



Central University of  
Technology, Free State

# **RESEARCH EDUCATION** at the Central University of Technology

**Prof. E.M. Bitzer**

A compendium for postgraduate students and study supervisors



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and study supervisors

This compendium involves a collection of concise, but relatively detailed, information about concepts, procedures and ideas that could be of value to research students and their supervisors.



*Research Education at the Central University of Technology*

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## Contents in brief

This compendium outlines key research concepts, the requirements of different types of research qualifications, various models and modes of supervision, hints on academic writing and thesis structuring, hints on conducting literature reviews, how to provide and generate feedback to and from research students, how to promote research independence, and how to generate and interpret doctoral examination criteria. It also contains useful references to relevant literature sources.





**1.**

**KEY (THRESHOLD)  
CONCEPTS IN  
POSTGRADUATE  
STUDIES**

## Research

A clear understanding of what the term 'research' means is essential for research students. Mouton (1998) suggests that we link the meaning of 'research', which literally means 'to re-look' or 'to re-visit', to different kinds of knowledge.

Knowledge-wise, people inhabit different 'worlds' which involves different and dissimilar 'stocks' of knowledge and strategies to make sense of these 'worlds' (Mouton 1998; 2001). For instance, in the world of everyday life, lay knowledge helps us to cope with problems, issues and decisions of everyday interest. The knowledge belonging to this 'world' has a pragmatic interest, which means people use such knowledge to cope with their everyday life.

However, in the 'world' of science, the phenomena of everyday life become the objects of natural and social inquiry and investigation. What distinguishes scientific knowledge, and thus research, from everyday knowledge, is the systematic and rigorous ways in which such knowledge is generated and tested. The overriding goal of all scientific research is a search for truth, understanding and novelty, and often also to apply such truths in ways that may or may not benefit everyday life. As science primarily has an epistemic (knowledge) interest, the world of science and research is diverse, complex and challenging and need diverse, complex and challenging ways of inquiring into research issues and 'doing' or 'conducting' research.

## Mastery

The term 'mastery' indicates a form of research accomplishment at the level of the master's degree, which is formally at level 9 on the Higher Education Qualifications Sub-framework (HEQSF). Such studies are more advanced than undergraduate, honours or advanced diploma studies, but less so than doctoral studies, which resides formally at level 10 of the HEQSF. Internationally, examiners agree that the 'mastery' in master's studies inevitably points to the mastery of a range of methodological knowledge and skills (see Biggam, 2009; Bui, 2015; Forsteh & Everett, 2013).



## Doctorateness

While the ‘mastery’ of methodology is assumed to be in place on completion of the master’s degree, the expectation for doctoral candidates is to make novel and original contributions to theoretical knowledge or professional practice. The concept of ‘doctorateness’ has thus been well described by Park (2007), Trafford & Leshem (2011) and Lee (2018).

‘Doctorateness’ can also be visualised in terms of the elements of a doctoral study (see Diagramme 1). All of these elements need to be present in a doctoral study, but the synergy among the different doctoral components, which brings integration and coherence into a doctoral study and a thesis, is key.

Contribution to knowledge	Stated gap in knowledge	Explicit research questions	Conceptual framework
Conceptual conclusions	<b>SYNERGY AND DOCTORATENESS</b>		Explicit research design
Research questions answered			Appropriate methodology
Coherent argument	Engagement with theory	Clear/concise presentation	‘Correct’ fieldwork

Diagramme 1: Components of ‘doctorateness’ (adapted from Trafford & Leshem 2011: 38)

Please see Trafford & Leshem (2011) for a detailed discussion on the concept of ‘doctorateness’.

The background is a solid dark blue color. Overlaid on this are several large, semi-transparent, overlapping circles of varying shades of blue, creating a sense of depth and movement. The circles are arranged in a way that they appear to be part of a larger, complex geometric pattern.

**2.**

**GENERAL RESEARCH  
CONCEPTS**

The world of research has a unique vocabulary and in order to participate in research, one needs to know its 'language'. Research concepts and terms that research students often struggle with include:

- Research approach and research logic
- Research paradigm
- Research design
- Theoretical/conceptual framework
- Hypotheses and research questions
- The difference between 'research methodology' and 'research methods'
- A research thesis
- Conclusions drawn from a study/research

To assist somewhat with a better understanding of these concepts and terms, please see Table 1.

**TABLE 1: RESEARCH TERMS AND CONCEPTS**

Term	Meaning	Example
Research approach / Research logic	<p>The way one conducts one's thinking about researchable phenomena or situations.</p> <p>[Important to note: There are no 'approaches' such as 'qualitative' or 'quantitative' to research. Thus there is also no 'qualitative' or 'quantitative' research or researchers. The terms 'qualitative' and 'quantitative' refer to the type of data generated in a research project and the methods that generate such data.]</p>	<p>- Inductive reasoning (an inductive approach/logic) implies the building of theory or generating propositions.</p> <p>- Deductive reasoning (a deductive approach/logic) implies testing theories, propositions or hypotheses.</p> <p>- Abductive/retroductive reasoning (a 'backward-looking' reasoning process that is aimed at developing a hypothesis which aims at explaining a current observation or event. One or more hypotheses are then tested against observations or data to explain a relationship or a cause.)</p> <p>An example of abductive reasoning: Student achievement is low. The abduction might be, say, that teaching standards are low. [See D Plowright, 2015: The work of CS Peirce. London: Routledge.]</p>
A research paradigm (or a research tradition)	<p>A paradigm is a world-view or lens to evaluate reality. Paradigms link to the purpose of the research, i.e. whether one wants to prove something, to better understand something, to change something or to solve a practical problem. Paradigms play a role in science and theory construction, in how the nature of knowledge is viewed (epistemology), views on being/existence (ontology), views on what is right/wrong/good/bad (axiology) and views on how to approach and conduct research (methodology).</p> <p>The term 'paradigm' also refers to a research culture or tradition with a set of beliefs, values, and assumptions that a community of researchers hold regarding the nature and conduct of research (Kuhn, 1970). A paradigm hence implies a pattern, structure and framework or system of scientific and academic ideas, values and assumptions (Olsen, Lodwick, &amp; Dunlap, 1992). The importance, use and value of paradigms vary among disciplines/fields of research.</p>	<p>For example: An economic perspective; an aesthetic perspective; a sociological perspective; a psychological perspective; a historical perspective; an educational perspective; a positivist perspective; a materialist perspective; an existentialist perspective; an interpretivist perspective; a critical (cf. critical realism) perspective; a pragmatic perspective (to be distinguished from a pragmatic view), and many others.</p> <p>For a more elaborate discussion, see Annexure 1.</p>

Term	Meaning	Example
Research design	The broad architecture (plan) of a research project to assist researchers to decide on how to think through and conduct their research. Research designs are sensitive to (a) the research problem (what exactly needs to be investigated and what knowledge gap exists?), (b) the research questions/hypotheses and (c) the research aim or purpose (e.g. exploratory, descriptive, explanatory, evaluative or transformational).	For example: Experimental designs; Quasi-experimental designs; Non-experimental designs; Interventional designs; Natural designs; Case study designs; Evaluative designs; Grounded theory designs; Ethnographic designs; Phenomenological designs, and many more.
Theory (theoretical framework)	A theory or several theories can assist to understand the planning of a research project and to interpret its research results.	For example: Ways to understand human learning might rely on learning theories such as Brain physiology, Behaviourism, Rationalism, Cognitivism, Cognitive-constructivism, Socio-constructivism, Transformational learning, Adult learning, and others.
Conceptual framework (CF)	An essential thinking device or tool that includes key concepts relevant to a study/project and which emerges from literature (reading), own experience with a phenomenon (background knowledge and observations) and the experience of others, which might include observations from knowledgeable peers (also see Ravitch & Riggan, 2012).	Conceptual frameworks are unique to particular research projects and are developed via a researcher's understandings of literature (concepts and theories), personal understandings as well as the understandings of others in the field of inquiry (see 'Conceptual Frameworks' websites on Google for visual representations of CFs).
Hypotheses/ Research questions	The guiding element in all research projects. No research can be conducted without a clear, well-formulated hypothesis or research question (also see Alvensson & Sandberg, 2013)	Example of a hypothesis: 'Older students are more self-directed in their learning than younger students'. To be proven or rejected here is the relationship or non-relationship between chronological student age and self-directedness in learning.  Example of a research question: 'How, if at all, do the learning orientations of older students change?' The question is here whether and how the learning orientations of older students change. Such a question are usually followed by subsidiary research questions which, if answered, help to answer or address the main research question.

Term	Meaning	Example
Research methodology	<p>The broad conceptualisation of a research project. It includes, but is much more than, the methods used for generating data. It assists to state and explain, for instance, the 'why, what, where, who and how' of the research project.</p> <p>The Wikipedia version: 'Methodology is the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. Typically, it encompasses concepts such as the research paradigm, a theory or theoretical model, the phases of the research and the methods to generate quantitative or qualitative data. A research methodology does not set out to provide solutions - it is, therefore, not the same thing as a method. Instead, it offers the theoretical underpinning for understanding which method, set of methods or so called 'best practices' can be applied to a specific case, for example, to arrive at a specific result.</p>	<p>Research methodologies are unique to particular studies and have to be aligned to research problems, research aims and research questions/hypotheses.</p>
Research methods (methods to generate data)	<p>The range of ways to generate research data and which fits well into the research methodology.</p>	<p>For example:          Methods to generate interview data; Methods to generate case study data; Survey methods; Methods to analyse documents; Methods to generate observational data; Consensual methods (e.g. the Delphi method); Methods to generate visual and image-based data; Methods to generate internet/electronic data, and many others. According to Plowright (2011) there are only three methods to generate data: (1) Observations, (2) Asking questions and (3) Artefact analysis.</p>

Term	Meaning	Example
Master's and doctoral studies	The purposes of master's and doctoral studies differ.	<p>Doctoral studies primarily aim to contribute to existing bodies of knowledge – thus to extend knowledge in different ways and being recognized as such by scholars (peers) in the particular discipline or field of study.</p> <p>Master's studies primarily aim to master the methodologies of research within a particular discipline or field of studies – thus to demonstrate that the candidate has mastered the knowledge and skills to conduct research at a particular scholarly level.</p>
A thesis	The term 'thesis' can have more than one meaning. On the one hand it can mean the central argument or statement in a research project (e.g. What is your 'thesis'? It can also refer to a final research product or research report.	Structurally, a written thesis normally involves: An orientation to the study; Theoretical perspectives; Research design and/or methodology; Findings and a discussion of the findings; Conclusions and implications. A list of references. Appendices.
Drawing conclusions from research	When theoretical perspectives (literature) and empirical (experimental or field) data have been generated, analysed and interpreted, a researcher has to be able to draw a number of conclusions based on the findings of the study. Such conclusions have different implications (for theory, for practice and for future research) that need to be explicitly stated to reader of the thesis.	<p>There are usually three types of conclusions that can be drawn, based on the findings from a study:</p> <ul style="list-style-type: none"> <li>• Factual conclusions (based on the facts that were found)</li> <li>• Analytical conclusions (based on an analysis of the facts)</li> <li>• Conceptual conclusions (based on insights into relations among the factual, analytical and theoretical findings of a study).</li> </ul>

# 3.

## DIFFERENT TYPES OF DOCTORAL STUDIES AND THEIR REQUIREMENTS



At the master’s level a plethora of study options exist worldwide. The main ones include a master’s qualification by coursework, by coursework plus research or by research only.

