

IDENTIFYING CRITICAL FACTORS TO DEAL WITH RESEARCH ETHICS

L.O.K. LATEGAN

ABSTRACT

In this article the focus is on the role of ethics in the research cycle. The author argues that current thinking with regard to ethics in research is very often scattered and limited to certain disciplines and certain activities only. It is also pointed out that research ethics is not only applicable to the actual doing of research but also processes associated with research such as supervision, the commercialization of research and the presentation of research within the public domain.

Keywords: research ethics, integrity, the research cycle, commercialisation

1. INTRODUCTION

Two recent research incidents in South Africa placed research integrity in the spotlight again. The alleged accusation of possible plagiarism and the questioning of the quality of a doctoral study signal that good science is not limited to the design of theories or the application thereof only but that the creation of new knowledge should meet required standards and practices as well. These standards and practices are not limited to quality standards only. One immediately calls to mind issues such as the expenditure of the research grant, the modules included in the research studies, the support offered to the student whilst doing the research, the interaction with research data, etc. Penslar *et al* (1995) adds to this vocabulary by referring to topics such as the challenge for being a professional scientist, science misconduct, authorship, data alternation, ethics of geen screening and testing, ethics and eugenics, animals, human subjects, administration of alcohol, deception in research, behavior control, science and coercion, etc. This signals that the entire research process should be ethically sound.

Following on this deduction is the simple yet powerful question: *How much integrity is there in the research system?* This question intentionally suggests that the research cycle and its *processes* have to be subjected to normative actions. Surely nobody denies the need thereof. To limit the evidence to the South African situation only: In *literature* there are several references to research ethics (Mouton 2001, Lues and Lategan 2006, Lategan 2007, Strydom 2005). In *legislation* strict guidelines are formulated on how researchers should interact with human subjects and tissue. In research grant applications and awards questions with regard to ethics are asked and guidelines how to deal with ethical issues are provided (for example NRF guidelines on the acceptance of grand conditions). University ethics committees deal with the research applications in medicine and animal research.

The examples can be extended to the global society to include other burning issues: Pattyn and Van Overwalle (2006) investigate what the niche market for universities is: Is it only the creation of new knowledge immaterial the possible economical value thereof or is there a preference for the commercialization of research through the creation of new knowledge?

Based on this overview it would be safe to say that a general awareness exists on the reasons for maintaining integrity in research. The concern, however, is that this awareness is often (simply!) a paper exercise only. Based on this assumption a more *comprehensive integration* of ethical guidelines into the research process is needed to direct researchers and postgraduate students.

2. PROBLEM STATEMENT AND AIM OF STUDY

The problem statement of this study is the apparent lack of comprehensive ethical indicators to deal with unethical research practices in the research cycle and therefore to sustain a culture of research integrity.

This paper challenges the (1) assumptions that research ethical frameworks sufficiently address the ethical demands of the research cycle, (2) that research ethics is catered for when researchers comply to the grant statements and/or research contracts and (3) that research ethics is primarily concerned with health issues only. Although various research ethical frameworks exist they do not sufficiently address all ethical activities associated with the research cycle (which is broader than the research process). Consequently research ethics is seen as a coincidence.

The problem statement is authenticated by Macnee (2004:212) who defines a research problem "as a knowledge gap that warrants filling and can be addressed through systematic study". Research problems are derived from either theoretical or practical problems.

