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Fostering Research Integrity in African Higher Education Institutions

Patrobers Robert Simiyu
Durban University of Technoloy
patroberss@dut.ac.za

Elutunji Buraimoh
Durban University of Technology
elutunjib@dut.ac.za

Innocent Ewaen Davidson
Durban University of Technology
InnocentD@dut.ac.za

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Abstract

African higher education institutions (HEIs) have been considering changing in the last twenty years. The realisation of knowledge synthesis as a critical driver for social-economic development, has led to countries promoting research in universities and related institutions of higher learning towards a knowledge-based economy. However, the increasing emphasis on HEIs' research productivity has raised questions of whether or not the parties involved in funding, conception, conducting, and review/reporting are upholding responsible conduct of research (RCR). Equally, concerns on adequate rules, regulations, and guidelines to foster research integrity (RI) amongst the research professionals prevail. In this paper, an in-depth understanding of the RI concept, and the strategies that the research fraternity in the African HEIs and policymakers use to foster RCR, are illuminated to address gaps that need to be filled. This is a new dawn for HEIs in Africa to strengthen their knowledge base by applying the best practices that are founded on high levels of RI to meaningfully inform, influence, and impact Africa's current and future development. This study provided a detailed literature investigation of the occurrences of irresponsible research conduct in Africa's HEIs, existing efforts to mitigate them, and the path forward to foster RCR. Unfortunately, Africa's HEIs have ineffective policies and structures in place to promote RI and research misconduct.

Keywords: *Research integrity; higher education; social-economic development; responsible conduct of research*

Introduction

In the last decade, Africa has witnessed increased growth and access rates in higher education due to growing globalisation, economic development, rise in middle-class aspirations, growth of private institutions, and distance education, including appreciation of virtual learning (United Nations Educational, Scientific and Cultural Organization, 2020). Further rise in higher education has been attributed to a global shift to the knowledge economy, more government-supportive policies, and increasing responsibility for social equity (United Nations Educational, Scientific and Cultural Organization, 2020). Consequently, demand for research productivity and evolving scientific environments have scrutinised the status of research integrity (RI) in Africa's higher education institutions (HEIs). Postgraduates, post-doctorates, junior/senior lecturers, and associate/full professors are extremely pressured to research and publish accomplished studies and secure careers. As researchers pursue this line of thought, some resort to shortcuts that compel the higher education research authorities to monitor and regulate research misconduct at the expense of supporting RI. However, RI, sometimes referred to as responsible conduct of research (RCR)

(Khanyile *et al*., 2006); (Ščepanović *et al*., 2021) and (Ballyram and Nienaber, 2019), is the basis for credible research and knowledge that serves as a precondition for an effective scholarly research environment. Thus, HEIs should strive to promote scientific integrity and RCR (Horn, 2013).

Studies show that research misconduct is prevalent in countries with a long tradition in research like the United States (US), United Kingdom (UK), Scandinavian countries, and low and middle-income countries (LIMs) like in Africa. The latter has recorded some high-profile research misconduct cases (Ana *et al.*, 2013) and (Dubravka Komić *et al.*, 2015). There is an alarming trend of growing research misconduct in Africa's HEIs in recent years, in which unacceptable research behaviour has increasingly attracted the attention of scientific journals and mass and social media. For instance, unacceptable authorship and fabrication, falsification, and plagiarism (FFP) have been reported in by Okonta and Rossouw (2013); plagiarism in masters and doctoral theses have been uncovered in Govender (2007); details of 118 awarded questionable doctorate degrees are outlined in Oduor (2019). The adverse effects of such irresponsible behaviour include credibility damage of the researcher, research group, and institution, wastage of research resources, and inaccurate research records, which may mislead policy and cause public harm. However, much as the impacts may seem obvious, the extent to which they may happen in practice is unknown (Steneck, 2006).

In developed countries, institutional structures have been established to foster RCR and prevent, detect, investigate, and correct research misconduct. For instance, the US Office of Research Integrity (ORI) promotes RI and regulates research misconduct (Office of Research Integrity, 2021). By way of contrast, many African countries do not seem to have policies and guidelines that fairly compare the ORI of the US. For example, South Africa and Nigeria have developed research ethics that lack elaborate structures for dealing with research misconduct, as evident in the scanty recorded misconduct cases, despite the increasing prevalence (Ballyram and Nienaber, 2019) and (Okonta and Rossouw, 2013). Similarly, ethical guidelines, accreditation of research ethics committees (REC), and ensuring ethical conduct are well managed in Uganda's health research without addressing RI (Mwaka, 2017). Although there is a small empirical study on RI in Africa (Okonta and Rossouw, 2013), research misconduct, being a product of a mix of individual character and environment (Kornfeld, 2012), gestures to recognising that Africa's HEIs have a real challenge in regulating scientific misconduct. Therefore, policy guidelines at national and institutional levels should be established to promote RCR and regulate research misconduct (Mwaka, 2017).

HEIs in Africa have weak policies and structures for promoting RI and discouraging research misconduct. There are calls by many researchers to establish clear structures at institutional and national levels to address RI systematically (Okonta and Rossouw, 2013) and (Mwaka, 2017). Since RI is a multifaceted activity involving a diverse research community, each with distinct roles (Khanyile *et al*., 2006), promoting RI and regulating research misconduct should be a concerted effort for many stakeholders. This study examines the incidences of irresponsible research conduct in Africa's HEIs, existing attempts to mitigate them, and the way forward to foster RCR.