At the doctoral level qualifications can be categorised into ‘traditional’ types of doctoral studies and ‘non-traditional’ or ‘new’ types of doctorates. To briefly highlight the differences amongst current doctoral types as they appear at universities in many countries, the information in Table 2 might be useful.

**TABLE 2:** Variations of the doctorate

Qualification	Characteristics
The traditional doctorate	Based on a supervised research project and examined on the basis of a written thesis
The doctorate by publication	Based on a (sometimes supervised) research project, but examined via peer reviewed scholarly papers which have been published or submitted for publication, an overarching introductory and an conclusions section. Further guidelines on the doctorate by publication follow below.
The ‘new route’ doctorate with integrated studies	Contains significant taught elements which are examined and must be passed. It was initially developed to provide international students with
The professional doctorate	Based on a combination of taught modules which are examined and must be passed, accompanied by supervised a research project which is often smaller than the traditional doctorate, is more applied and is work-based or more focused (also see Carr et al., 2010)
The practice-based doctorate	Based on a supervised research project, usually in the performing arts, where the output involves both a written piece (which is shorter than a traditional doctoral thesis) and one or more other forms such as a portfolio of work (for art and design) and one or more performance pieces (for theater studies or music). Both these forms of output are examined.

(Adapted from: Eley & Murray, 2009; also see Carr et al. 2010, Lee, 2010 and Louw & Muller, 2014)

Each of these formats have their own unique requirements and assessment procedures which are not elaborated on here.

# 4.

## THE DOCTORATE BY PUBLICATION – AN ALTERNATIVE OPTION

The thesis format as a model to demonstrate ‘doctorateness’ (Trafford and Leshem, 2011) mainly refers to the traditional way of presenting doctoral work. A more recent trend however is to conduct PhDs by publication. One recent South African study (Odendaal & Frick, 2018) analysed and compared the formats and publication rates of 1128 doctoral theses across disciplines at a South African research intensive university over a 7 year period. Here unpublished monographs accounted for 41% and published PhDs for 27% of the sample.

While the doctorate by publication is a rather recent phenomenon in South African higher education, it has to demonstrate, like in the case of theses by monograph, features such as coherence, integration and unity as a scholarly piece of work. These features are not always taken into consideration from the outset as a study in publication format is planned. A number of questions thus seem important to clarify decisions to embark on the PhD by publication route.

### **Why the publication route?**

Increased demands for shorter doctoral completion times, requirements to show greater accountability as governments and industry expect a return on investment by means of rapid and public dissemination of research results, and the delivery of employment-ready researchers drive the push to publish. Early publication also holds potential benefits to the student, supervisor/research team, university, and doctoral education as a whole (Frick, 2019). The PhD by publication develops essential communication skills and the publication process key to a further academic or research career. In addition, publication makes doctoral research work accessible to a wider academic audience beyond the thesis and builds the scholarly reputation of the candidate, the supervisor(s), (where appropriate) the research team, and the university. Publication can also serve as a comparable standard of doctoral excellence across disciplines and national systems, which is important given the mobility of doctoral graduates.

## **Familiarity with the publication PhD format**

It might help to look at examples of completed theses within a discipline, and speak to other doctoral students and supervisors who have used this format – even those in other disciplines. This should provide an idea of what is acceptable as a norm within the field of study. Aitchison and her colleagues (2010; 2012) have shown several options in their investigation of pedagogical practices when using this format, while Mason and Merga (2018) also offer an array of potential options that are worth considering. A further consideration is whether the nature of the project lends itself to this format, and whether the timelines associated with the type of project would facilitate or hamper completion in the case of the publication format.

## **What are the institutional guidelines and policies related to doctoral thesis formats?**

There is a need for explicit guidelines to be provided to examiners of PhDs by publication, outlining the institution's definitions and requirements, for example the requisite number of papers; status of papers (published, submitted for publication, publishable); handling of co-authorship; bridging sections and appendices. Many institutions have specific guidelines for a publication format, but these may differ across, and sometimes even within, institutions.

## **Are students aware of the demands of a PhD by publication?**

There is a myth that the publication-based PhD is an easier or quicker option to completing a PhD than the traditional monograph dissertation. This thinking has been shown by Linqvist (2018) to be flawed.

## What makes the publication-based thesis worthy of a PhD qualification?

There is the risk that a PhD thesis may be a series of descriptive studies rather than a process to develop and reflect ‘doctorateness’ in the sense of rigorous and sustained scholarship. The introductory chapter is particularly important as it could help to establish coherence, and make the contribution and originality of the work explicit (see Frick, 2018).

## What supervision and other support mechanisms are in place?

The PhD by publication implies a shift in the power dynamics in the student-supervisor relationship, in which the traditional apprenticeship model of supervision may no longer be appropriate. Supervisors need to be actively publishing themselves and provide appropriate support and advice from the outset, including writing support; scaffolded reading; journal selection; citation practices; possible financial implications (for example page fees); the institution’s policies and expectations; and care in choosing examiners. Thein and Beach (2010) add four supervisory practices that would support such an approach: (a) mutual engagement of both the student and the supervisor in collaborative research; (b) co-authored research, which provides opportunities for mentoring writing development; (c) reciprocal review and evaluation; and (d) networking. Paré (2010) makes a strong case for the development of language skills (both reading and writing) and whether we provide students with the space and opportunity to fail before exposing them to the scrutiny of journal editors and reviewers. Such opportunities include doctoral seminars, writing groups, writing retreats and working paper collections. Online writing opportunities in groups can also serve as a way of supporting our students.

## To whose benefit will publication be?

Some supervisors may see PhD by publication as an easy way to increase their own publication record, but it can come at a high cost to the well-being of the student. Considering that this route to the PhD might actually take longer (especially if the institutional requirement is that the included papers need to be published), there needs to be benefits for the student to offset the probable disadvantages. Issues such as determining publishable units, possible journal selection, as well as author inclusion and order have ethical implications and relate to the question on whose interests are being served by publishing the work. The sooner these issues are discussed and negotiated, the less room there is for conflict later on in the process.

## The issue of feedback

In a publication-based PhD supervisor roles include 'visible authorship' and 'publication broker' whereby reviewer comments are mediated. Doctoral students (and their supervisors) may benefit from peer review during the publication process as formative assessment. Eventual publication may serve as an impartial indication (through blind review) of the originality and merit of the work. Yet reviews are not always favourable or kind. Supervisors need to carefully consider how to mediate such comments and support students to make sense of required revisions, as well as manuscript rejections - which can delay or even paralyse a student's progress.

## Examining the PhD by publication

If a doctoral thesis presents published work, then the question arises as to what role examiners play in the process. Are they merely there to put a rubber stamp of approval on the work presented towards a degree? Or can they still offer critique and suggest changes?

While the PhD by publication is a viable qualification option, both supervisors and institutions have to understand the implications of choosing this format and offer the necessary support to doctoral

students. One consideration is that the student's interests need to be considered foremost – not the stature of the institution, nor the contribution possible publications, would make to the academic standing of the supervisor(s). Careful consideration is necessary before adopting this format, as some students, projects and supervisors may be more suited to particular study formats than others.



# 5.

## THE DIFFERENCE BETWEEN MASTER'S AND DOCTORAL STUDIES

Questions are often asked about the difference between the master's and the doctoral level of studies. Other than different quantitative (length) and credit (duration and input) requirements, the qualitative differences can be summarised as in Table 3 below.

**TABLE 3:** Differences between master's and doctoral level requirements

Research requirements of a master's qualification (NQF Level 9)	Research requirements of a doctoral qualification (NQF Level 10)
<p>Master's graduates must be able to deal with complex issues both systematically and creatively, make sound judgements using data and information at their disposal and communicate their conclusions clearly to specialist and non-specialist audiences, demonstrate self-direction in tackling and solving problems, act autonomously in planning and implementing tasks at a professional or equivalent level, and continue to advance their knowledge, understanding and skills.</p>	<p>The defining characteristic of this qualification is that the candidate is required to demonstrate high-level research capability and make a significant and original academic contribution at the frontiers of a discipline or field. The work must be of a high quality to satisfy peer review and merit publication. The degree may be earned through pure discipline-based or multidisciplinary research or applied research. This degree requires a minimum of two year's full time study, usually after completing a Master's degree. A graduate must be able to supervise and evaluate the research of others in the area of specialisation concerned.</p>

(Source: Government Gazette No 38166, 17 October 2014, pp. 36 - 40.)

These two positions indicate a clear difference. While the doctorate asks for evidence of an original contribution of knowledge to a field, a discipline or a practice, the master's qualification basically requires a sound demonstration of methodological and problem-solving knowledge and skills. This does not mean that master's studies cannot make a meaningful contribution to knowledge, which in many fields they do, but in general this is not an expectation at the master's level of studies.

This brings forward the question of what master's and doctoral students do their research about. Or, in other words, what their research topics are about. At a university of technology this is an important question as the expectation is that contributions from such universities will make a difference – whether to technology, industry, society or other spheres of work and life. The next topic thus addresses a few questions about the relevance of postgraduate research topics.

The background is a solid dark blue color. Overlaid on this are several large, overlapping, semi-transparent circles of varying shades of blue, creating a layered, geometric effect. The circles are centered around the text.

**6.**

**THE RELEVANCE  
OF POSTGRADUATE  
RESEARCH TOPICS**

The worldwide Covid-19 pandemic has shown, in very clear and substantial ways, the importance of research relevance as many researchers had to focus their attention on solutions to the many problems created by the pandemic. The shift was not confined to only finding an effective vaccine, but spanned fields and research across the spectrum.

In a paper on multi-, inter- and transdisciplinary research at CUT in 2012, Koki, Lategan and Orkin argued that research at universities of technology should be infused by the application of technology and integrally related to the world of work (2012: 136). Other requirements include the quest for innovation and the transformation of research findings into user-oriented and practically viable products. The authors continue by emphasizing the crossing of knowledge and disciplinary boundaries to realise such expectations. Research programmes and research topics obviously need to reflect these sentiments and requirements for CUT to fulfill its role as a contributor to research as a reputable university of technology.

These authors are not alone in their call for research which is more relevant to the mission of universities of technology. Earlier, Bercovitz and Feldmann (2006), Green *et al.* (2009), Markides (2011) and Assbring & Nuur (2017) all highlighted the quest for relevance in research topics and programmes. Bercovitz and Feldmann argued that within knowledge-based societies, the relationships between universities and industries are crucial to play a meaningful role in knowledge-based innovation systems. Equally, Green *et al.* (2009) had appealed to universities to make science relevant to practice, especially as it relates to the field of research and the application of evidence-based knowledge to health and community health issues. This plea was underscored by Markides (2011:121) who approached the problem of relevance and application of research findings from the field of management and applied behavioural sciences. In his words:

*“There is growing concern within the Academy of Management that a big and growing gap exists between management research and practice. The persistence of this gap is a mystery!*

*Over the past 20 years, literally hundreds of ideas have been proposed to close it. Yet nothing seems to work and according to some, the gap continues to grow. Why is that? Is it that all the ideas proposed are bad or are we simply guilty of not implementing our own ideas in a manifestation of the “knowledge–doing gap”?*

Much more published work can be cited to illustrate the point, but what remains is for students and candidates to be increasingly aware of how limited resources for research are in a developing country such as South Africa. This requires research topics, especially within universities of technology, to be relevant to the needs and problems of industry, commerce and society. At the same time research at CUT should be reputable and of quality – only then will it really honour its position within the higher education research dispensation.

The next section looks at models, modes and practices of supervision – particularly as it relates to doctoral research and studies.

