



Developing ethical research behaviour in doctoral students

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Ethical research behaviour plays an essential role in ensuring the integrity of knowledge. Consequently, ethical transgressions during the research process negatively influence the knowledge produced, and have wider social consequences for various stakeholders in society. To honour the value and role of ethical research for individuals and society, researchers are required to display ethical judgement and ethically responsible research behaviour. Doctoral students, who are considered to be significant contributors to knowledge creation, can improve the quality of their research through their ethical research behaviour. Owing to the implicit and explicit ethical practices and conflicts that can arise during the research process, the supervision process is an opportune moment for developing ethical research behaviour and ethical capabilities in doctoral students. This article focuses on developing ethical research behaviour in doctoral students, and offers pragmatic guidelines for ways in which this behaviour can be developed during the supervision process.

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Scientific research is considered an important foundation of society. Investments in the form of money and time are devoted annually to the generation and dissemination of knowledge. Owing to the impact for society provided by, for example, new technologies, improvements in the quality of life and economic growth, the honesty of research is paramount. Honesty in research is, however, dependent on the researcher's adherence to ethical research practices, and when researchers stray from these, the integrity of knowledge is damaged.^[1] Researchers therefore need to skilfully confront the ethical issues that are inherent in the research process.^[2] As cases of unethical research practices continue to emerge, the need to develop and preserve ethical research behaviour is reinforced. In view of the contribution that doctoral students make to the knowledge base,^[3,4] their ethical research behaviour can enhance the integrity of knowledge.

Ethics and research ethics

The concept of ethics pertains to human action and making us good people, and includes topics such as thoughts about human action, and views on what right human action is, or what right opinions about human action are. The focus of ethics is on practical knowledge and its application to human activities.^[5] Although research ethics evolved from the philosophical debates of Aristotle,^[5] conduct in research has been influenced by the moral principles of Beauchamp and Childress,^[6] namely autonomy (supporting autonomous decisions), non-maleficence (preventing harm), beneficence (balancing benefits and risks) and justice (fair distribution of benefits and risks). These moral principles are considered to be general guidelines that can be used to formulate more specific rules and policies.^[6] In terms of ethical considerations, researchers focus on how they treat research subjects. This involves obtaining informed consent, protecting participants from harm, maintaining confidentiality and informing participants about the purpose of the research and their right to withdraw from the study.^[2] Brinkmann and Kvale^[2] refer to this

process as the micro-ethics of research, but point out that the macro-ethics of research also needs to be considered. Macro-ethics pertains to how the knowledge produced by research affects humans and society. The recently retracted article 'Age- and education-related effects on cognitive functioning in Colored South African women', by Nieuwoudt, Dickie, Coetsee, Engelbrecht and Terblanche,^[7] is an example of where the micro-ethics of the study were considered and were found to be unproblematic, as it is stated in the retracted article that the participants gave their written consent to participate in the study. Nevertheless, the research was deemed to be problematic on a macro-ethical level, as it had a negative impact on society. This example highlights the many complex ethical issues that are inherent in the research process.

International ethics guidelines

To ensure adherence to the micro- and macro-ethics of research, several sets of guidelines have been drafted that provide ethical guidance for research organisations, governments and scientists. The Singapore Statement on Research Integrity is an example of an internationally accepted guide, developed in 2010 at the second World Conference on Integrity (course material of Module 6 of the DIES/CREST training course for supervisors of doctoral candidates at African universities, Stellenbosch University; DIES/CREST course material). Many universities endorse this statement and promote the moral principles of Beauchamp and Childress. The Singapore Statement includes 4 principles (honesty, accountability, professional courtesy, and fairness and good stewardship) and 11 professional responsibilities (integrity, adherence to regulations, research methods, records and findings, authorship, publication acknowledgement, peer review, conflict of interest, public communication, reporting and responding to irresponsible research practices, and research environment and societal considerations) (DIES/CREST course material). Although the Singapore Statement is not a regulatory document, it serves as a

global guide for ensuring the integrity of research.^[8] In addition to the Singapore Statement, the World Conferences on Research Integrity (WCRI) has published the Montreal Statement (2013), which gives guidance on cross-boundary research collaborations, the Amsterdam Agenda (2017), which aims to establish a registry for research on the responsible conduct of research, and the Hong Kong Principles (2019), which were formulated to strengthen research behaviours that promote research integrity (DIES/CREST course material). Other well-known and influential documents that provide ethical principles and guidelines for the conduct of research involving human subjects are the Helsinki Declaration^[9] and the Belmont report.^[10] Although the last-mentioned documents are aimed at medical researchers, the basic ethical principles of respect for persons (acknowledging autonomy and protecting those with diminished autonomy), beneficence (maximising benefits and minimising harm) and justice (treating research participants equally) of the Belmont report^[10] are also relevant for research conducted in non-medical fields, and can be used to evaluate actions pertaining to research involving human subjects.