Research Behaviour in HEI

Integrity in research is based on six basic science values: objectivity, honesty, openness, accountability, fairness, and stewardship, shaping the researcher's practice and relationships in the scientific community (National Academies of Sciences, Engineering, and Medicine, 2017) (World Conferences on Research Integrity, 2010) (World Conferences on Research Integrity, 2019). Objectivity describes the researcher's expected attitude of impartiality when working. Honesty, openness, accountability, and fairness describe the relationships amongst the researcher's scientific community. Lastly, stewardship involves the relationship between members of the scientific community and the broader society within which the research is situated. Good stewardship perpetuates all the other five values, therefore is the most essential (National Academies of Sciences,

Engineering, and Medicine, 2017). These fundamental values are similar to the four principles in the Singapore Statement on RI (World Conferences on Research Integrity, 2010). Additionally, the Statement outlines 14 fundamental professional responsibilities for researchers when conducting, writing, and publishing in whichever field of study (World Conferences on Research Integrity, 2010). The Hong Kong Principles are augmented by recognising and rewarding researchers with responsible research behaviour (World Conferences on Research Integrity, 2019).

Research behaviour can be categorised broadly into three categories: deliberate misconduct, generally described as FFP; questionable research practices (QRP), and responsible research (RCR) or RI. Deliberate misconduct comprises the worst research behaviour or practices that directly damage the integrity of the research process (Steneck, 2006), (National Academies of Sciences, Engineering, and Medicine, 2017). Deliberate misconduct by fabrication, falsification, or plagiarism in proposing, performing, reviewing, or reporting research results is undoubtedly gross scientific misconduct. FFP likened to lying, cheating, and stealing results from a combination of personal traits and surrounding circumstances. Several researchers record fabrication and falsification, often occurring close together (Kornfeld, 2012). Fabrication is making up data or results and recordings or reports, including creating false participant consent and other related documentation. Falsification is manipulating research materials, equipment, or processes or changing or omitting data or results without scientific or statistical reasoning. It can also include inappropriate manipulation of graphics and participant consent. In this way, fabrication and falsification undermine the reliability and integrity of research publication records that can result in decisions/measures that can cause personal or public harm (Khanyile et al., 2006); (Steneck, 2006) and (Office of Research Integrity, 2021).

Plagiarism is the misappropriation of one's research ideas or another researcher's ideas, processes, results, words, or graphics without giving appropriate credit (Steneck, 2006). This may comprise of the misuse of one's intellectual property or work that may be published or unpublished without acknowledgment or permission. presenting them as 'own work'. Plagiarism is limited to written works in articles, dissertations, theses, or books and includes other forms of intellectual property like electronic audio-visual media, multimedia, websites, lectures and speeches, and privileged communication. Researchers should be as keen on self-plagiarism as to any other. as republishing one's work in part or as a whole without credence constitutes as gross research misconduct (Roig, 2015). Given that the original scientific work being plagiarised is accurate, plagiarism does not affect the reliability of the research record. However, plagiarism wastes time and funds for reviewing and publishing the work and undermines professional trust and collegiality within the scientific community (Steneck, 2006).

QRP refers to research practices that generally violate the research enterprise's classical values but do not directly damage the integrity of the research itself. QRPs include misrepresentation, inappropriate authorship, the salami-slicing publication (publishing findings of the same study put into several partial papers to increase the number of publications), inaccuracy (quotation errors, improper use of the cited information and statistics), citation errors, as well as insufficient abstracts, descriptions of the methodology, or discussion and, lastly, bias (giving evidence or making decisions without any scientific justification, and conflict of interest or conflict of conscience) (Steneck, 2006). QRPs are not limited to the aforementioned. In addition, some research misconduct cases in (Preventing Research Misconduct: Some Programs in Africa) like falsification of credentials, deception in the research proposal and implementation, researching without the clearance of REC or a similar organisation, deviation from, or failure to adhere to, a proposed protocol without proper permission, piracy of materials, failure to obtain informed consent; breach of confidentiality, as well as any other deviations from the accepted ethical research standards, amounts to QRP.

RCR is described as how research is conducted to fulfil professional responsibilities defined by professional organisations, the institutions they work for, and, where relevant, the government and the public. RCR is the ideal behaviour that researchers and institutions should uphold to promote RI (Steneck, 2006). Unfortunately, despite having some guidelines for promoting RCR, the prevalence of unacceptable research conducts worldwide being recorded in literature is on the rise (Ana *et al*., 2013) and (Theresa *et al*., 2014). Unfortunately, irresponsible conduct of research has adverse impacts like undermining the reliability of research records, weakening the trust colleagues have in one another as well as the public's trust, wasting research funds, and resulting in decisions that can cause personal and public harm (Steneck, 2006). There is a need for deliberate support, organisation structures, and effective communication strategies in HEIs to promote best practices in science and foster RCR (Mejlgaard *et al.*, 2020).