# 7.

## MODELS, MODES AND PRACTICES IN (DOCTORAL) SUPERVISION

South Africa faces some dramatic new developments and challenges. Higher education, like other sectors of society, is affected by such challenges in major ways as they relate to, among others, the following: The Corona pandemic, student health issues, institutional and students' economic constraints, educational delays in the academic calendar, various outcries about racial and inequality issues, and more. Similarly, senior degree research and studies pose new questions as they involve aspects such as increasingly limited face-to-face contact between students and study supervisors, researcher difficulties with laboratory and field work, limited or no access to research sites and participants, new modes of communication, limited data for some research students, the national review of doctoral programmes, and more.

Amidst all these challenges, questions are also asked about alternative ways of supervising senior degree research. The traditional 'apprenticeship' model of supervision seems to be increasingly questioned in terms of its efficiency and effectiveness, and how to handle increasingly larger numbers of postgraduate students, limited supervisory capacity at institutions, a demand for increases in research outputs, the quality and relevance of research products, and other.

This section relates to new modes and models of supervising and addresses at least three aspects involving senior degree studies and supervision. The first is (a) the important question of how to promote senior degree attributes and responsibilities of research supervisors and their students. The second (b) focuses on the pertinent issue of roles, styles, modes and models of supervision, their characteristics, pros and cons. The third and final aspect (c) deals with some issues related to supervising students over distance and building trust within student-supervisor relationships.

#### **a. Senior degree attributes and responsibilities**

The Higher Education Qualification Framework had suggested a number of attributes (2012) that were endorsed by the self-evaluation directives of the recent national doctoral review (2019). These attributes can be summarized as follows (for the complete list, see the level descriptors for qualification levels 9 and 10, HEQF 2012):



Irrespective of how their studies are being promoted, senior degree graduates need to demonstrate, at the minimum, an ability to

- develop research expertise and critical knowledge;
- interpret scholarly debates and literature;
- identify and effectively apply research methodology;
- apply knowledge to solve identified problems;
- carry out ethically responsible research;
- make independent research judgements;
- appropriately produce and defend scholarly work;
- effect change for the better through their research;
- effectively manage or co-manage a research project;
- operate relatively independently and take responsibility for own work.

In order to promote these attributes, supervisors and senior degree students clearly have responsibilities in terms of adhering to institutional requirements. At a minimum, these responsibilities involve the following:

Supervisors of senior degree students have to

- promote their students' achievement of graduate attributes;
- assist students with ethics applications;
- ensure students' familiarity with institutional regulations regarding senior degrees studies;
- communicate at agreed times with students about their work and their progress;
- ensure that applicable research facilities are available to students;
- monitor students' work according to an agreed schedule;
- advise students in terms of project choice, scope and research development activities;
- refrain from doing research or language editing on students' behalf;

- promote appropriate research outputs with students as agreed, including clarifying intellectual property rights, research applications and patents;
- inform students of any long term absence and ensuring appropriate alternative arrangements;
- conduct formative assessments of students' work in progress;
- ensure an appropriate summative assessment of students' completed work in line with institutional examination procedures.

At the same time, senior degree students have to

- achieve postgraduate attributes as stipulated;
- familiarise themselves with and abide to CUT's senior degree regulations;
- obtain ethics approval for their research;
- take responsibility for progress and quality of work;
- update supervisors on progress and difficulties encountered;
- familiarise themselves with the guidelines and conditions for research support;
- meet regularly with supervisors/promoters (at least once every four to six weeks);
- submit all requested work on time as agreed;
- check written work for plagiarism and abide by CUT's regulations in respect of plagiarism, copyright and intellectual property rights;
- participate in all research development activities as agreed with supervisors; (1 1) present own research at a public forum as agreed with supervisors (e.g. a colloquium any time prior to graduation;
- co-operate with supervisors towards research outputs required by the examination procedures for senior degrees;
- defend own research in oral examinations (vivas) if and when required;
- adhere to the editorial and technical requirements for final theses;
- understand that the copyright of theses/dissertations belongs to the University.

## **b. Roles, styles, modes and models of supervision**

By way of introduction, reference was made to the issue of striving towards the attainment of senior degree attributes. It was emphasized that irrespective of how their studies are being supervised or promoted, such graduates need to demonstrate, at the minimum, an ability to

- develop research expertise and critical knowledge;
- interpret scholarly debates and literature;
- identify and effectively apply research methodology;
- apply knowledge to solve identified problems;
- carry out ethically responsible research;
- make independent research judgements;
- appropriately produce and defend scholarly work;
- effect change for the better through their research;
- effectively manage or co-manage a research project;
- operate relatively independently and take responsibility for own work.

The issue of supervisor roles (the various tasks a supervisor must accomplish), supervisor styles or approaches (the ways in which supervisors interact and communicate with students to guide their studies), modes/models of supervision (the chosen structure of supervision, whether dyadic, project based, group-based; team-based, at a distance) were briefly touched upon. The question was raised about how do these roles, styles, modes and models of supervision affect one another?

When positioning one's supervision practices it seems important to determine one's current and 'ideal' position (see Table 4 below). For instance, the individual supervisor supervising the individual student might have an ideal situation if the number of senior degree students is low and individual attention to each is possible. However, if senior degree student numbers and departmental expectations about completion rates increase, individual supervision might not be the ideal model to follow. Also, if a supervisor lacks a particular knowledge base or set of skills (e.g. regarding research methodology), one-to-

one supervision might also not be ideal. Because of these mitigating factors, the trend internationally is towards teams of supervisors that supervise cohorts of students. The implications hereof are discussed further on.

**TABLE 4:** Positioning supervisor practices

	Individual student	Students in teams/ cohorts
Individual supervisor		
Co-supervisors		
Supervisory teams		

Also important was to highlight a few important concepts related to senior degree supervision (see Table 5 below).

**TABLE 5:** A framework for concepts of research supervision

	Functional	Enculturation	Critical thinking	Emancipation	Relationship development
Supervisor's activity	Rational progression through tasks	Gatekeeping	Evaluation, challenge	Mentoring, supporting, constructivism	Supervising by experience, developing a relationship
Supervisor's knowledge and skills	Directing, project management	Diagnosis of deficiencies, coaching	Argument, analysis	Facilitation, reflection	Emotional intelligence
Possible student reaction	Obedience, organised	Role modelling	Constant inquiry, fight or flight	Personal growth, reframing	Growth in emotional intelligence

Table 5 shows, on the left-hand side, possible activities, knowledge and skills positions by supervisors and possible student responses to such positions. For instance, if the supervisor takes on supervision

solely as a rational project closely directed by her/himself, the student might react by being extremely obedient and organised (as in the second column, last line of Table 5). However, if a supervisor might take on a more emancipatory position by being a research mentor and facilitating student reflection (see the second last column, last line of Table 5), students might react by growing in person and in research competence as the study progresses. In the case of doctoral students, for instance, the ultimate aim is to educate independent researchers. This might not happen unless both supervisor and student shift their positions during the course of a study from being directive to being emancipatory and from being a dependent researcher to being independent, respectively.

Literature and observed practices point to a number of supervision models. Often these models are not 'stand-alones' but very much blended or integrated, so one should not view them in isolation.

- The apprentice-master model;
- Team supervision/co-supervision;
- The collaborative cohort model;
- 'Distance' supervision, and
- 'Mixed' mode options.

### **The apprenticeship model (in many instances this is the 'default' model at institutions)**

This model involves basically where an established 'master' inducts the new apprentice into the 'mysteries of the craft' (in this case the craft of research). Research apprentices learn mainly by observing how 'masters' conduct research, undertaking sustained academic research themselves and having the 'masters' provide written and verbal feedback on their work.

The assumptions here may include that the supervisor the learned expert and the student the apprentice who learns by doing; that the supervisor may engage in mentoring, sponsoring, progressing and coaching; that the students are intelligent, self-directed and capable of becoming independent researchers with minimal input from

supervisors; also that such a model could lead to the isolation of students and/or uneven positions of power.

## Team supervision

Increases in the use of supervisory teams in part reflects a growing trend towards inter-disciplinarity and the recognition that a single supervisor is unlikely to have the full range of knowledge and skills to support complex research work (e.g. methodological skills, subject knowledge). What is often the case is that teams of supervisors are probably more common in the natural sciences than in social sciences, but this model might be more challenging for (doctoral) students in particular to manage as team dynamic may not be always cohesive or harmonious.

However, team supervision is thought to reduce the risk of supervisory incompetence, increasing the likelihood of successful completion. When the team consists of one experienced supervisor teaming up with a novice supervisor this could be understood as a 'coaching' or 'mentoring' model. Such an arrangement gives rise to status differentiation within the team, but due to clear role definition will potentially result in more harmonious and smoother functioning than where supervisors have equal status.

In team supervision relationships between supervisors can both positively and negatively affect student's experience of the doctoral undertaking. Teams characterized by intellectual and personal divisions can result in students being 'caught up in the middle'. Therefore, communication is at the core of effective team supervision. For instance, pre-meeting communication between supervisors on submitted work is essential to iron out differences of opinion and ensure a broadly agreed 'line' of feedback to the student – this builds trust in the supervision relationship and avoids conflicting messages. However, disagreements between supervisors can provide opportunity for deeper critical reflection on both ideas and process and benefit the student – the key is the way in which differences are shared and managed. Effective supervisory teams represent intellectually and

practically engaged cooperatives operating in the best interest of the student and also guarantees continuity in case of illness, death or departure of one of the supervisors.

## Supervising cohorts of students

All students who enroll for their senior degrees (or who have completed their coursework) within a discipline/project/department compose a collaborative learning cohort. One or more faculty member(s) serves as coordinator and mentor (this could also be a supervisor) to promote academic research enculturation. The cohort meets regularly, either in person, or by electronic means (Skype/Zoom/MS Teams), which promotes a community of practice/research. Students present their work from time to time to the cohort and other members of the cohort provide feedback to promote constructive criticism. During meetings students might discuss a wide range of issues related to their studies (e.g. research methodology, appropriate and useful literature, technology), but they can also form smaller 'buddy' groups within a larger cohort.

The roles of the coordinating faculty member in cohort supervision include the following: To organise and structure meetings; to facilitate the meeting according to an agenda; to establish communication mechanisms for cohort members; to teach constructive feedback skills to students, and to structure links between students with appropriate experts. If the coordinating faculty member is not the supervisor, students must inform their supervisor of the cohort and the supervisor should receive regular communication from cohort meetings.

There are obviously both advantages and disadvantages to the supervision of students in cohorts as indicated in Table 6 below.

**TABLE 6:** Advantages and disadvantages of senior degree supervision in cohorts

ADVANTAGES OF COHORT SUPERVISION	DISADVANTAGES
Students feel less isolated, because they have the opportunity to meet with fellow students in a collaborative framework to discuss common issues and concerns	Careful selection of coordinating faculty member is crucial – increase in faculty workload could have ripple effect
Students are more likely to complete their dissertations	Potential for conflict between coordinating faculty member and individual supervisors
Students gain a greater breadth of knowledge from reading fellow students’ work	Some students might not thrive under or benefit from cohorts
Students acquire knowledge and understanding of a wide range of research design and methods	
Students acquire critical feedback skills	
Workload for supervisors could decrease	
Quality of proposals and dissertations produced by students is enhanced	

Figure 1 indicates how the supervision of student cohorts could be organized and aligned within a department or faculty, starting with basic undergraduate projects and scaffolding towards a project team within a field of specialization over a period of time.



