorsed, librarians should be able to facilitate the various stages of the research lifecycle by creating data, processing data, analysing data, preserving data, disseminating data and ensuring the re-use of data for effective research.

Practicing Personal Information Management (PIM) enables one to “create, organize, retrieve, use and distribute information to fulfil various responsibilities”. By that one will be able to use and reuse information thereby enabling the possibility to have the right information in the right place and in the right format. Additionally, tagging and alert services, Selective Dissemination Information and mentoring students are recommended.

Policy and compliance - On the issue of policies and compliance, Academic Research and Ethics Committees should be established to advocate, enforce, sanction and penalize offenders. Again, establishment of ethical standards and policies that will promote conformity and compliance on the type of consent needed to carry out research is recommended. The policy should also outline the areas of focus as well as the dos and don'ts in research.

Improvement in accreditation standards is also recommended. The accreditation entities ought to produce checklist which encompass ethical compliance.

As part of the recommendation, the Research and Ethics Committee should develop checklists that will explore integrity. The checklist may guide researchers on relevant areas to review literature, select a design and adopt sound methodologies.

Intensified advocacy and education on academic research ethics -Teaching of Information Ethics, as part of the curriculum in Library and Information Science (LIS) schools, is recommended to enable librarians obtain the knowledge on ethical issues on research. Also, the establishment of academic writing centres where research papers and works are proo read

and edited to ensure that academic writing meets the required standards and pedestal are recommended. An example is the Carnegie Writing Centre at the University of Ghana, Legon, Ghana.

There is the need to educate researchers and students on the preventive measures such as effective referencing and citation other than the use of plagiarism detectors which will incur additional cost.

Behavioural change- Ethical obligations, according to the deontology theory, entail rules of behaviour for scholars to abide by. Thus it is not only right to do it, but that it is wrong not to do it irrespective of the environment. Henceforth, the use of sanctions and punitive measures such as rejection, retraction, demotion amongst others could be introduced to promote the desired behavioural change.

Conclusion

The study was conducted prior to the conversion of Polytechnics in Ghana to Technical Universities. With the transition of the Polytechnics to Technical Universities, reputation building and ranking, research funding, the exponential growth of information as well as changes in technological trends have impacted on the tasks and expectations from librarians. Their traditional roles are currently embedded with new and challenging task in order to meet the demand and desires of faculty, students and researchers. However, the study discovered that much emphasis is placed on the traditional functions performed by majority of the librarians. This does not fully address the diverse ethical research dilemmas currently experienced. Managing research output for national development requires vigorous ethical scrutiny and research enquiry in order to justify funding support and research sustainability.

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