Research Integrity Issues in HEIs in Africa

There is evidence of the prevalence of FFP in HEIs in Africa, though not systematically studied and quantified. However, some known cases have been highlighted in South Africa, Nigeria, and Kenya to show their prevalence. One notable case involved a famous oncologist and professor at the University of Witwatersrand, South Africa. Prof. Werner Bezwoda reported positive results in the Journal of Clinical Oncology and at the 1999 annual meeting of the American Society of Clinical Oncology (ASCO) for a clinical trial in which he claimed breast cancer was treated using high-dose chemotherapy (HDC) followed by bone marrow transplantation (BMT). Since other researchers could not reproduce the results, an independent audit team constituted by ASCO reviewed the research and found cases of falsification, amongst others (Weiss *et al.*, 2000).

The study protocol was misrepresented as "CNV vs. HD-CNVp in high-risk breast cancer." There were no signed consent forms for the participants in the clinical trials. During the on-site audit, the team was denied access to records of patients in the control group. Only records of 58 of 75 patients, who had undergone HDC, were availed. Amongst the 58, only 20 patients were eligible for the clinical trial. Of the 58 patients, 25 showed significant discrepancies in treatment from the outlined protocol. The critical inconsistencies, primarily on eligibility and implementation, raised serious validity questions on the research findings. The approval of such clinical trials in South Africa was a two-stage process; through the pharmacy and therapeutics committee and the REC at the University; Prof. Bezwoda never sought the latter. The scrutiny of the study by the REC could have checked the veracity of the investigations by sealing some loopholes protecting the participants' rights and availing duplicate data for rapid auditing, and so on (Weiss *et al*., 2000).

Govender, in (Govender, 2014), reported notable cases of research misconduct in South Africa. The report entitled "Universities Battle a Rising Tide of Cheating" highlighted cases of falsification and plagiarism after investigating a proportion of HEIs. The number of students reported to have been involved in cheating and plagiarism amongst some selected universities includes Northwest University (535); University of Johannesburg (153); Nelson Mandela Metropolitan University (66); Stellenbosch University (35); University of the Witwatersrand (31); University of the Western Cape (27); and University of Cape Town (24). Some Universities were afraid of releasing statistics on misconduct cases for reputation's sake, and since less than a half cooperated in the investigations, the outcomes were believed to be the tip of the iceberg. The investigations also unravelled suspension and expulsion, and prevention and advocacy as mitigation measures going forward to curb research misbehaviours (Govender, 2014). For Thomas (2019), plagiarism in management academic journals in South Africa recorded increased plagiarism from 2015 to 2019. Out of 454 published articles in 19 journals, more than 80.8 per cent (68.2 per cent in 2015) showed a similarity of over 9 per cent, implying increasing research misconduct amongst students, faculty, and journal editors.

Through the Department of Higher Education and Training (DHET), the South African government grants financial incentives to universities from research undertaken by the faculties to promote research productivity. Since the funds comprise a substantial portion of the universities' funds, the universities' authorities apportion the money to faculties, departments, and individuals who generated the publications. Since there is no guarantee, especially for individuals, for using the money on research, the 'financial top-up' on their salary encourages unethical authorship for more 'cash' at the expense of research quality (Hedding, 2019). A study in which papers from universities in South Africa published in 48 journals from 2004 to 2014 had a significant portion of predatory journals revealed the direct incentive as the driving force. Further examination discloses 23 universities as significant catchments for the predatory journals. The study recognises that 47 of 48 journals were at the time recommendable by DHET for funding but underscores the researcher's choices on ethical grounds (Johann and Astrid, 2017).

The first study on the prevalence of research misconduct and related behavioural influences on 133 researchers in Nigeria, was conducted by Okonta and Rossouw (2013). The bulk of the researchers (62.4 per cent) worked in HEIs, with 30.3 per cent of all the researchers having more than 10 years of experience, while the rest with at most 10 years of research practice. 91 researchers (68.9 per cent) confessed to having committed at least one research misconduct. The cases investigated include plagiarism, data falsification, intentional violations of protocol related to subject enrolment and procedures, selective dropping of 'outliers', falsification of bio-sketch, resume, reference list, authorship conflicts, or unethical practice related to pressure from sponsors. Authorship conflicts were the most prevalent misconduct, at 36.4 per cent, whereas plagiarism was at least 9.2 per cent. Nearly 42 per cent was plagiarised or falsified data. Further analysis showed that committing plagiarism was inversely proportional to years of practice, showing that experiences built from mentorship, training, seminars, or conferences on RCR played a significant role in reducing plagiarism.

Falsification of data was deemed a function of ineffective institutional rules and regulations on research misconduct, while yielding to sponsors' pressure to participate in research misconduct was related to the sex of the researcher. The same authors in Okonta and Rossouw (2014) reported on attitudes, perceptions, and factors related to the work environment perceived and associated with research misconduct in Nigeria. Thus, half of the researchers (50.4 per cent) admitted being aware of a colleague who had committed research misconduct. More than 88 per cent were concerned with the perceived prevalence of research misconduct in their institutions, whereas 96.2 per cent acknowledged the incidence of at least one form of misconduct at their workplace. Regarding regulation and prevention, 56.1 per cent revealed that the chance of being caught for research misconduct at their institution was meagre, while 52.7 per cent rated the severity of the related penalties as quite low.