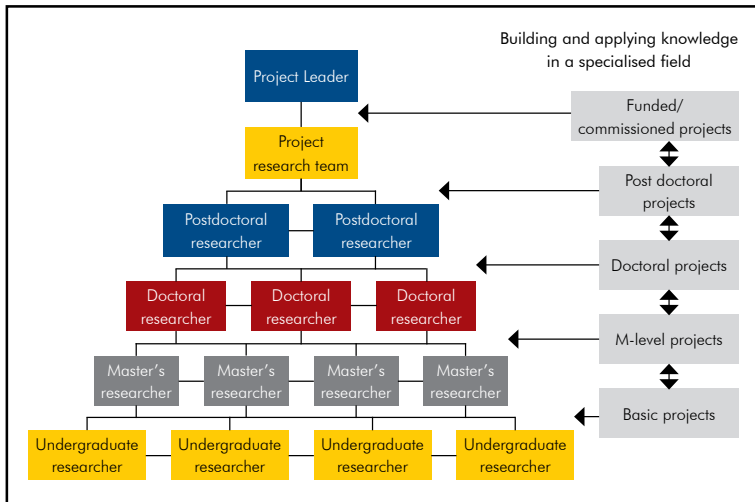


Figure 1: Cohort supervision showing the scaffolding of projects and researcher roles at different research levels

## Supervising 'at a distance'

This option might involve a mixture of all the former alternative models by incorporating new technologies. This mode of supervision combines individual sessions between supervisors and students with virtual meeting options that offer teleconferences, online exemplars, discussion groups and self-paced (online) research training. The use of such technologies can strengthen relationships between supervisors and students and create virtual communities of practice.

The theoretical underpinnings of supervision engagement refer back to transactional analysis – a system of popular psychology; based on the idea that one's behaviour and social relationships reflect an interchange between parental (critical and nurturing), adult (rational) and childlike (intuitive and dependent) aspects of personality (Moore, 1973). Supervisor- student transactions during the course of a study are usually negotiated, however supervision at a distance needs a structured approach, the formation of student communities of practice, and regular feedback and communication (Jacobs, 2020).

Specific supervisory skills are needed in online communication, the use of asynchronous and synchronous technologies, the management of online communication and social skills (Kumar & Johnson, 2017). It also involves academic, professional and psychosocial support. At the institutional level, resources and support for research (e.g. access to research software online) should be available to students so that individual supervisors do not have to find and communicate such resources but can focus on the online mentoring of the research itself (Kumar & Johnson, 2017). The importance of structure, small group mentoring and peer support in overcoming challenges faced during online supervision (Kumar & Johnson, 2017) cannot be over-emphasised.

Supervision at a distance requires online student accountability, peer support and institutional support (Kumar & Coe, 2017). If a supervisor is inexperienced or underqualified, not a permanent staff member or in cases of inter-disciplinary or multi-disciplinary research, team/co-supervision is preferable (University College Cork, 2018). Some of these issues and many others are recorded in a recent useful resource: Kumar, S., Kumar, V. & Taylor, S. (2020) *A Guide to Online Supervision*. UK Council for Graduate Education. <http://www.ukcge.ac.uk/media/download.aspx?MediaId=2268>

## In summary

Table 7 below summarises the supervision models we have touched on in terms of literature references to their distinctive characteristics.

**TABLE 7:** Supervision models and some characteristics

MODELS	CHARACTERISTICS
Traditional (one-to-one)	<ul style="list-style-type: none"> <li>▪ The power issue (Pearson &amp; Kayrooz 2004)</li> <li>▪ Possible isolation (Manathunga 2005)</li> <li>▪ Limited numbers and time consuming (Wisker et al. 2007)</li> <li>▪ Can involve mentoring and coaching roles (Gardner 2008; Kamler 2008)</li> </ul>
Teams of supervisors	<ul style="list-style-type: none"> <li>▪ Experience mix (Nulty et al. 2009)</li> <li>▪ Flexibility (Croussard 2008)</li> <li>▪ Delegation and acquiring supervisory skills (Lee 2009)</li> <li>▪ Distributed management responsibilities (Bitzer &amp; Albertyn 2011)</li> </ul>
Student cohorts	<ul style="list-style-type: none"> <li>▪ Interaction promotes quality (Lovitts 2008)</li> <li>▪ Experiencing a sense of community (Malfroy 2005)</li> <li>▪ Enculturation and doctoral identity formation (Samara 2006)</li> <li>▪ Distributed power (Guilfoyle 2006)</li> </ul>
'Mixed' options	<ul style="list-style-type: none"> <li>▪ Variation in supervisory roles and responsibilities; the use of technology; inclusion principles (Wisker et al. 2009)</li> <li>▪ Promoting new supervisory planning and delivery frameworks (Bitzer &amp; Albertyn 2011)</li> </ul>

Finally, the importance of trust between supervisors and students needs to be emphasized. Trust is important as it is central to knowledge development, the development towards independent scholarship and also for students to have safe spaces to try out ideas and support meaning making and knowledge formation. Developing trust takes time and effort and in all of this effective communication (e.g. clarifying roles and responsibilities, expectations, setting and

adhering to timelines, logistics, responses to the work patterns of those involved in the relationship) plays an important role. Supervisors are expected to promote their students' interests, but not at the expense of their own, and thus reciprocity as well as boundaries are needed.

To summarise:

- The chosen model of supervision (apprenticeship, team, group, distance model, hybrid/mixed model) determines the roles and responsibilities of supervisors;
- The type of study (disciplinary, inter-disciplinary, trans-disciplinary, multi-disciplinary) is also a major factor;
- The level of studies (master's or doctorate) plays a part;
- Conventions of disciplines/universities/faculties/schools/departments might be an important determinant (but also: How do we break out of these moulds?);
- Personality and inclination/style of supervisors are important variables in supervision (note: a supervisor is literally 'an overseer' of the process of a study).

Also note that rights and responsibilities in senior degree work are not one-sided, but mutual.

# 8.

## ACADEMIC WRITING

Academic writing is part and parcel of good research. It is mainly through our writing, whether in a research proposal, a thesis, a research report, an article, a chapter or any other scientific document whereby we communicate with supervisors, peers and others that our ideas become visible. Writing academically is largely a skill as scientific writing conventions in a discipline or field can be learnt and practiced. However, writing also constitutes an art which needs exploration, creativity, practice, revision and the ability to communicate clearly. Murray and Moore (2006) emphasize that academic writing is both a process and a journey that involves the courage of doctoral candidates to develop a scholarly 'voice' over time.

Below are a few important points related to a typical academic writing journey which can be divided into answers to three distinct questions, namely (a) Why do we write? (b) How do we write? and (c) When do we write?

**a. Why do we write?**

Firstly, academic writing aims to communicate with a particular (scientific) readership. Wentz (2014) claims, for instance, that academic writers cannot write well unless they read well. Seeing how successful authors write provides us with guidelines and hints how to write well ourselves. Thus, we write to communicate in a scholarly fashion to those who know what good academic writing looks like.

Secondly, academic writing aims to convince our readership of the inherent value of our scholarly thinking, knowledge and arguments. It thus illuminates the soundness of our research, its value, its methods and its results. For instance, a well-structured thesis, article or report is much more convincing than one that does not meet structural criteria. Furseth and Everett (2014) emphasise this very point by stressing the importance of order, logic and technical accuracy in a scientific document.

Thirdly, academic writing assists us to get known and accepted in scholarly communities. Put differently, we write to impress and to make a difference by adding to the body of knowledge in our respective

fields of expertise. This is true for doctoral theses, articles, chapters and books alike. The more academic peers become interested in and use our writing, the more value we can add to the (academic) value chain. Intellectual and emotional ownership of our own writing thus becomes of major concern (Murray, 2005).

### **b. How do we write?**

There is no general or magic formula to direct our academic writing. Different genres and different types of documents will require different types of writing structures and emphases. The focus in this section is on writing dissertations and theses for which three points seem important:

- The form or structure of thesis writing
- The style and content of thesis writing and
- The 'how' of thesis writing.

The form of a thesis and 'how it hangs together' will be discussed in more detail in Section 9 of this compendium (mainly based on the work of Trafford & Leshem, 2011). In broad terms such 'hanging together' of a thesis refers to: Chaptering, coherence, how integration amongst the constituting parts of a thesis is accomplished and how the 'flow' of the main argument is sustained. In a doctoral thesis the main challenge for candidates is often to aptly demonstrate to readers (examiners) that a contribution to the field of inquiry was made and that a sound case for sufficient evidence for the claimed contribution can be offered.

The 'style' of a thesis is obviously 'academic' or 'scientific'. What does an 'academic' or 'scientific' style of writing entail? There are several views on this issue, depending on the type of doctorate involved, but in general authors agree that the style elements in writing a doctoral thesis should

- Build on the work of other researchers;
- Acknowledge previous work in a field;
- Effectively communicate to an academic audience by using appropriate scientific language;

- Properly explain the aim, objectives and methodology of the research;
- Clearly communicate the findings of the research;
- Draw valid conclusions based on the research findings;
- Adhere to prescribed editorial and technical requirements and
- Adhere to the examination criteria of the particular institution or authority.

The style writing for, for instance, scholarly articles would obviously differ from that of a thesis and depends on the requirements and conventions of the targeted journal. The same goes for books, book chapters, research papers and reports written for various audiences.

When doctoral candidates embark on writing their theses they usually follow different approaches and use different techniques. One useful hint is to start writing early in the doctoral research process (Badenhorst, 2007) and not to wait until all data are available 'to write it up'. This implies that the nature of academic writing is iterative (sections and chapters are to be constantly revised and rewritten) and continuous (writing to be done regularly). Doctoral candidates often provide the following reasons for not starting to write early or continuously:

- I cannot write as well as others
- I know my writing will not be good enough
- I do not have sufficient time for writing
- I am not always in the mood for writing
- I struggle to find my own scholarly voice.

Most of these reasons can be linked a lack of writing confidence. One way to overcome a lack of writing confidence is to start small and expand gradually over time. Those who provide advice on academic writing (Anderson & Poole, 2009; Murray, 2006; Wentz, 2014) suggest that it cannot start and be practiced at the level of the doctorate. When candidates enter doctoral programmes they should already be able to engage in relatively high levels of academic writing.



Everyone knows that good (academic) writing starts with a sound idea and a well-structured sentence. Good sentences accumulate into good paragraphs, then into good sections and finally into good chapters and well-written theses. For a few basic hints, see the Table 8 below (also see Wentz, 2014).