Examples of unethical research practices

Despite an organised response to discourage unethical research through measures such as the implementation of internationally accepted ethics guidelines, codes of ethics and the establishment of ethics committees, unethical research practices and scientific misconduct persist.^[11] The most prominent historical examples include invasive medical treatments and dangerous medical practices conducted in concentration camps by the Nazis during the Second World War, and the Tuskegee experiment conducted between 1932 and 1972 on African-American participants only.^[5] More recent examples include the scientific fraud conducted by South Korean stem-cell researcher, Woo Suk Hwang, whose research on cloned human embryos was based on fraudulent data and data fabricated and manipulated by former professor Diederik Stapel for his research publications (DIES/CREST course material). Such unethical research practices and scientific misconduct are more prevalent than one may think: for example, a comprehensive meta-analysis conducted by Fanelli in 2009^[12] found that 1 in 50 scientists admitted to at least once fabricating, falsifying or modifying data, and were aware of colleagues who had also done so (DIES/CREST course material). Although such misconduct was more prevalent in medical research, the number is likely a conservative estimate owing to the sensitivity of the topic.^[12] It therefore appears that the effectiveness of measures used to discourage unethical research remains debatable,^[13] while the incentives in the publish-or-perish culture in contemporary academia continue to grow.^[14]

The costs and consequences associated with unethical research practices

Discouraging unethical research is paramount, as the costs and consequences of unethical research practices and scientific misconduct have an impact on the researcher, science, society and the environment (DIES/CREST course material). These consequences include the erosion of public trust in science. Public trust in science enables scientific progress through the allocation of resources for scientific research. However, when public trust is violated by questionable research practices, public perceptions of science are tainted, thereby harming the scientific community,^[15] because doubt is cast on the credibility of research findings, and false conclusions

impede scientific progress by preventing replication. This leads to an erosion of public trust in the overall scientific knowledge base.^[16] The consequences for researchers are also severe. These include reputational costs and damaged academic careers. Reputational costs are also felt by the employing institution^[17] and uninvolved prior collaborators such as graduate students and co-authors.^[18] Hussinger and Pellens^[18] refer to this as 'stigma by mere association', and report on how the prior collaborators of transgressing scientists are on average cited 8 - 9% less after the questionable practices have been exposed. The financial costs of scientific misconduct are felt by numerous stakeholders. These include wasted funds provided by governments or sponsors spent on falsified research, the costs associated with investigating the institution and the research misconduct, funds that need to be spent on settling legal matters related to the misconduct, and the loss of future funding provided to institutions and researchers.^[1] All these consequences demonstrate the ripple effect and far-reaching damage of unethical research practices and scientific misconduct.^[17]

How ethics in research can be improved

Although ethical rules and guidelines, codes of conduct and ethics committees are generally accepted by the scientific community, Sim^[15] is of the view that more innovative methods are required to improve and preserve responsible research conduct. As research is beset with ethical issues,^[2] Brinkmann and Kvale's^[2] proposition for cultivating practical ethical wisdom, thereby developing ethical behaviour in researchers and, for the purposes of this article, more specifically doctoral students, requires consideration. These authors do not suggest a disregard for moral rules and principles, but rather promote a situational judgement approach and the ethical capabilities of the researcher, as they are of the view that 'learning ethical principles is not sufficient to become an ethically responsible researcher'.^[2] Brinkmann and Kvale^[19] therefore promote morally responsible research behaviour that involves the moral integrity of the researcher and, most importantly, their commitment to moral issues and action. These authors are of the view that when it comes to ethical judgements pertaining to research, the integrity of the researcher is the decisive factor. Brinkmann and Kvale^[19] therefore propose an approach to ethical research practices that involves the moral and practical education of researchers.

Who is responsible for developing doctoral students' ethical behaviour?