An investigation was conducted on lecturers and consultant/attendants in three medical/dental schools in two adjacent southern Nigeria states that regularly shared material and human resources for research and training (Adeleye and Adebamowo, 2012). The results showed that out of 132 researchers, 14.4 per cent committed fabrication, followed by 9.8 per cent for falsification and 4.5 per cent for plagiarism. Further, researchers below the senior lecturer rank (31.9 per cent) admitted having committed at least one of the FFP offenses, compared to those above (10 per cent). Researchers who viewed ethics as hindering publishing papers from promoting, about 41.7 per cent, admitted to at least one FFP case compared to those without the perception (17.6 per cent). The prevalence of at least one FFP amongst the early career researchers signalled a possible poor mentorship environment. Given that the number of publications authored by researchers is a significant promotion criterion, some researchers felt the pressure to reach the requisite publication threshold through committing at least one FFP offense, especially fabrication.

A study in by Aiyebelehin (2021) examines the behaviour of researchers in academic institutions in Nigeria regarding research collaborations. The 'add my name' unethical authorship scheme was identified amongst some researchers who reciprocally used a network of colleagues to append their names to articles they never made any significant intellectual contribution. It is the 'easiest' and 'economical' way to increase their number of publications for promotion in the 'publish or perish' higher education environment. This practice is not solely for academic researchers as its prevalence is evident across most African universities where the essence of research collaboration is misconstrued as 'honorary/gift authorship'. The study further prescribes a universal collaborative model that outlines a universe of clearly defined and interconnected components: collaborators' research capacity, mutual research interest, leadership, teamwork, research issues, shared visions and goals, shared responsibilities, resourcefulness, and commitment. An appropriate interplay amongst these components would lead to quality collaborative research and publications.

In Kenya, a study on perceptions of research misconduct was carried out on about 100 investigators engaged in HIV-related research (Were *et al.*, 2020). The most common workplaces for most researchers were academic institutions (30.9 per cent), public hospitals (29.9 per cent), and research centres (14.4 per cent), with some proportion of investigators working at academic institutions and one of the other two. More than 68 per cent of the investigators reported involvement in at least one misbehaviour, i.e., FFPs and/or QRPs. In fact, the highest number ever reported for participation in research misconduct, excluding the five years preceding the study. A majority (36 per cent) admitted having committed at least one FFP offense in research. Over one of five reported involvements in falsification or plagiarism, whereas about a quarter admitted to fabrication. Notable QRPs in the study were the selective exclusion of 'outliers' in the data and authorship quarrels, admitted by about a third of the researchers (Were et al., 2020). The study's occurrence and awareness of research misconduct were comparable to the Nigerian case in (Okonta and Rossouw, 2013).

There are concerns of increasing academic dishonesty in Kenya, where politicians and other influential people in society enrolled in universities have their theses and related research papers done by other people in exchange for money (Taaliu, 2017). This is well demonstrated in a thesis by Walker (2019), in which some graduates in Kenya were disguising themselves as 'academic writers' engaged in 'contract cheating' to generate papers and theses for their clients while earning some income. Moreover, the 'academic writers' are well versed with technical skills that facilitate 'commercial plagiarism', which bypasses plagiarism detection software and inspection by lecturers. Thus, the precarious academic dishonesty is slowly diluting the public image of HEIs in the country.

In Moi University, Kenya, a study by Starovoytova and Namango (2016) was conducted on undergraduate students' views on plagiarism in the school of engineering. The findings recognised students overall and a widespread deficiency in understanding plagiarism. More than 50 per cent of the respondents were not sufficiently conversant on plagiarism in academic writing. The majority showed its prevalence as 76 per cent agreed that those who confessed to plagiarising were dishonest. According to them, everyone around, e.g., students, researchers, and academic staff, is plagiarising. In terms of institutional regulations and prevention of plagiarism, 48 per cent admitted that they always plagiarise because they have never been caught, 33 per cent indicated they plagiarised because any punishment administered would be light (Starovoytova and Namango, 2016). A follow-up study by the same authors on the school of engineering faculty staff revealed a lack of understanding of the fundamentals of scientific writing, including plagiarism. The study also showed a lack of an institutional, legal framework to deal with plagiarism, especially prevention and punishment (Starovoytova and Namango, 2017). A similar study focusing on senior faculty staff revealed more than half (60 per cent) alleged that plagiarism was never mentioned or explained to them at any level. Yet a vast majority (90 per cent) confessed that plagiarism is unfair to the original authors and colleagues, whereas 70 per cent and 60 per cent respectively agreed that plagiarism is

unfair to oneself and the university. Furthermore, an overwhelming majority claimed they never plagiarised, whereas 10 per cent confessed they plagiarised one or two times.

The other case of research misconduct was at Kenyatta University, in which a PhD degree awarded on August 1, 2018, was revoked on September 25, 2018, on the grounds of plagiarism. The affected student was found to have plagiarised a thesis from another African country (Mabonga, 2019). Furthermore, a study by Ramadhan (2017) on Master of Education students in three East African universities, including Moi University, Kenya, revealed the occurrence of plagiarism because of student and lecturer-based factors, mainly centred on workload and not taking responsibility seriously. Possibly a more severe case of research misbehaviour in Kenya involved 118 PhDs awarded by the Jomo Kenyatta University of Agriculture and Technology (JKUAT) on June 21 2019, that the regulator, the Commission of Higher Education (CUE), suspended and ordered a review because of flouted students' supervision regulations, some students' publication in non-existent journals amongst others (Oduor, 2019).