**TABLE 8: A FEW HINTS ON GOOD ACADEMIC WRITING**

Issue	Hints
The content of what I write	<p>Addressing the following typical questions are crucial:</p> <ul style="list-style-type: none"> <li>▪ What is the message of the sentence I just wrote?</li> <li>▪ How does this support the paragraph I am writing?</li> <li>▪ What is the main message or issue of this paragraph?</li> <li>▪ Does the topic sentence (the key sentence in the paragraph) reflect the message I want to convey in this paragraph?</li> <li>▪ How do my paragraphs link together to support the key message of the section?</li> <li>▪ How do the sections support the key message of the chapter and the thesis?</li> </ul>
The structure of what I write	<p>Key questions:</p> <ul style="list-style-type: none"> <li>▪ Do I have an appropriate outline for my thesis and my chapter (one that makes logical sense)?</li> <li>▪ Are there linkages between the key elements of my chapter outline and my thesis outline?</li> <li>▪ When I write the parts of a chapter/thesis, do I constantly keep the 'big picture' in mind?</li> <li>▪ Does the structure also shows signs of internal structure (i.e. do certain sections 'speak back' or relate to others well)?</li> <li>▪ Do I follow a 'funnel approach' - starting with generalities and moving on to specifics?</li> <li>▪ Is there internal coherence in my paragraphs by the appropriate linking of sentences? Do I use 'link words' (e.g. but, however, nevertheless, contrastingly) to keep readers interested and on board?</li> </ul>

Issue	Hints
Using the correct grammar, vocabulary and format	<p>Key questions:</p> <ul style="list-style-type: none"> <li>▪ Do I follow the grammatical rules and conventions on how to compose a sentence from a set of words?</li> <li>▪ Do I know the difference between balanced and unbalanced sentences?</li> <li>▪ Do I use the correct verbs throughout?</li> <li>▪ Do I use the electronic tools available (spell checker, thesaurus)?</li> <li>▪ Do I use the correct prescribed formatting for my text, formulae, tables, figures, reference list and annexures?</li> </ul>

(Adapted from: Anderson & Poole, 2009; Murray, 2006; Wentz, 2014)

### c. When do we write?

A major obstacle for academic writing is procrastination. Doctoral candidates often postpone their writing in favour of other academic tasks such as collecting and reading literature, generating data or analysing data. However these tasks are very important, productive writing is equally so. Murray and Moore (2006) suggest that candidates develop writing strategies that work best for them.

For instance: What is the best time of day for you to write? Do you write more productively in short 'bursts', or do you need longer, uninterrupted periods of time for writing? Do you write more productively in quiet, secluded venues or when you are with other people such as in writing groups? What is the nature of the writing task you are busy with (e.g. original writing or summarising or revising work or integrating work)?

One might get some ideas for developing a personal writing strategy by contrasting small amounts of writing to large blocks of writing and by looking at the negative and positives of each as in Table 9 below.

**TABLE 9: HINTS FOR DEVELOPING A PERSONAL WRITING STRATEGY**

	Positive	Negative
Small amounts of writing	<ul style="list-style-type: none"> <li>Writing regularly</li> <li>Keeping track with the larger project</li> <li>Filling in the gaps of the outline</li> </ul>	<ul style="list-style-type: none"> <li>False starts</li> <li>Disjointed bits of writing</li> <li>Not adhering to the discipline that accompanies writing</li> <li>Continuous tinkering with what has already been written</li> </ul>
Large blocks of writing	<ul style="list-style-type: none"> <li>Promote proper planning for writing</li> <li>More dedicated to the writing task</li> <li>Maintaining focus</li> </ul>	<ul style="list-style-type: none"> <li>Writing endlessly without breaks</li> <li>Producing large tracts of text without reflection on written work</li> <li>Feeling under pressure to produce</li> </ul>

(Adapted from: Anderson & Poole, 2009; Murray, 2006; Wentz, 2014)

It follows that both modes of writing (shorter chunks and larger periods of dedicated writing) have positive and negative elements. The key is to find a writing strategy that works productively for each candidate to enhance and ensure progress and completion. Unfortunately there is no magic formula for effective academic writing and candidates have to find their own personal preferences in order to write as economically and productively as possible.

# 9.

## THESIS STRUCTURING

Trafford and Leshem (2011) remind doctoral candidates and supervisors that having a strategic overview of an entire research process is important. Not only does this help one in planning your research project, but it also provides a framework against which to structure a thesis. It offers a means for to visualise how the research project fits together and whether it promotes cohesion in the research.

In order to visualise the complete doctoral research project and to explain how it ‘hangs together’, Trafford and Leshem (2011) offer a model which points to external as well as internal coherence in a study. The model is portrayed in the Figure 2 below and then briefly explained.

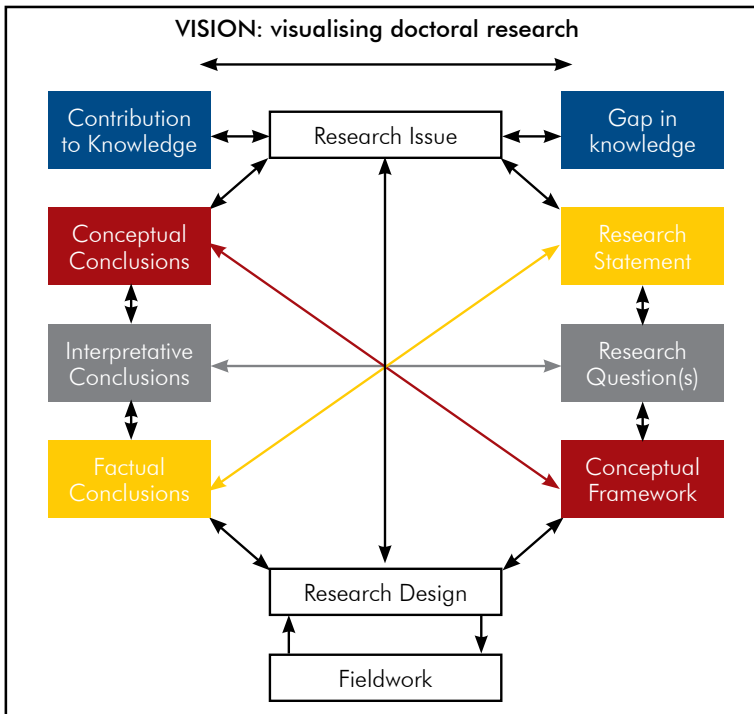


Figure 2: Visualising doctoral research

(Adapted from Trafford and Leshem 2011: 170)

The outer circle of elements (external black arrows) that constitute a thesis have to correspond in terms of being constituent of a doctoral degree (also see Section 1 on the concept of ‘doctorateness’).

When research is viewed as a system of interconnected parts, then it can be portrayed as shown in the figure above. The model shows the normal sequences of research actions around the outside circle of boxes. There are two possible starting points for the sequence: (a) One may have an idea about a possible research topic. Thinking more about it and reading opens up the topic and you appreciate that it represents a gap in knowledge. Alternatively, (b) you may suspect, know about or even stumble on a knowledge gap in your area of interest. As a gap in knowledge you could then refine that into a specific research issue to be investigated. Either way, one will journey between these two factors as boundaries are established for the research topic.

Moving thus clockwise around the model shows that your research statement is derived from the research issue. This statement is normally expressed as a single sentence encapsulating answers to questions regarding your research topic. Producing research questions that are clear and capable of being answered leads you into the theoretical perspectives you have gleaned from the literature. In turn, this enables you to devise your conceptual framework which is central to how your research is designed. The iterative relationship between fieldwork and research design acknowledges how these features influence each other throughout the duration of your research.

The data that are collected then enable you to generate factual, interpretive and conceptual conclusions. These conclusions should allow you to make a modest, reasonable and defensible claim for a contribution to knowledge that closes the gap in knowledge. Your contribution to knowledge should also relate specifically to the originating research issue and its boundaries. This closes the circle of your research.

While this model, portrayed as a circle of doctoral elements or factors, offers a neat picture of a doctoral research project, there is another important level of meaning latent inside the circle. The four

diagonal double arrow-headed lines connect pairs of factors that are influential on one another. These are:

- The research issue – the research design: One should be able to show how the boundaries and focus of the issue are apparent in how the research was designed. The result of this is that the fieldwork should be seen to investigate and generate data on that issue and not some other issue. This represents a check on the internal empirical consistency of the project.
- The research statement – the factual conclusions: A candidate should be able to show how the research statement relates directly to the factual conclusions that are drawn from the evidence. Both are concerned with fact – what was to be investigated and the facts that were found that related to that statement.

The direct relationship between these two research components demonstrates that the research project possesses internal empirical consistency.

- Research questions – interpretive conclusions: Answers to one's research questions should emerge as you interpret, analyse and discuss the evidence that transpired from the inquiry.

This relationship represents a higher level of thinking than the descriptive text that is associated with the previous pair of factors. It demonstrates the internal theoretical consistency of the research.

Two further relationships:

- The conceptual framework – the conceptual conclusions: This relationship determines the scholarly and theoretical level of the research. Among the set of conclusions this is most critical, since it demonstrates the relationship and relevance of the research to other, external or previous research and extant theories.

In the final analysis, the model suggested by Trafford and Leshem (2011) enables both doctoral candidates and their supervisors to arrive at an integrated and coherent piece of research. It also enables them to check on the consistency of the research plan. In addition, the model can be used to check whether a study accounts for essential scholarly research features and thus provides confidence that a study is methodologically and otherwise rigorous.

While the Trafford and Leshem model mainly refers to traditional doctoral theses, the doctorate by publication also has to demonstrate features such as argumentative coherence, the linking of research elements and unity as an acceptable piece of scholarly work.



The background is a solid dark blue color. Overlaid on this are several large, overlapping, semi-transparent circles of varying shades of blue, creating a layered, geometric effect. The circles are centered around the text.

# 10.

## LITERATURE REVIEWS

This section looks briefly at the following questions:

- What does a literature review entail?
- Why are literature reviews important and what are their aims?
- What are the criteria for a sound literature review?
- What do candidates need to conduct sound literature reviews?
- How does a candidate get started on a literature review?

## What does a literature review entail?

Often, when research candidates are asked about the nature of a literature review they come up with answers such as: “A list of bibliographic citations; A bibliographic search; A survey to outline existing knowledge; A vehicle for learning and exploring; A research facilitator which shapes and directs the study”, and more. Most of these responses are, however, only partly accurate or inaccurate.

A literature review is rather:

- An account of the ‘status quo’ in a field of study or on a particular topic;
- A contribution to shape the student’s research and her/his thinking about research;
- An integral part of a thesis or dissertation;
- An important contributor to a reflective and integrative approach to the research, and
- A form of contemplative action – speculation or abstract thought – aimed at discovering insight, at making meaning.

In essence, particularly at the doctoral level of studies, a literature review informs the theoretical perspectives held by the candidate.

## Why are literature reviews important and what are their aims?

Literature reviews offer researchers explanatory (and sometimes even predictive) power through foregrounding the features of what is being studied, and backgrounding others. They also allow researchers to

make better sense of complex issues, inform their methodology and research design and often generate new insights into a particular study. Properly done literature reviews thus give depth and substance to any study.

### **The aims of literature reviews are manifold, but here are a few:**

- They contextualise a study theoretically and reinforce a proposition or a thesis by revealing the underpinning theory or theories on which the research rests.
- They also pinpoint gaps in the research of a particular field and help to identify contradictory results and opposing findings by providing a broad overview of the published materials in the particular field/study area.
- In addition, literature reviews help to identify appropriate research methods and techniques, help to establish a conceptual or theoretical framework and justify the need for the research, while at the same time bringing the candidate in contact with sound scholarly writing.

### **What are the criteria for a sound literature review?**

Literature reviews need to be

- Comprehensive – to include relevant and pertinent past and current knowledge in a field or on a topic (irrelevant or marginal literature should be excluded);
- Specific – focusing on a topic and not on unrelated other topics;
- Authoritative – prominent authors in the field need to feature in the review;
- Current – reflect the latest thinking, writing and debates in the field;
- Indicating the availability of sources – if little or no literature sources are available in a field, the literature review might become difficult or impossible. The candidate has then probably have to revert to more popular literature available in the lay 'world of knowledge' such as newspapers, magazines and reports.

A literature review is usually deficient if it excludes landmark studies in a field, uses outdated material, mostly uses secondary sources, takes a parochial perspective, fails to be critical of what is read, not discriminating between relevant and irrelevant/marginally relevant material and lacks synthesis.