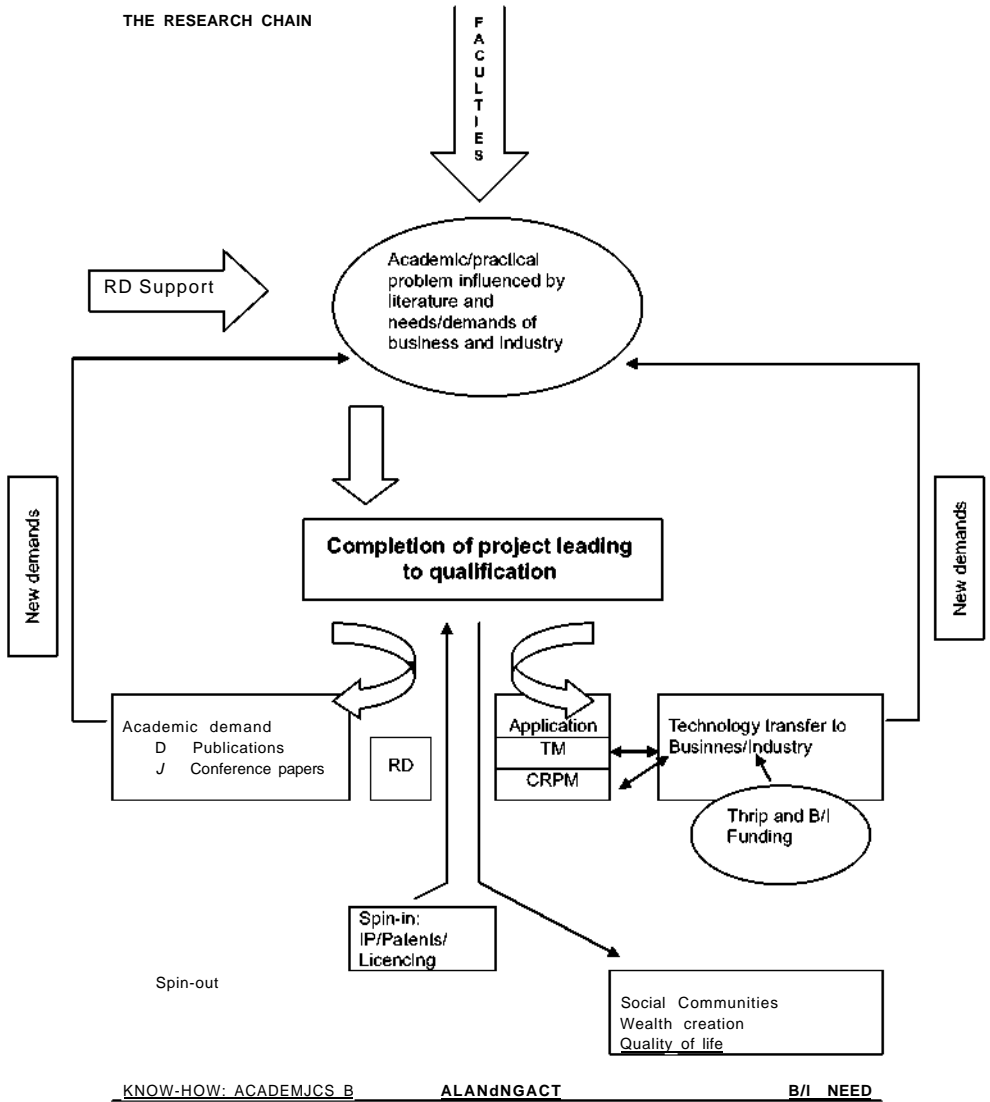
The aim of this study is to identify critical factors that will deal with research integrity in the research cycle. The identification of the critical factors is based on a literature review as part of the qualitative research methodology.

3. CONTEXTUALISATION OF RESEARCH PROBLEM

The research cycle can be described as the process to take the research problem through various academic stages (such as the enrolment for postgraduate qualifications, publication writing, conference papers, supervision) to the process of patenting (intellectual property), commercialization (spin-in to business and industry and first step towards third stream income) and eventually production (spin-out and sustained third stream income). The research cycle includes both academic practice and technology transfer. The cycle designed for the Central University of Technology includes an academic-research and academic-support focus. This cycle encapsulates the philosophy that research management should be viewed from a four quadrant view. Firstly, research management is about

steering the research process to provide a solution for the identified research problem. This is based on the four pillars of the research process, namely problem identification, methodology in support of creating an understanding of the problem and to derive at a possible solution for the problem, evidence in support of the problem and solution and conclusions based on the research conducted. Secondly, resources must be identified in support of the research. The resources range from financial support, human resources development, infrastructure, etc. The utilization of these resources should be managed. Thirdly, environmental impacting factors must be understood to steer research in meeting national policy directives, institutional strategies and identified needs. Fourthly, research should be in service of social communities to improve the quality of life and end users (business, industry, government) to create wealth. The next figure portrays this cycle.