The question that arises is onto whom the responsibility falls for ethically educating doctoral students? Research conducted by Titus and Ballou^[20] regarding the responsibility for the ethical conduct of doctoral students suggests that many supervisors believe this is an institutional responsibility. Because doctoral students' experiences are extremely varied, Titus and Ballou^[20] suggest a standardised education that will ensure a more consistent experience for all students. However, these authors seem to support Brinkmann and Kvale's^[19] views of moral integrity, and believe that such behaviours cannot be developed solely on an institutional level, as ethical behaviour is an ongoing contextual learning process. Brinkmann and Kvale^[19] and Titus and Ballou^[20] support the notion of becoming an ethically responsible researcher through learning on a theoretical and

practical level. This would place the responsibility for developing ethical behaviour in doctoral students at both the institutional and the supervisory level.

A practical guide Learning ethical behaviour on an institutional and supervisory level

Both the supervisor and the institution need to contribute to developing doctoral students' ethical behaviour. Most universities offer many training opportunities for students and supervisors, and supervisors need to inform their students of relevant training opportunities that arise. As knowledge is constantly being updated, and because ethical behaviour is an ongoing contextual learning process, supervisors also need to keep abreast of the latest knowledge in the research ethics space. The implementation of the Protection of Personal Information (POPI) Act No. 4 of 2013^[21] in South Africa is a prime example. The POPI Act has implications for the types of personal information that can be collected, and how participants can be recruited. It is therefore suggested that a balance be attained between institutional and supervisory involvement in developing ethical behaviour. Compulsory ethics training sessions can be considered, and supervisors should also keep abreast of developments in the field.

Reflecting on axiological assumptions

Although doctoral students are made aware of and learn about universal ethics guidelines, this does not guarantee that they will exhibit ethically responsible research behaviour. This is supported by Brinkmann and Kvale,^[2] who firmly believe that formal principles and guidelines alone are inadequate and 'the way to ethically justifiable research'. Ethically responsible research behaviour can be achieved through an ethical awareness of the entire research process. To understand their ethical awareness of the entire research process, doctoral students should reflect on their ethical beliefs and values, in other words their axiological assumptions. Axiological assumptions pertain to the ethics and values that guide the research process.^[22] As a branch of philosophy, axiology deals with ethics, values and religion.^[23] Doctoral students need to be invited to critically examine what in the knowledge creation process is right conduct, what is valued, and what is considered good for the participants of a study, as well as society in general.^[24] Doctoral students' axiological assumptions need to be considered during both the design and the implementation of their research study. Supervisors can consider asking students to critically reflect on the following ethical questions, as proposed by Brinkmann and Kvale,^[19] on an ongoing basis:

- (i) What are the beneficial consequences of your study? How can your study enhance the lives of your participants or the group they represent or society in general?
- (ii) Why is it important that your participants remain anonymous?
- (iii) What are the potential negative consequences/risks of your study for the participants? Will you inform your participants about all these negative consequences/risks?
- (iv) If there are negative consequences/risks, will the potential benefits outweigh the negative consequences/risks of your study?
- (v) If the negative consequences/risks outweigh the benefits, why do you want to continue with this research study? If the negative consequences/risks outweigh the benefits, why should you continue with this research study?

- (vi) During the publication of your research, what consequences can be anticipated for the participants, as well as the population they represent?
- (vii) How will your role as the researcher impact your study?
- (viii) What is the most responsible way of conducting your study?
- (ix) How will you ensure that no one is harmed during your research?
- (x) What complex ethical issues and dilemmas can you anticipate?

These questions are not exhaustive, and other questions pertaining to informed consent and confidentiality can be added. It is therefore suggested that doctoral students reflect on their research integrity and commitment to acting in an 'ethically committed fashion'^[2] in their thesis, via journal reflections and in discussions with their supervisors on an ongoing basis.

Conclusion

The need to develop ethical research behaviour in doctoral students stems from the continuous emergence of unethical research practices, and the need to preserve the integrity of the knowledge base. It is also for this reason that ethics has become a relevant issue in society.^[19] The supervision process is an opportune moment to ensure the integrity of research, and ultimately knowledge, by teaching doctoral students how to adopt ethically responsible behaviour throughout the research process. It is hoped that the pragmatic guidelines in this article stimulate more critical reflection on the way in which doctoral students' ethically responsible research behaviour can be developed during the supervision process.

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