## What do candidates need to conduct sound literature reviews?

Students who undertake literature reviews need:

- ***Critical reading skills. This includes the ability to pose the following questions:***
  - Epistemological questions – e.g. which of the author’s ideas are predetermined by the intellectual paradigm in which s/he works?
  - Experiential questions – e.g. what kinds of experiences does the author overlook?
  - Communicative questions – e.g. what do the metaphors and analogies used reveal about the author’s standpoint or orientation?
  - Political questions – e.g. whose interests are served by this theoretical work?
- ***Information retrieval skills, which include***
  - Understanding database structure and content;
  - Knowing how to build successful search strategies using logic and field searching limiters;
  - Understanding when to use controlled vocabulary;
  - Understanding the difference between precise and comprehensive searches;
  - Understanding how to ‘read’ records found;
  - Knowing how to find items in a library, electronically or via inter-library loans;
  - Recognising how to alter searches if first attempts do not find suitable information or if too much or irrelevant information is found.

- How does a candidate get started on a literature review?

Hints that have helped students to get started with literature reviews include, but are not limited to, the following:

- Look at literature reviews in successful thesis documents (see how others have done it)
- Write as much as possible and restructure later (do not try to read everything before you start writing)
- Adopt a reflective approach to literature searching (e.g. What am I looking for? What have I found thus far? What remains to be searched for? What have I found useful end less useful in the search thus far?)
- Formulate questions that the literature review should address
- Deal with the problem of the scope of the literature review (too wide, too shallow, or 'just right'?)
- Request your supervisor to provide feedback at different stages of your literature review – do not try to finish everything before asking for feedback (especially feedback on the preliminary structure or outline of your review)
- Make sure (from existing sources) what is considered as a proper literature review in your field of study.

One colleague who has much experience in guiding research students on conducting their literature reviews often explains the process by referring to 'attending a party' analogy:

If you are invited to a party where you practically do not know anyone, you might want to start spotting and identifying different groups of people at the party. There are the 'older' and more experienced guests (the authoritative and seasoned authors) - often sitting around the back of the room. You will hear them talking about original theoretical work in the field and sharing their depth of knowledge and perspectives. In the middle of the room you might find a younger generation of scholars (the more recent authors) who draw on the work of the seminal authors, but add new perspectives or value to the original debates. You will listen to what they have to say. Then, towards the front part of the room there might be the very current and new researchers (peers) who try to find out how to link the foundational

and original work with current challenges and problems in the field. You would have by now (reading the work of all three 'generations' of authors), started to form a picture of what the field you are immersing yourself in looks like. When you leave the party and someone (your supervisor) might ask 'What have you overheard at and learnt from the party?' (i.e. by reading the works of these different authors), you might start developing your own interpretations and theoretical perspectives related to the problem you are inquiring into. The value of the 'listening' to (studying the work of) various other authors is thus (a) to learn what they contributed from their own research and, very importantly, (b) to interpret what they have contributed in terms of your own inquiry.

# 11.

## FEEDBACK TO AND FROM RESEARCH STUDENTS

## Feedback to students

There are several good sources available on how to effectively provide feedback to research students on their work (Delamont, Atkinson & Parry, 2004; Matthiesen & Binder, 2009; Wisker, 2008; 2012).

What seems to be important here is the kind of feedback provided (e.g. Written, verbal or both? Formative, summative or both? From peers, critical readers, supervisors, or others? Timing of feedback - at what stage of the study or when in the particular piece of writing?). The stage of research will very much determine the kind of feedback needed and appreciated.

We also know from research into adult learning that adults prefer feedback that is relevant to the task, is needs driven and goal oriented, builds on previous knowledge and experience, and is practical and respectful.

Against this background supervisors are reminded that their feedback to candidates should be

- Focussing on the task or problem, not on the individual student;
- Timeous (if feedback on writing tasks are postponed for too long, it becomes less useful and valuable);
- Open-minded (supervisors should see the writing task and its logic as being attempted by the candidate and not by themselves);
- Professional (the idea of 'being compassionate', but at the same time 'being rigorous');
- Fair (honest and fair feedback is required in terms of the stage and level of research);
- Recorded (a paper trail of feedback is needed to contribute to evidence of fairness).

However feedback may be meeting all of the aforementioned requirements, students sometimes experience feedback as being overwhelming (too much), complicated (confusing), too 'thin' (saying nothing or too little), too detailed (loosing view of the bigger picture or issue), too global (not paying sufficient attention to detail), inappropriate (for the stage of research or research development)



or silencing (negative or destructive in nature). These 'negative' characteristics should obviously be avoided by supervisors.

The style by which feedback is provided to students might vary, depending on the stage of the research (early, middle or final stage). Such styles may range among being didactic (aiming at teaching), prescriptive (prescribes a solution), informative (requires information), confronting and challenging (follows on a student's 'cue-deafness' or non-responsiveness to earlier feedback), tension-relieving (desensitises a difficult exchanges between candidate and supervisor), encouraging and facilitating (developmental, to spur the candidate on), eliciting (draws out further comments), supporting (helps nurturing emerging scholarship), summarising (pulls together, marks a stage, consolidate), clarifying (supports clarification of terms, arguments, designs, models, etc.) or collegial (promotes scholarly dialogue aiming at research independence).

Each of these styles can add value to the feedback and to doctoral studies if appropriately employed. In all cases the aim of the feedback is to assist the student in improving her or his work and completing the study in good time.

## Feedback from students

When it comes to feedback from students to departments or faculties there are various ways and means to elicit and handle feedback (Eley & Murray, 2009).

Supervisors, departments or faculties may collect feedback from students regularly. Such feedback is useful as it allows supervisors, departments or faculties to act on the feedback in a timeous manner. Feedback at the exit point of a study is also useful as it provides information to be used for future studies and candidates.

The feedback from candidates are not always easy reading. Take this example from the feedback of one professional doctorate candidate (Eley & Murray, 2009:105):

*“Universities and industries are worlds apart. The university is not professional, especially when it comes to postgraduates. This is due to the fact that problems aren’t recognized, principally by supervisors. But students take their problems away with them and never tell anyone about the problems they have had with their PhDs. So departments can’t learn.”*

This quote was taken from a post-PhD interview, but feedback can also be from questionnaires and other means of generating feedback. What is generally understood by ‘feedback from students’ is that

- They get a chance to put their views on paper;
- Supervisors, departments and faculties can learn from such feedback;
- In the absence of feedback, supervisors, departments and faculties would not know about the problems candidates have, and
- Such feedback could be valuable at any stage of the research process, not only at the end.

In the case of feedback via questionnaires the following typical questions might feature – usually anonymously:

- Accessibility of research supervisors
- Time devoted by supervisors to discussing projects with candidates
- Supervisors’ level of interest in research topics
- The level of expertise available on research topics
- The institutional and other support available in the planning and execution of research the project
- The overall quality of supervision and departmental support
- The materials, equipment and technical support available to candidates.

A key issue here is that feedback from candidates should not jeopardize their relations with supervisors, departments or faculties. Hence the feedback should be anonymous or generated by a non-affiliated party.

What is also of major importance is how supervisors, departments and faculties respond to the feedback of candidates. Some supervisors and departments take the approach that they can always learn from such feedback and improve their practices. Others may think that they 'have seen this before' and only have to take limited measures towards improvement, while there are also those that become defensive in their response and either ignore or oppose candidates' feedback. What seems important in continuous quality promotion, however, is that developmental opportunities for both supervisors and departments should not be ignored. In this respect candidate feedback can play a significant part.

The last bit of feedback coming indirectly from completed doctoral studies is the feedback from examiner reports. Such reports can provide important feedback to candidates, supervisors and departments about the quality of completed doctorates. The use and distribution of such reports should, however, be treated with caution as examiners might feel exposed to scrutiny and may be unwilling to avail themselves for future examination. On the other hand, the quality of feedback on theses via examination reports and doctoral vivas (if used) are crucial and should provide some indication of the overall quality of doctoral products.

# 12.

**THE INTRODUCTION  
AND CONCLUSIONS  
CHAPTERS OF A  
THESIS**

Many master's and doctoral studies are conducted via the production of traditional thesis options (also see Section 3 on doctoral types). Probably the two most important parts of a master's or a doctoral thesis are the introductory and conclusions chapters. This is because examiners usually read these chapters first and thus sets the tone for the rest of the thesis. As the saying goes: *'There is no second chance to make a first impression'*, thus the first reading of a thesis by an examiner should provide evidence of a piece of research that was executed well and excellently presented.

In what follows, the purpose and structure of introduction and conclusions chapters are outlined. What is important to keep in mind is that each area of study or discipline have their own conventions and preferences, therefore only broad and general guidelines are provided as they are drawn from applicable literature and experience.

#### **a. The introduction chapter**

##### **Purpose**

The main purpose of an introduction chapter of a conventional thesis by monograph is to orientate the readers (examiners) to what follows in the rest of the thesis. It has to convince its readership of the inherent worth and merit of the study by clearly indicating why the study was undertaken, what the main research concerns were and how the study was done. The reader would also want to know what data quality and ethical measures were taken and the main concepts that the study built on. Authors such as Bui (2014), Furseth & Everett (2013) Mouton (2001) and Wisker (2008) provide excellent guidelines as to what readers would be looking for in such chapters.

##### **Structure**

The structural features or characteristics of an introductory chapter may vary across disciplines due to particular research conventions, but the list below represents the most important headings of such a chapter:

- Introduction
- Motivation or rationale for the research

- Theoretical considerations
- Contextual considerations
- The research problem
- The research hypotheses/questions
- The methodology and design of the research (including data sources, sampling, data quality measures and data analysis procedures)
- Ethical considerations
- A brief explanation of key concepts relevant to the research project
- An outline of the remainder of the thesis.

It is also recommended that the introduction chapter would not be a long one – preferably no more than between 12 and 15 pages. As the aim is to orientate, all references to detail should be included in the chapters that follow. Thus, references to other chapters are preferred, rather than including such detail in the introduction, which may lead to possible duplication. Also remember that to ensure proper closure and coherence in a thesis, there should be clear links between Chapter 1 and the final chapter of conclusions. Readers would look for these links by checking whether the researcher has delivered on what was promised and whether hypotheses or research questions were indeed answered or addressed.

## **b. The conclusions chapter**

### **Purpose**

Again, as is the case with the introduction chapter, the guidelines below should be adapted for suitability within a discipline or field of study. However, conclusions chapters ideally have four functional purposes:

- To remind readers of something - with the aim of re-enforcing some of the detail
- To tell readers something – with the aim of reminding readers about the most important findings of the study

- To 'sell' readers something - with the aim of persuading readers of the value and worth of the study findings
- To leave readers with something – with the aim to convince readers of the overall merit of the study.

In order to achieve these purposes and aims, candidates might consider to include the following elements in their conclusions chapters:

- *To re-inforce some of the detail with readers (without repeating the detail): Why was the research topic chosen? What did the research sought to discover or prove? How was the research designed and undertaken? What were the exact boundaries of the study and what was the rationale for the boundaries within which the research was conducted?*
- *To remind readers of the most important findings (again, without repeating detail): What was found (facts as answers to questions)? How were those facts interpreted (as concepts)? What primary and secondary findings have been reached? Why the claim is to have made a 'modest' contribution to knowledge (especially in PhD studies)? How was the research critiqued? What issues might form a future research agenda?*
- *To persuade readers of the value of the study: How was scholarly engagement with appropriate ideas demonstrated? What explicitly-stated informed choices were made in the study? How were factual and conceptual conclusions based upon the sound analysis of data? How were coherent and scholarly arguments used to support an advance in knowledge (especially for doctoral studies)?*
- *To convince readers of the overall merit of a thesis: Was there sufficient evidence provided to judge the merit of the thesis? What insights were promoted in enhancing the scholarship of the researcher? Was there any indications of the academic resilience of the researcher? How does the candidate display the capability to undertake post-doctoral research?*

## Structure

The suggested structure of a conclusions chapter (not more than 12 - 15 pages) would typically include:

- An introduction

Briefly reminds the reader why the research topic was chosen, what the research sought to discover or prove, how the research was designed and undertaken, the boundaries of the study and why the study was conducted within these boundaries.