THE RESEARCH CHAIN



Just looking at the cycle immediately identifies ethical pitfalls (this doesn't mean that the cycle doesn't harmonise ethical behaviour as well!). I list the following pitfalls:

- Supervision challenges such as managing the overall research cycle.
- Publication challenges such as plagiarism.
- Management challenges such as meeting ethical standards.

Technology transfer challenges such as improving living conditions.

This cycle depicts amongst others a move away from the isolation of the benefits of research for society. Patrick Cunningham, Chief Scientific Advisor to the Irish Government, indicates the positive move between research spin-ins to the university and research spin-outs to business, industry, government and the broader society (Cunningham 2007). This move away from the "ivory tower image of research and the ethical challenges associated with this new approach to research is well articulated by Duderstadt (2004). He says that research reaches every aspect of human society. The wide range of research activities urges the landing of more grants, which in turn, leads to stiff competition. As a result it has an unavoidable impact on the morale of people. Duderstadt (2004: 76) remarks:

"The peer-reviewed grant system has fostered fierce competitiveness, imposed intractable work schedules, and contributed to a loss of collegiality and community. It has shifted faculty loyalties from the campus to their disciplinary communities. Faculty careers have become nomadic, driven by the marketplace, hopping from institution to institution in search of higher salaries, more generous research support and better colleagues."

These new developments lead to the changing nature of research and scholarship. The changes are noticeable (Duderstadt 2004:77-81):

- Continuous knowledge explosion - specialisations about dark matter and quantum entanglement suggest another revolution (similar to Einstein's theory on relativity and introduction of quantum mechanics).
- Lots of data available.
- Developments bigger than disciplines.
- Continuous debate on basic (curiosity-driven or Baconian) and applied (mission-oriented or Newtonian) sciences and their link.
- A move away from individual research to team research, from single discipline to multidiscipline research.
- Research must have international character: "Scholarship is a global enterprise in which nations must participate both for their own benefit and that of the world".
- Tools of research continue to evolve, increasingly dramatically in power, scope and, of course, cost.
- Although research and education must be closer the innovation of research not yet integrated with education.
- Government shifted from partner to becoming a procurer of research.
- Growing commercialization of academy.

As a result there is a "new intellectual architecture" servicing: All these new developments have changed the face of the university and its activities. This change is evident in especially the urge for third stream income for a university. Bok (2003), in his study on the commercialization of higher education, makes important remarks for the integrity of the research process.

He asks:

"Was everything in the university for sale if the price was right? If more and more "products" of the university were sold at a profit, might the lure of the marketplace alter the behavior of professors and university officials in subtle ways that would change the character of Harvard for the worse? ... Observing these trends, I worry that commercialization may be changing the nature of academic institutions in ways we will come to regret" (Bok2003:x).

Bok (2003:59) identifies important ethical challenges in the shift towards commercialization of higher education. One such an example is the increase in the number of science papers based on industrial problems. Although the co-operation with industry can be to the advantage of research, the conflict of interest arises when financial or personal decisions are influencing the conduct of research. Examples are reported of researchers who promote the medicine of companies in which they have shares but they do not reveal negative results. Favorable results lead to the rise of prices. In addition more new drugs or medical procedures are tested where human subjects are involved. There are also examples of researches who are engaged with companies but make bad or hazardous results known. Commercial activities can have a good intention but can easily lead to conflict. Commercial incentives have succeeded in encouraging universities to do a much better job of serving the public interest. But, universities have paid a price for industry support through excessive secrecy, periodic exposes of financial conflict and corporate efforts to manipulate or suppress research results (Bok 2003: 59-73).

"Most universities have not done all they should to protect the integrity of their research" (Bok 2003:77).