Existing Efforts for Promoting Research Integrity in HEIs in Africa

Some efforts exist at national and institutional levels to promote RCR in HEIs and other African research institutions, albeit in human health-related research. For instance, in South Africa, the National Health Research Ethics Council (NHREC) was established in 2003 (Department of Health, 2015). The NHREC provides ethical guidelines on research involving humans; it also advises and observes international developments in health ethical issues in liaison with related organisations. The Complaints and Advisory Committee (CADC), under the NHREC, is authorised to handle any research-related issues and complaints from established research ethics committees (REC) (Department of Health, 2015). Fundamentally, NHREC guides researchers on research ethics and not RI researchers, specifically in health research. Accordingly, CADC is mandated to refer to the relevant statutory professional council on any violation of ethical codes or standards by any researcher and institute necessary disciplinary action. Additionally, CADC's jurisdiction is limited to protecting human and animal subjects in research; thus, other research misconduct concerns like FFP are beyond their mandate.

Therefore, the absence of national standards or guidelines on RCR leaves the mandate to professional bodies, hence institutions with little expertise, resources, and infrastructure are disadvantaged (Theresa et al., 2014). Most HEIs and other research institutions have REC to uphold ethical principles by reviewing and approving research. However, some require more capacity to enhance their competency, especially promoting RCR (Horn, 2013) (Horn, 2017). Similarly, in Nigeria, the National Health Research Ethics Committee (NHREC) was initiated in 2005 under the Federal Ministry of Health (FMOH). The responsibilities of NHREC include formulation of norms and standards for researching humans and animals, including clinical trials; setting the regulatory framework for REC; resolving complaints from REC; registering and auditing REC activities, and recommending to appropriate regulatory body disciplinary actions against any persons found in violation of any norms or guidelines for RCR (National Health Research Ethics Committee, 2007). However, NHERC has no data on research misconduct in Nigeria despite the prevalence signifying national institutional challenges in response to research misbehaviour (Okonta and Rossouw, 2013) and (Okonta and Rossouw, 2014).

In Kenya, the National Commission for Science, Technology, and Innovation (NACOSTI), established in 1977, was mandated to regulate and assure quality in scientific research, amongst other functions. Thus, NACOSTI registers and accredits all research institutions, including universities in Kenya, approving all scientific research and developing and enforcing research codes, guidelines, and regulations. It facilitates these functions through the Institutional Ethics Review Committees (IERCs) in research institutions under the auspices of the National Bioethics Committee (NBC) (National

Commission for Science, Technology, and Innovation, 2021). Despite the existing guidelines, mainly on health-related research, RI is not explicit in its mandate. Thus, policies and guidelines are inadequate in several aspects, like regulating research misconduct at an institutional level and inadequate protection mechanisms for whistle-blowers for research misconduct. Some institutions cannot report research misconduct cases for fear of damaging their public image. The research misconduct allegations are lengthily resolved (Wanjau *et al.*, 2021). Accordingly, the occurrence of research misbehaviour is common in Kenya, hence the need to institute much awareness and create institutional structures and policies to promote RCR (Were et al., 2020).

Some universities in Africa, like the University of Pretoria (Office of the Registrar, University of Pretoria, 2021); the University of Ibadan (Abiodun-Oyebanji, 2019); the University of Nairobi (Akaranga and Makau, 2016), amongst others, have anti-plagiarism software where all scholarly research works like journal articles and theses are scanned before submission. In fact, these anti-plagiarism reports have to be submitted for approval before the proposal and final defence. However, the overemphasis on the anti-plagiarism software in the plagiarism prevention policy by most HEIs narrows the focus of managing research conduct to plagiarism detection alone, its flaws notwithstanding. Preventing the student from engaging in the dishonesty act is the key to RCR through effective education/training on academic writing (Olutola, 2016). In extreme scenarios for blatant plagiarists, institutions should have policies and procedures to manage such incidents. Therefore, there is a dire need to strengthen policy development and implementation on research integrity issues in Africa (Horn, 2017) and (Omutoko, 2020).

Institutional Framework for Promoting Research Integrity in HEIs in Africa

A great deal of effort is evident in HEIs in Africa towards ethical research. Still, the deliberate promotion of RCR has lagged significantly. Existing African national and institutional structures regulate research conduct and related issues. However, RI is not provided despite the prevalence of research misbehaviour (Theresa *et al*., 2014) and (Horn, 2017). Therefore, universities and other research institutions in Africa need to deliberately promote RCR through institutional and individual capacity building and incorporate deterrent, corrective policies, and mechanisms for effectively detecting, investigating, and disciplining cases in breach of scientific integrity (Kombe, *et al*., 2014). Theresa *et al*., (2014) argue that a more centralised framework supported by national research bodies providing policies and capacity development guidance to institutions should be created. The establishment of the institutional office of research integrity (ORI) is an essential step in fostering an encompassing culture of research ethics and RCR. The ORI should be equipped to serve multiple stakeholders at the local/institutional, national, and international levels and across all active research domains beyond health research, as it has been before in many HEIs in Africa.