- The main findings

Briefly reminds the reader what was found by the study, why these findings are important for the field in which the study was conducted and how the findings could have been influenced by possible limitations to the study.

- Conclusions

Briefly informs the reader of the author's scholarly engagement with relevant theoretical ideas and what conclusions were drawn, based on the findings from (the empirical part of) the study. It also persuades the reader that the factual and conceptual conclusions are based upon 'sound' data and analysis, and that coherent and scholarly arguments support the conclusions that emerged.

- Implications of the study

Points the reader towards the implications of the study (based on its findings and its conclusions) for (a) theory, (b) practice and (c) further research.

- Conclusion

Contains two or three paragraphs to bring the thesis to a logical conclusion and to complete the 'full circle' of the research project.

As in the case of the introductory chapter, the conclusions chapter should demonstrate clear links to the first chapter of the thesis by making use of appropriate links and cross-references, thus convincing the reader of the coherence and integration of the research and the research report (also see Section 7 on the structure of a thesis and Trafford & Leshem, 2011: Chapter 8).



In the case of the thesis by publication, the introductory and conclusions sections or chapters form the 'wrap-around' elements of the reported research. Typically, an introductory chapter in the publication-based thesis should explain the rationale, aim, objectives, methodology, and research ethics of the research. It should also explain how the different chapters/ articles hang together and indicate how the study forms a coherent piece of scholarly work. The conclusions chapter, in turn, should point out the overall contribution of the research project as a whole, its implications, limitations and opportunities for further research in the field. It thus seems clear that no matter what format a thesis might take, these two thesis elements remain of crucial concern.

The background is a solid dark blue color. Overlaid on this are several large, semi-transparent, overlapping circles and arcs in a slightly lighter shade of blue. These shapes are arranged in a way that creates a sense of depth and movement, with some appearing to be in front of others. The overall effect is a modern, geometric, and layered design.

**13.**

**RESEARCH INTEGRITY**

Throughout, and even after the completion of a postgraduate research project, students, supervisors and those involved in the research should be aware of and adhere to research integrity requirements. But what is research integrity?

The National Academy of Science (NAS) in the USA describes research integrity as active adherence to the ethical principles and professional standards essential for the responsible practice of research. This means an adoption of ethical principles and practices as a personal credo, not simply accepting them as impositions by rulemakers, ethics committees or institutional ethical clearance requirements (see Korenman: <https://ori.hhs.gov/education/products/ucla/chapter1/page02.htm>).

Research integrity thus includes

- the use of honest and verifiable methods in proposing, performing, and evaluating research
- reporting research results with particular attention to adherence to rules, regulations, guidelines, and
- following commonly accepted professional and institutional codes or norms.

The VALUES that underpin research integrity are important. These include, but are not limited to, the following:

- Honesty – in proposing, performing, and reporting research; to convey information truthfully and to honour commitments
- Accuracy – to report findings precisely and take care to avoid errors
- Fairness – to fairly represent the contributions of others to research ideas, research proposals and research reports (the use of tools such as Turnitin are encouraged to avoid the misuse and misrepresentation of own and others' work) ;
- Efficiency – to use resources wisely and avoid waste
- Objectivity - to let facts 'speak for themselves' and avoid improper researcher bias
- Openness – to disclose any conflicts of interest;

- Concern – to protect the dignity and safety of human or other subjects in the conduct of research;
- Responsibility – to adhere to the mutual responsibilities of candidates and supervisors (see Steneck, 2007: 3; Lategan, Sempe & Tilley, 2017: 122)

Most universities have published codes of conduct for research and they expect their postgraduate researchers and supervisors to honour and adhere to such codes. Misconduct may lead to punitive measures and in serious cases the cancellation of research projects or grounds for disciplinary action, dismissal or expulsion.

Typical conduct that accompanies research that is conducted with integrity includes examples like the following:

- No researcher or supervisor should benefit unfairly from the research being conducted;
- Full commitment to the respective agreed roles and responsibilities of candidates and supervisors;
- Honouring the obligations and recognition of authorship in the publication of research results;
- Ensuring minimal or no personal risk to research participants;
- Informing research participants honestly, openly and clearly about what their participation entails;
- Adhere to ground rules for privacy, confidentiality and anonymity where required;
- Ensuring no conflict of interest, whether ethical, legal, financial or any other conflicting interest that might hamper or influence the research process or the research results (also see Lategan, Sempe & Tilley, 2017: 122 – 127)

While research ethics is firmly embedded in the research process, the question arises as to how the research process should be managed by research candidates. The next section looks into this issue somewhat more closely.



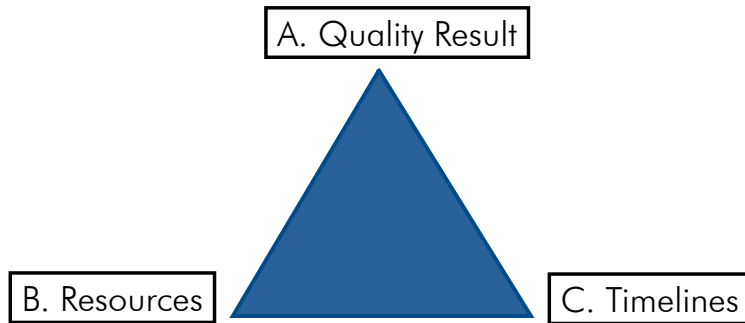
**14.**

**PROJECT  
MANAGEMENT IN  
POSTGRADUATE  
RESEARCH**

Every research student is a research project manager and although research requires much more than managerial competence, there is no escape from being a project manager. Why is this so?

The answer is quite simple: Because all research projects involve careful planning, the efficient use of resources and much care about accuracy and quality. All of these elements point to managerial competence in research. But much of such competence are often lacking – in students and even sometimes in supervisors. Managerial competences thus have to be learnt prior to and during research education.

Holzbaur (2017) has provided a number of valuable pointers for research candidates and their supervisors which could be useful towards effective research project management. He suggests, among other things, attention to the 'project triangle', which consists of (a) an envisioned quality result, (b) the resources needed to achieve this result and (c) the timelines for materialising the result.



- A. In the case of master's or doctoral projects, the quality result will be a successfully completed thesis and, preferably, some publications that accompany the thesis. The study project manager should thus have a clear vision for her/his study, what the study project will contribute and whether the study product will meet the review criteria from scholarly peers and experts in the field of study.

- B. In terms of study resource management there is always money involved, time is a crucial resource and infrastructural resources such as computer hardware and software, library resources, laboratory resources (where applicable) as well as physical spaces conducive to study projects have to be negotiated and managed.
- C. Since time is such a crucial resource in postgraduate studies, careful planning and scheduling of project time is vastly important. Budgeting time for each step of the research process, as well as for unforeseen events, is crucial for the timely completion of studies. This is not only important for the individual study project manager (student/supervisor), but also for the university as institution since time, quality and subsidy funding for studies go hand in hand. Useful time planning tools such as Gantt charts ® <https://www.smartsheet.com/blog/gantt-chart-excel01>) and others are available to assist with this.

The Holzbaur triangle obviously covers a plane that represents the research process itself (well configured by Lategan 2017: 27) and whereby the research project, in broad terms, entails the identification of a researchable problem, a suitable methodology, quality evidence, accurate evaluation of the evidence and drawing meaningful research conclusions based on the evidence.

From a research education perspective, research management might also be represented as a 'staircase' (Holzbaur 2017: 39) of research management skills whereby research management is configured as an upward path towards achieving a research outcome (also see the Researcher Skills Development framework suggested by Willison & O'Regan in Section 11). My version of the 'staircase' configuration differs in a few respects from that of Holzbaur as represented in Figure 4 and briefly discussed below.

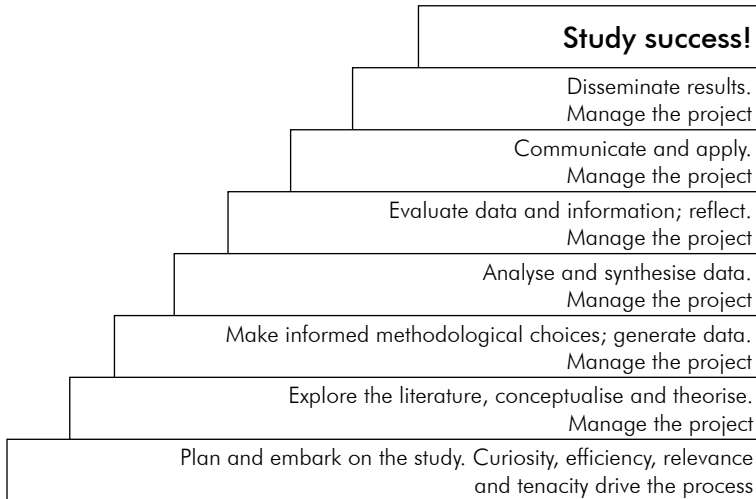


Figure 4: Research management steps towards study success (adapted from Holzbaur 2017: 39)

Starting at the baseline:

- Study success and the management of the study project starts with a study plan (study proposal) that needs to be driven by the curiosity of the candidate and the ability to produce an efficient study plan. This is the first step towards study success and where all good research studies start.
- The second step is to thoroughly explore literature relevant and pertinent to the study. This process of exploration within the study project needs to be managed well. Systematic reading, efficient use of time and resources as well as conceptualizing, theorizing and economically communicating insights and ideas all form part of the research project which needs to be managed.
- On the basis of literature exploration, a third step is to make informed methodological choices to embark onto the empirical part of the study. Implementation and use of applicable research methods require effective and efficient management as they pertain to the data generated. Tools and instruments to collect, interpret and present data might often pose management challenges to students.



- Following on generated data, the processes of analysis, synthesis and evaluation of data towards findings and information need to be managed. Development of analytical skills, reflective skills and communication skills are required.
- How the new information from the study is applied and communicated to scholarly or professional audiences and peers needs to be managed in order to gain approval of peers in the field towards success. Managing the examination and dissemination processes successfully provides for the final step: Study success!

This brings one to the question of how knowledgeable peers in the field might examine studies and what criteria they might apply in such assessment.

# 15.

**EXAMINATION  
CRITERIA AND  
PREPARING  
CANDIDATES  
AND THESES FOR  
EXAMINATIONS**

One of the most important elements of postgraduate education and research is the assessment and examination thereof. In what follows, three key issues are highlighted:

- How to ensure that a research thesis is ready for examination;
- How to promote and use valid and trustworthy examination criteria and instrumentation for examination reports and oral examinations;
- How to interpret and respond to examiners' reports.

**a. Ensuring an examination-ready thesis**

Before a thesis is submitted for examination, the following points need to be considered as a minimum:

- Were language and technical requirements adhered to (a basic, non-negotiable requirement)?
- Is the study well motivated and introduced (including clearly stated hypotheses/research questions, a knowledge gap indicated and the research procedures briefly outlined)?
- Are the theoretical perspectives that were generated accurate and sufficient to adequately support the empirical part of the study (including the relevance and appropriateness of the literature review)?
- Is the employed research methodology appropriate, justifiable, clear and unambiguously described?
- Are the research data and results well reported and adequately discussed in terms of the candidate's theoretical perspectives?
- Are the conclusions reached well formulated and supported by sufficient evidence (including whether hypotheses were proven or research questions answered and whether the implications of the study were pointed out clearly)?
- Does the thesis hang together well structurally and are the different elements and sections of the study well integrated?
- Does the 'storyline' of the study reads well from cover to cover and are there any possible discrepancies or gaps that need to be rectified prior to examination?