It is not always the outcome of the research that challenges the integrity of research but also the research that researchers are engaged in or the continuation of a project just to get the funding. Another problem is universities investing in companies started by their own faculty. Conflict of management can arises. Universities have then to pick and choose between own scientists (Bok 2003: 146-154). Bok remarks:

"Worst of all, universities with a financial stake in work of their professors may be influenced, or may be thought to be influenced, by commercial considerations rather than academic merit when they decide on promotions, salaries or other sensitive personnel questions" (Bok 2003:154).

"It is unhealthy for universities to have their integrity questioned repeatedly by reports of excessive secrecy, conflicts of interest, and corporate efforts to manipulate and suppress research" (Bok 2003:156).

It is therefore evident that the way in which research is lately practiced calls for strict ethical behaviour. The ethical challenges are not limited to the engagement with research only but also the challenges from the communities external to the universities. Goedegebuure and Van Vught (2000:13) summarise it well when they say that research is big business!

4. METHODOLOGY

This study will be primarily a qualitative literature study. The authenticity of this study is guided by Macnee's (2004:219) observation:

"The literature review is guided by the variables that have been identified in the research purpose and aims to give the reader an overview of what is known about those variables, how those variables have been studied in the past and with whom they have been studied."

Burns and Grove (2007:161) expand on this by saying that literature review is summary of current knowledge about problem and includes what is known and not known about this problem.

5. UNDERSTANDING RESEARCH ETHICS

Scientific misconduct is normally viewed as fabrication and falsification (including plagiarism) of data (Altman 1997). But she says that it cannot be limited to these two acts only. The US National Academy of Science (1992) distinguishes between misconduct and "questionable research practices" as those which "violate traditional values of the research enterprise and may be detrimental to the research process" (US National Academy of Science 1996: 6). Researchers may not be guilty of misconduct but guilty of carrying out questionable research practices. The USA National Academy of Science (1992) questions the integrity of practices such as failing to retain data for a reasonable period, maintaining inadequate research records, conferring or request authorship on the basis of a specialized service or contribution that is not related to the research listed in a paper, refusing peers reasonable access to unique material or data that supports published articles, using inappropriate statistics or methods of measurement to enhance significance of research findings, inadequately supervising research subordinates or exploiting them, misrepresenting speculations as facts or releasing preliminary research results in media without allowing peers to validate them.

Burns and Grove (2007:196, 203, 231) refer to *unethical research* as scientific misconduct, violation of subjects' rights and the publication of inaccurate scientific information. They further define scientific misconduct into *fabrication* (making up results and report on them), *falsification* (manipulating results or omitting results) and *plagiarism* (appropriation of other's ideas, processes, results or word without giving credit). They also emphasize the normative value that research should project human rights.

Macrina (2000:1,2) joins this sentiment by starting of saying that integrity is expected in science - science is build upon a foundation of trust and honesty.

Science is seen as a definitive vehicle for uncovering truth: "Bogus results cannot make a contribution to our understanding of a problem." There is a difference between sloppy science and misconduct. Although the public doesn't always understand why and when scientists differ there is the obligation on scientists not to deliberately mislead the public.

"Preventing misconduct is key in science as in the other professions, and it is logical to argue that emphasis needs to be placed on education and appropriate socialization. But even the most rigorous efforts in this regard are not likely to affect someone who is intent on deliberate deception or misconduct" (Macrina 2000:9).

Lester and Lester (2002:123) join this debate on scientific integrity. They connect integrity with credibility, They refer to ethics of research especially in following matters:

- Using sources to establish one's credibility.
- Using sources to place one's work in proper context.
- Honoring property rights.
- Avoiding plagiarism.
- Sharing credit and honouring it in collaborative projects.
- Honouring and crediting electronic sources.
- Seeking permission to publish material on one's website.

Cherulnik (2001:374-5) devotes a chapter to the researcher's responsibilities as scientist, colleague and citizen. Researchers therefore have a *scientific responsibility* (valid research findings, scientific integrity), *social responsibility* (ethical conduct, societal pressures) and *professional responsibility* (publication of research, cooperation with colleagues). Cherulnik (2001:374) also says that to maintain high scientific standards of quality, one of best ways is to be responsible towards society.