Thus, the ORI should be broad in its skill set to embrace diversity of the research portfolio. Fig. 1 shows the institutional ORI (Horn, 2017). The authors feel that the existing REC, in some HEIs, should be expanded and their mandate enhanced under ORI. African countries should have a harmonised RI body and create a common internet-based system for sharing information on the best practices and research misbehaviour cases and related measures. It should be mandated to deal with some instances of unacceptable research behaviour (Kombe, *et al*., 2014).

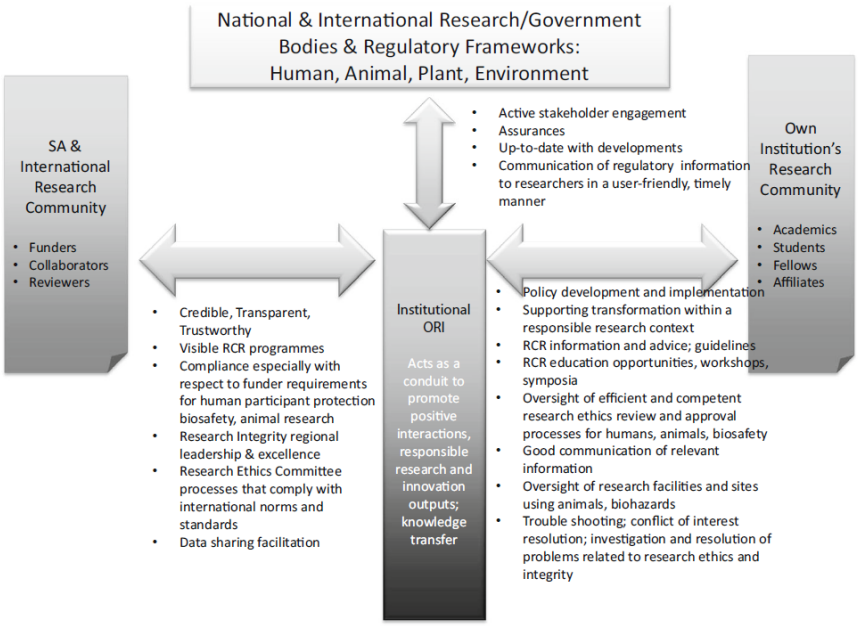

Figure 1: Institutional office of research integrity (ORI).

Typically, the ORI at a university shall be responsible for creating an enabling environment for RCR by developing and implementing institutional policies for promoting RCR amongst its research community. Since researchers are the foundation for sound scientific inquiry, an institutional culture, founded on moral and ethical reasoning, should be fostered (Horn, 2017). The institutional office of research integrity for South Africa is shown in Fig. 1 (Horn, 2017). Primarily, researchers should promote and uphold high professional standards in research and related responsibilities because it is the right thing to do, rather than mere compliance to set rules (Horn, 2017). The RIO should be the gatekeeper for RCR and should ensure that the best practices research statutes, like the Singapore Statement (World Conferences on Research Integrity, 2010), the Hong Kong Principles (World Conferences on Research Integrity. 2019), and the Global Code of Conduct (University of Oxford Research Support, 2018), amongst others, are applied in their research environment. Concerted efforts and resources should be devoted to teaching/mentoring researchers: undergraduates, postgraduates, post-doctoral fellows, and research staff in a bottom-up approach to uphold RCR. Several cases of research misconduct and QRPs in Africa were because of ignorance; hence extensive awareness campaigns should be implemented across the research community. The lecturers/senior researchers should be cognisant of their position as role models and lead by example in upholding RCR and practicing good stewardship of research on behalf of others (Khanyile et al., 2006) and (Kombe, et al., 2014).

Operationalising RI in HEIs in Africa can be adopted from (Mejlgaard et al., 2020). Firstly, the research environment, supervision and mentoring, and integrity training should be supported. In particular, postgraduate supervision, as part of a challenging mentorship role with varied models, pedagogies, and challenges, should be supported effectively to nurture responsible future researchers and mentors, implying that all supervisors (novice and senior) should continually seek the best practices for mentorship (McKenna *et al.*, 2017). Secondly, organisational structure on ethics, integrity breaches, and data practices and management should be instituted. In cases where some research community members commit research misbehaviour, the integrity structures in place should help monitor, identify, judiciously investigate, report, and punish (Kombe, et al., 2014).

Finally, excellent communication in research collaborations, declaration of interests, and publication and communication should be ensured.

Conclusion

This study investigates the occurrences of irresponsible research conduct in Africa's HEIs, existing efforts to mitigate them, and the path forward to foster RCR. It is discovered that certain research behaviours have far-reaching consequences. Consequently, deliberate support, organisational structures, and effective communication strategies are required in HEIs to promote the best practices in science and foster RCR. Similarly, this study reported research Integrity issues in HEIs in Africa. There is a prevalence of research misconduct and related behavioural influences among researchers. Thus, the behaviour of researchers in academic institutions regarding research collaborations has been examined. Therefore, studies on perceptions of research misconduct have been reported. Thus, there are concerns of increasing academic dishonesty, plagiarism, and degrees revoked on the grounds of plagiarism in Africa's HEIs. Providentially, there are existing efforts to promote RI in HEIs in Africa. In addition, at the national and institutional levels, some efforts are being made to promote RCR in African HEIs and other research institutions, especially in the human health-related fields. Lastly, the institutional framework for promoting research integrity has also been deployed in African HEIs. There is much work being put in by African HEIs to conduct ethical research. Nonetheless, deliberate RCR promotion has significantly lagged. Typically, the ORI of a university is in charge of building an enabling environment for RCR by developing and implementing institutional policies to promote RCR among its research community. Implementing RI in African HEIs can be modelled.

References

Abiodun-Oyebanji, O. O. F. 2019. Adoption and the use of plagiarism software amongst university students in Oyo State Nigeria. *Journal of Education Review*, 11(2): 85-95.

Adeleye, O. A. and Adebamowo, C. A. 2012. Factors associated with research wrongdoing in Nigeria. *Journal of Empirical Research on Human Research Ethics,* 7(5): 15-24.

Aiyebelehin, A. J. 2021. Add-my-name as a parody of research collaboration among Nigerian researchers. *Accountability in Research,* 1(29): 1-10.

Akaranga, S. I. and Makau, B. K. 2016. Ethical considerations and their applications to research: A case of the University of Nairobi. *Journal of Educational Policy and Entrepreneurial*, 3(12): 1-9.

Ana, J., Koehlmoos, T., Smith, R. and Yan, L. L. 2013. Research misconduct in low- and middle-income countries. *PLoS Medicine*, 10(3): e1001315-e1001315.

Ballyram, R. and Nienaber, A. 2019. Research misconduct and publication ethics: A South African perspective. *South African Dental Journal*, 74(1): 24-31.

Department of Health. 2015. Ethics in health research, principles, processes and structures. South Africa: Department of Health.

Komić, D., Marušić, S. L., Marušić, A. 2015. Research integrity and research ethics in professional codes of ethics: Survey of terminology used by professional organisations across research disciplines. *PLoS One*, 10(7): 1-13.

Govender, P. 2007. Academic piracy: More walk plank in Sunday Times. Available: https://www.timeslive.co.za/sunday-times/ (Accessed 3 December 2021)

Govender, P. 2014. Universities battle with a rising tide of cheating. Available: https://www.timeslive.co.za/sunday-times/lifestyle/2014-08-17-universities-battle-a-rising-tide-of-cheating/ (Accessed 2 September 2021).

Hedding, D. W. 2019. Pay-outs push professors towards predatory journals. *Nature*, 565(7739): 267.

Horn, L. M. 2013. Promoting responsible research conduct in developing world academic context. *The South African Journal of Bioethics and Law*, 6(1): 21-24.

Horn, L. 2017. Promoting responsible research conduct: A South African perspective. *Journal of Academic Ethics,* 15(1): 59-72.

Johann, M. and Astrid, V. 2017. The extent of South African authored articles in predatory journals. *South African Journal of Science*, 113(7/8): 1-9.

Khanyile, T. D., Duma, S., Fakude, L. P., Mbombo, N., Daniels, F. and Sabone M. S. 2006. Research integrity and misconduct: A clarification of the concepts. *Curationis*, 29(1): 40-50.

Kornfeld, D. S. 2012. Research misconduct: The search for a remedy. *Academic Medicine*, 87(7): 877-82.

Kombe, F., Anunobi, E. N., Tshifugula, N. P., Wassenaar, D., Njadingwe, D., Mwalukore, S., Chinyama, J., Randrianasolo, B., Akindeh, P., Dlamini, P. S., Ramiandrisoa, F. N. and Ranaivo, N. 2014. Promoting research integrity in Africa: An African voice of concern on research misconduct and the way forward. *Developing World Bioethics*, 14(3): 158-166.

Mabonga, M. 2019. Kenyatta University Lecturer's PhD revoked for plagiarising Nigerian Scholar, Kenya. Available: https://www.tuko.co.ke/316269-kenyatta-university-lecturers-phd-revoked-plagiarising-nigerian-scholar.html (Accessed 12 February 2021).

McKenna, S., Clarence-Fincham, J., Boughey, C., Wels H. and van den Heuvel, H. 2017. *Strengthening postgraduate supervision.* Stellenbosch: African Sun Media.

Mejlgaard, N., Bouter, L. M., Gaskell, G., Kavouras, P., Allum, N., Bendtsen, A. K., Charitidis, C. A., Claesen, N., Dierickx, K., Domaradzka, A., Elizondo, A. R., Foeger, N., Hiney, M., Kaltenbrunner, W., Labib, K., Marušić, A., Sørensen, M. P., Ravn, T., Ščepanović, R., Tijdink J. K. and Veltri, G. A. 2020. Research integrity: Nine ways to move from talk to walk. *Nature* 586: 358-360.

Mwaka, E. S. 2017. Responsible conduct of research: enhancing local opportunities. *African Health Sciences*, 17(2): 584-590.

National Academies of Sciences, Engineering, and Medicine. 2017. Fostering integrity in research. Available: https://www.nap.edu/catalog/21896/fostering-integrity-in-research (Accessed 22 December 2021).