Another problem very often overlooked in this debate is the supervision of students which goes beyond the student-mentor relationship. Both staff and students have to balance rights and duties. Supervisors complain that their students are not always committed to their research and expect from them (the supervisors) to do the research on their (the students) behalf. Students in return argue that their supervisors are not always prepared for their task, lack sufficient time to interact with a student and leave the students to deal with the research on their own (see Lategan *etal.* 2007).

Based on this overview it is evident that research integrity should be integrated in all aspects of the research cycle. It is also obvious that it is a one-sided perspective to limit the ethical evaluation of the research to the completed project only.

6. CONCEPTUALISING RESEARCH ETHICS

Ethics is the science of norms and values. Research ethics is the science of norms and values in the research cycle. Norms are the identified principles according to which the researcher operates. Norms are the application of these values. One's orientation towards a norm is influenced by a world and life orientation.

The application of this approach is articulated by Pojman (1990:3) who says that ethics is concerned not with *what is but what ought to be*. Ethics is not law although it is closely related. Law is instituted to promote well-being. But the law doesn't cover all ethical issues. Physical sanctions are enforcing the law but only the sanctions of the conscience and reputation are enforcing morality (Pojman 1990:3).

In applying ethics to the research process one can be guided by Minogue (2006:12-13) who asks four basic questions associated with (research) ethics:

- What makes actions right?
- What makes actions good?
- How are conflict between society and the individual to be reconciled?
- How do these answers give us procedures for addressing our bioethical problems?

These questions call for ongoing action and involvement by all stakeholders (the university and its stakeholders) with research. Macnee (2004:128,129) echoes this sentiment. She states that "It is unethical and illegal to implement a research study using animal or human subjects without institutional review board approval" and "The goal of research with human subjects is always to minimize the risks and to maximize the benefits." She lists the American Nurses Association (ANA) five rights for human subjects in research (Macnee 2004:128):

- Right to self-determination
- Right to privacy and dignity
- Right to anonymity and confidentiality
- Right to fair treatment
- Right to protection from discomfort or harm

At the bottom of these five human rights in research lies the *responsibility* of the researcher(s) (Macnee 2004:131). Basic problems associated with research ethics are the ignorance of informed consent, complying with informed consent, biasness in subject recruitment, selectivity (to support research focus) and response rate (Macnee 2004:134-140).

As research ethics cannot be limited to certain aspects of the research cycle only so can research ethics not be limited to certain disciplines only. In support of this observation can one refer to Minogue (2006:77) who works with the idea of the *expanding circle*: this means that ethics includes more than that what are obvious and known fields of research ethics. A perfect example is the common belief that research ethics only applies to fields such as the medical and health sciences, business, research into animals and the environment. Growing fields of interest are postgraduate supervision and engineering sciences.

7. REFLECTION ON ETHICAL FRAMEWORKS TO DEAL WITH RESEARCH INTEGRITY

7.1 Towsley-Cook and Young

Towsley-Cook and Young (200 7:1) write on ethical and legal issues for the imaging sciences. They believe that ethics and the law cannot be separated. They believe that the sum of ethical and legal knowledge together with common sense, personal values, professional values, practical wisdom and learned skills "will enable imaging professionals to tackle and solve the problems they will face."

Towsley-Cook and Young (200 7:2) define ethics as "the system or code of conduct and morals advocated by a particular individual or group." They also refer to ethics as the "the study of acceptable conduct and moral judgment." Values determine professional and personal ethics. Values are defined as qualities or standards that are desirable or worthy of esteem in themselves (Towsley-Cook and Young 2007:4). Values influence decisions and judgements (Towsley-Cook and Young 2007:5). Ethics is never remote from social changes. They designed historical foundations of ethics. Twentyfirst century ethical developments portrays society's needs and professional reactions as major foundations of ethics. (This follows on the twentieth century during which bioethics was born, W.D. Ross presented his professional behaviours, J Rawls his theory of justice and L. Kohlberg his stages of moral development) (Towsley-Cook and Young 2007:5).

In dealing with ethical problem solving they identify three schools of thought and five modules. They divide ethics in three major schools of thought (Towsley-Cook and Young 2007:9,10):

School of thought	Meaning
Consequentialism (teleology)	Decisions based on outcomes or consequences of given act.
Deontology	Decisions based on individual motives or morals.
Virtue ethics	Uses practical wisdom and character for emotional and intellectual problem solving. More of an holistic approach.

Next to the school of thought they identify five ethical models (Towsley-Cook and Young 2007:10-12):

Ethical models	Meaning
Engineering	Patient is a condition or procedure
Paternal/priestly	Somebody else thinks he/she knows what is best for patient
Collegial	Mutual cooperation between provider and patient
Contractual	Business relationship in which both provider and patient have obligations, rights and responsibilities
Covenantal	Agreement between provider and patient grounded in traditional values.

They also refer to the Dowd Problem Solving Model (Towsley-Cook and Young 2007:12):

- Assessment of problem
- Isolation of the issues
- Analysis of the data
- Development of a plan of action
- Institution of the plan
- Analysis of the outcome

Based on their approach, they identify seven principles for biomedical ethics¹ (Towsley-Cook and Young 2007:3, 29-31):

Principle	Meaning
Autonomy	Respect for patient as person
Beneficence	Performance of good acts
Confidentiality	Duty to protect the privacy of the patient
Justice	Moral Tightness
Nonmaleficence	Avoidance of evil
Role fidelity	Faithfulness or loyalty
Veracity	Obligation to tell the truth and not to lie.

In assessing the quality of life they placed it on a continuum between minimal need and maximal need. Issues influencing quality of life are biological functions, intellect, creativity, emotions and contact with others (Towsley-Cook and Young 2007:124-125). They advocate that the development of a code of conduct is a sign of professionalism (Towsley-Cook and Young 2007:3).

¹ They use bioethics as the application of ethical principles in the whole range of health care systems.

7.2 Shielda Rodgers

Rodgers (2007:113-114) defines ethics as "actions an individual should take ... Ethics are process-oriented and involve critical analysis of actions." She observed that although many ethical decision models exist in literature, the communalities of these models are more than the differences. The steps are not always sequential or intended to be rigid. It is a process (Rodger 2007:132). She summarises all these models into the next table:

Process	Ethical decision making model
Access	Clarify the ethical dilemma, gather additional data
Analyse	Identify options
Plan	Make a decision
Implement	Act
Evaluate	Evaluate

7.3 Creasia and Parker

Creasia and Parker (2007:275-277) point out that ethics has several meanings:

- Ethics = practices or beliefs of a particular group of individuals (example Christian ethics, nursing ethics).
- Ethics = expected standard of behaviour described in the group's code of professional conduct (example -ANA s Code of Ethics for Nurses (2001).
- Ethics = also used to refer to a philosophical mode of enquiry that helps us understand the moral dimensions of human conduct. "In this sense, ethics is an activity, a particular method of investigation that one undertakes to respond to particular types of questions about human behaviour" (Creasia and Parker 2007:275).

Their organization of subject matters of ethics is particularly useful:

- Metaethics: analyses connections between conduct and morality, analyses moral language, relationship among rules, principles and theories.
- Descriptive ethics: describes, examines and analyses.
- Applied ethics: application of values.
- Normative ethics: analyses standards or criteria, assesses duties and obligations.

Seen from the nursing practice and health care practice, beneficence (do good and avoid harm), justice (just and fair allocation of resources) autonomy (personal liberty) veracity (tell truth and do not lie) sanctity of human life (do not infringe on the sacredness of human life) and fidelity (faithful to one's commitment) are important.

Based on their views a representative framework for case study analysis is presented (Creasia and Parker 2007:291-293):

- What is the story behind the values conflict?
- What is the significance of the values involved?
- What is the significance of the conflicts to the parties involved?
- What should be done?