National Commission for Science, Technology and Innovation. 2021. Mandate and functions. Available: https://www.nacosti.go.ke/index.php/mandate-functions (Accessed 5 May 2021).

National Health Research Ethics Committee. 2007. National Code of Health Research Ethics, in Nigeria. Available: http://www.nhrec.net/nhrec/NCHRE_Aug%2007.pdf (Accessed 14 December 2021).

Oduor, A. 2019. Regulator Instructs JKUAT to review the award of 118 Phds. *Kenya*. Available: https://www.standardmedia.co.ke/education/article/2001336092/regulator-instructs-jkuat-to-review-the-award-of-118-phds (Accessed 3 December 2021)

Office of Research Integrity. 2021. Definition of research misconduct. Available: https://ori.hhs.gov/node/1468/printable/print (Accessed 13 December 2021)

Office of the Registrar, University of Pretoria. 2021. Plagiarism prevention policy. Available: https://www.up.ac.za/media/shared/1/ZP_Files/s5106-19-plagiarism-prevention-policy.zp181077.pdf (Accessed 22 November 2021).

Okonta, P. and Rossouw, T. 2013. Prevalence of Scientific misconduct among a group of researchers in Nigeria, *Dev World Bioeth.* 13(3): 149-157.

Okonta, P. I. and Rossouw, T. 2014. Misconduct in research: a descriptive survey of attitudes, perceptions, and associated factors in a developing country. *BMC Medical Ethics*, 15(1): 25.

Olutola, F. O. 2016. Towards a more enduring prevention of scholarly plagiarism among university students in Nigeria. *African Journal of Criminology and Justice Studies*, 9(1): 83-97.

Omutoko, L. 2020. Systematisation of research integrity by regulatory bodies and universities in Africa: Research and publication ethics. *Journal of Education and Practice*, 4(1): 41-55.

Ramadhan, Z. 2017. Plagiarism in master of education studies at selected East African Universities. Master of Education thesis, Nelson Mandela University.

Roig, M. 2015. Avoiding plagiarism, self-plagiarism, and other questionable writing practices: A guide to ethical writing. Available: https://ori.hhs.gov/avoiding-plagiarism-self-plagiarism-and-other-questionable-writing-practices-guide-ethical-writing (Accessed 22 December 2021).

Ščepanović, R., Labib, K., Buljan, I., Tijdink, J. and Marušić, A. 2021. Practices for research integrity promotion in research performing organisations and research funding organisations: a scoping review. *Science and Engineering Ethics*, 27(1): 4-20.

Starovoytova, D. and Namango, S. 2016. Viewpoint of undergraduate engineering students on plagiarism. *Journal of Education Practice*, 7 (1): 48-65.

Starovoytova, D. and Namango, S. 2017. Awareness of engineering faculty on plagiarism. *Research on Humanities Social Sciences*, 7(1): 7-20.

Steneck, N. H. 2006. Fostering integrity in research: Definitions, current knowledge, and future directions. *Science and Engineering Ethics*, 12(1): 53-74.

Taaliu, S. 2017. Corruption in schools and universities in Kenya. *Open Journal of Social Sciences*, 5 (4): 227-231.

Theresa, M. R., Christa van, Z. and Anne, P. 2014. Responsible conduct of research: Global trends, local opportunities. *South African Journal of Science*, 110(1/2): 1-6.

Thomas, A. 2019. Plagiarism in South African management journals: A follow-up study. *South African Journal of Science*, 115(5-6): 1-8.

United Nations Educational, Scientific and Cultural Organization - International Institute for Higher Education in Latin America and the Caribbean. 2020. Towards universal to higher education: International trends. *Place de Fontenoy*, 1(1): 1-85.

University of Oxford Research Support. 2018. Global code of conduct for research in resource-poor settings. Available: https://researchsupport.admin.ox.ac.uk/article/global-code-of-conduct-for-research-in-resource-poor-settings (Accessed 5 August 2021).

Wanjau, M. N., Kivuti-Bitok, L. W., Aminde, L. N. and Veerman, L. 2021. Stakeholder perceptions of current practices and challenges in priority setting for non-communicable disease control in Kenya: a qualitative study. *BMJ Open Science*. 11(4): 1-13.

Walker, C. 2019. The white-collar hustle: academic writing and the Kenyan digital labour economy. Available: https://ora.ox.ac.uk/objects/uuid:35c57129-11eb-4fad-a91f-65b2f3849b7a (Accessed 13 April 2021).

Weiss, R. B., Rifkin, R. M., Stewart, F. M., Theriault, R. L., Williams, L. A., Herman, A. A. and Beveridge, R. A. 2000. High-dose chemotherapy for high-risk primary breast cancer: An on-site review of the Bezwoda study. *Lancet,* 355(9208): 999-1003.

Were, E., Kaguiri, E. and Kiplagat, J. 2020. Perceptions of occurrence of research misconduct and related factors among Kenyan investigators engaged in HIV research. *Accountability in Research*, 27(6): 372-389.

World Conferences on Research Integrity. 2010. Singapore statement on research integrity. Available: https://wcrif.org/singapore-statement (Accessed 22 June 2021).

World Conferences on Research Integrity. 2019. Hong Kong principles for assessing researchers. Available: https://wcrif.org/hkp-downloads (Accessed 22 June 2021).