7.4 Fingold and team

Fingold and his co-workers work in the bio-business. They conducted thirteen case studies on ethical issues in various aspects of their work. All their work is bio-business related, varies in seize, focus, location, ethical issues, etc. In their case studies ten recurring themes are identified (Fingold *et al.* 2005:331-340).

- Financial pressures
- Developing new technologies
- Research ethics
- Working with regulators
- Marketing and delivery of products
- Value, pricing, access to products
- Doing business globally
- Managing conflicts of interest
- Corporate and social responsibility
- Business ethics and good governance.

Based on these case studies they build an ethical decision making process. This process has a broad applicability for the bio-business although each company faces unique set of circumstances.

- Put people first
- Start early
- Lead by example
- Build ethics capabilities
- Integrate ethics with business strategy
- Communicate: create an ongoing dialogue (not secrecy but dialogue)
- Build structural protections for ethical behavior
- Treat ethics as a process not a plaque
- Extend ethics to partners
- Measure effectiveness (Fingold *et al.* 2005:341-348).

They argue that it is important to engage the public through science and ethics education (Fingold *et al.* 2005:351). Behaving ethically depends on the ability to recognize the ethical issues that exist (Fingold *et al.* 2005:354). Ethics is inherently part of doing business in the bioscience sector (Fingold *et al.* 2005:354).

8. IDENTIFYING CRITICAL INDICATORS FOR RESEARCH INTEGRITY

Based on the various frameworks and discussions thus far, the following critical indicators can be identified to assist with ethical behavior and practice in the research cycle:

- Researchers should follow the professional codes of their professions but also the code associated with research (Scott 1998).
- Responsibility should be at the basis of all research activities. The responsibility is not limited to the research environment only but should be extended to all environments with which the researchers engage (Cherulnik 2001).
- Responsibility should be extended to the research placed in the public domain. Publications (articles) and presentations (oral posters) are one way of going public with research. Researchers must be responsible not only by putting research in the public domain but also *what* is put in the public domain (Bailey and Burch 2002).
- Ethical decisions should be evidence-based to make final decision (Burns and Grove 2007).
- During the planning phase of research, ethical concerns should already be addressed. In the planning stage of research, it is advisable to consider three things. Firstly, plan the research in such a manner that the chances for misleading results are minimal. Secondly, projects must meet criteria for acceptability. Thirdly, protect and ensure dignity and welfare of participants as well as those who might be affected by the outcomes of the research (see Spata 2003).
- Assess benefits and risks. Benefits should be greater or equal to risks before one proceeds with project. If risks outweigh benefits then one should not continue (benefit-risk-ratio) (Burns and Grove 2007).
- Human rights must be respected. Human life must be protected at all times. No researcher can compromise on the safety of the human being during the research process (see Diedericks and Lategan 1995).

- Participants in research should be protected. Vulnerable participants must be identified. Research ethical codes often tell us what not to do but do not always cater for the effect/impact/outcomes of the research (Giles 2002).
- Animal rights should be protected in doing research. Animals as research subjects are a growing concern. Two concerns are raised: firstly, should animals be used as subjects and secondly what mechanisms are available to ensure that they are treated fair? (Burns and Grove 2007)
- Research ethics cannot escape a business ethics focus. The value that business ethics can bring to the research environment is threefold: Firstly, it can develop researchers as moral individuals. Secondly, it can build an environment in which standards and values are central to the company's strategy, just as economic purpose is. Thirdly, it can formulate and implement policies that support ethical performance as well as safeguarding that they are observed (see Andrews 2003).
- The intrinsic value of environmental ethics for research ethics cannot be ignored. Based on claims about something's intrinsic value are claims about how it makes sense for us and care about the thing (McShane 2007).
- The intrinsic value of research is not limited to the research environment only. In return is research not beneficial only to the researchers and their immediate environment.

9. CONCLUSION

This study has made it clear that research ethics should be integrated with all aspects of the research cycle. It has also pointed out that in implementing research ethics into the research cycle a magnitude of aspects should be acknowledged and uphold to claim that research ethics has been applied to all activities in the research cycle.

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