In the case of doctoral studies the model suggested by Trafford and Lessem (see Section 7) can be productively used to check on the readiness of a thesis for examination.

### **b. Criteria and instruments to examine postgraduate research**

At most research-oriented higher education institutions a number of procedures and instruments are used to examine postgraduate research products. These include: Detailed lists or checklists of examination criteria; 'open' narrative examiner responses; assessment of published and/or publishable articles; oral examinations; the assessment of research products such as artifacts, patents and inventions; the assessment of artistic products, compositions and recitals.

Each of these procedures and instruments would differ in terms of the criteria applied and this compendium cannot elaborate on the complete range of such instruments. However, what is emphasised here are three examples:

- The use of detailed lists of criteria;
- The use of open narrative;
- The use of oral examinations.

### **c. Examination instruments using detailed lists of criteria**

Each examination instrument contains strengths as well as weaknesses but, importantly, one should consider whether the instructions and criteria used are clear and adequate to make accurate and valid examinations possible. A good examination instrument cannot compensate for a weak examiner, but a bad examination instrument provides for an even worse case scenario. However, good examiners, who are usually the more experienced ones, can sometimes overcome the weaknesses of an inadequate instrument.

It is important that supervisors ensure candidates' familiarity with examination criteria very early in the study process and remind their candidates of such criteria along the way – especially as the research project draws to a close. Examination criteria can thus be used as a

planning instrument for a research product as well as a checklist prior to examination submission.

In the case of a master's study, examination marks are usually allocated. The question is then whether the different examination criteria are adequately weighted in order to enable a fair contribution to the composite mark. For doctoral theses marks are not allocated and the question here is whether the examination criteria provide an examiner with a sound basis for making valid and reliable judgements as to whether the thesis is acceptable, needs further work or is unacceptable.

## **Examination instruments using broad criteria for a narrative report**

There are a number of possible headings for an examiner to draft a narrative examination report. It includes issues such as:

- *The clarity of focus*
- *Review of the body of scholarship*
- *Articulation of theory and concepts*
- *Appropriate research design, methodology and strategies*
- *Evidence of innovation, creativity and a contribution to knowledge in the field*
- *Technical quality*
- *How publishable the thesis or parts of the thesis might be.*

## Examination questions for doctoral vivas

Trafford and Leshem (2003; 2011) have done extensive research on the effectiveness of oral examinations to discriminate between good and bad research projects. As a result they have produced a list of typical or most-asked questions in doctoral oral examinations (not included here). What seems important is that these questions generate candidate responses at different levels of thinking, clearly demonstrating whether a candidate is capable of responding in terms of the requirements for doctorateness or not.

# 16.

**EVALUATION OF  
INSTITUTIONAL  
QUALITY THAT  
SUPPORTS RESEARCH  
EDUCATION**

One development that follows on the questions and concerns related to research education and research qualifications is the issue of the quality of postgraduate research education experience. In the UK, for example, a set of precepts were developed by the UK Quality Assurance Agency (QAA 2004; 2007) that assists the governing of the quality and management of postgraduate education and research at universities.

This code of practice includes a total of 27 precepts that were interpreted and elaborated on by Eley and Murray (2009). This might be helpful to an institution such as CUT to use as a thinking tool for re-interpreting and contextualising such precepts and their implications for research education at the level of institutional research education policy.

The following precepts could be useful:

### Code of practice for quality assurance and standards in postgraduate research programmes

Criteria	Standards
Institutional arrangements	<ul style="list-style-type: none"> <li>▪ Effective institutional arrangements are in place to maintain appropriate academic standards and enhance the quality of postgraduate research programmes</li> <li>▪ Institutional regulations for postgraduate research programmes are clear and readily available to students and staff. Where appropriate, regulations are supplemented by accessible subject-specific guidance at faculty, school or department level.</li> <li>▪ Codes of practice regarding postgraduate research programmes are in place and reviewed from time to time. They are readily available to staff and students</li> <li>▪ The success of postgraduate research programmes is monitored against appropriate internal and/or external indicators and targets</li> </ul>
Research environment	<ul style="list-style-type: none"> <li>▪ Students will only be accepted into environments that provide support for doing and learning about research and where high quality research is occurring</li> </ul>



Criteria	Standards
Selection, admission and induction of students	<ul style="list-style-type: none"> <li>▪ Admissions procedures are clear, consistently applied and demonstrate equality of opportunity</li> <li>▪ Only appropriately qualified and prepared students are admitted into research programmes</li> <li>▪ Admissions decisions involve at least two institutional staff who will have received instruction, advice and guidance in respect of selection and admissions procedures. Balanced and independent admissions decisions are made supporting relevant admissions policies</li> <li>▪ The entitlements and responsibilities of research students are defined and clearly communicated</li> <li>▪ Research students are provided with sufficient information to enable them to begin their studies with an understanding of the academic and social environment in which they will be working</li> </ul>
Supervision	<ul style="list-style-type: none"> <li>▪ Supervisors of research students have the appropriate skills and subject knowledge to support, encourage and monitor research students effectively</li> <li>▪ Each research student has at least one main supervisor who will normally be part of a supervisory team. There is always one clearly identified point of contact for a research student</li> <li>▪ Responsibilities of all research student supervisors are clearly communicated to supervisors and students via written guidance</li> <li>▪ The quality of supervision is not put at risk as result of an excessive range of responsibilities assigned to individual supervisors</li> </ul>
Progress and review	<ul style="list-style-type: none"> <li>▪ Clearly defined mechanisms for monitoring and supporting student progress are in place and brought to the attention of students and relevant staff</li> <li>▪ Clearly defined mechanisms for formal reviews of student progress, including explicit review stages, are in place and brought under the attention of students and relevant staff</li> <li>▪ Appropriate records are kept of the outcomes of meetings and related activities regarding progress monitoring and review processes</li> </ul>

Criteria	Standards
Development of research and other skills	<ul style="list-style-type: none"> <li>▪ Research students are provided with appropriate opportunities for personal and professional development</li> <li>▪ Each research student's development needs are identified and jointly agreed upon, initially during the induction period, and regularly reviewed and amended during the research programme</li> <li>▪ Research students have opportunities to maintain records of personal progress that include references to the development of research and other skills</li> </ul>
Feedback mechanisms	<ul style="list-style-type: none"> <li>▪ Mechanisms are in place to collect, review and respond to feedback from those concerned with postgraduate research programmes. Feedback is considered openly and constructively and results are communicated appropriately</li> </ul>
Assessment and examination	<ul style="list-style-type: none"> <li>▪ Criteria for assessing research degrees are used which enable institutions to define academic standards for different research programmes and the achievements of their graduates. These criteria are clear and readily available to students, staff and external examiners</li> <li>▪ Research degree assessment procedures are clear, operated rigorously and consistently. This includes input from external examiners carried out to a reasonable time scale</li> <li>▪ Assessment procedures are communicated clearly to all parties involved, including students, supervisors and examiners</li> </ul>
Student representation	<ul style="list-style-type: none"> <li>▪ Procedures for dealing with student representation are in place and public to ensure that such representations are fair, clear, robust and consistent. Such procedures allow students access to relevant information and opportunities to present their case</li> </ul>
Complaints	<ul style="list-style-type: none"> <li>▪ Independent and formal procedures exist to resolve complaints from research students about the quality of the institution's learning and support provision</li> </ul>
Appeals	<ul style="list-style-type: none"> <li>▪ Formal procedures are in place to deal with appeals made by research students. Acceptable grounds for appeals are clearly defined.</li> </ul>

(Based on quality assurance criteria adopted in the United Kingdom and elsewhere. Also see CHE, 2019: National review of doctoral degrees offered by higher education institutions in South Africa)

The background is a solid dark blue color. Overlaid on this are several large, semi-transparent, overlapping circles of varying shades of blue, creating a sense of depth and movement. In the center of the composition, the number '17.' is written in a large, bold, white sans-serif font. Below the number, the word 'CONCLUSION' is written in a smaller, all-caps, white sans-serif font.

# 17.

## CONCLUSION

This compendium is aimed at those involved in research education at the Central University of Technology – research students, research supervisors and institutional managers who have responsibilities for research education. The term ‘compendium’ means a collection of ‘things’ such as ideas, facts, illustrations, examples and so forth, gathered and presented as a group - especially in the form of a printed document or a book. In this case the compendium represents a collection of proven and well-researched ideas, guidelines and hints that might assist in promoting research education on brief topics such as key research concepts, practices of supervision, academic writing, thesis structuring, literature reviews, feedback, examination criteria, institutional support systems and others. It is hoped that the compendium might serve as a useful prompt for discussions, workshops, meetings and developmental opportunities to enhance and promote the research education quality chain at the University.

Compiled by Prof Eli Bitzer, November 2020

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**ANNEXURE 1**

**THE POTENTIAL USE OF  
(EPISTEMOLOGICAL/  
KNOWLEDGE)  
PARADIGMS IN  
RESEARCH**

This Annexure contains (a) a few notes on the nature of knowledge and (b) notes on the role of philosophical views, stances or paradigms in doctoral research projects.

“All knowledge starts with ignorance.” – Socrates

“The beginning of thought is disagreement; not only with others, but also with ourselves.” - Eric Hoffer

“Skepticism is the first step towards truth.” – Denis Diderot

### **a. The nature of knowledge**

Epistemology in research is used to describe how we come to know something – how we know truth or reality, or what counts in the world as knowledge. Obviously, where there is no or little knowledge, there is ignorance; often with significant consequences.

The questions we grapple with from an epistemological perspective include: What is the nature of knowledge? What forms does knowledge take? How can knowledge be justified? How can knowledge be effectively communicated? How can knowledge be extended, broadened, and deepened within or across a particular field of study or inquiry?

Those involved in research, as one form of knowledge creation, are also often confronted by questions such as the following: Can knowledge be ‘objectively’ acquired or does it emerge from personal experience? What is the relationship between the knower and the would-be known? What is the relationship between the knower and what is already known? How do we come to know what we know? What counts as ‘new’ knowledge or as a ‘contribution to knowledge’?

Slavin (1984) has suggested that researchers can draw on at least four knowledge sources: intuitive knowledge, authoritative knowledge, logical knowledge, and empirical knowledge. Intuitive knowledge draws on beliefs, faith and intuition, while authoritative knowledge (taken from ‘those who know’) draws on previously communicated knowledge contained in oral accounts, written texts, or electronic sources. Logical knowledge draws on individual thought

and reasoning, whereas empirical knowledge derives from sense experiences and demonstrable facts.

Epistemological stances or lenses in research assist researchers and those who judge their work in establishing the 'truth' and the quality of data processes, the findings from the data, and the conclusions based on the findings from the data. Epistemological choices obviously effect how a researcher will go about generating new and novel contributions to a field or discipline.

### **b. The role of philosophical views, stances or paradigms in doctoral research**

The term 'research paradigm' was coined by Thomas Kuhn (1962) in his book, *The Structure of Scientific Revolutions*. The term has its origins in Greek, where it means 'pattern' and was used by Kuhn to indicate 'an agreed philosophical way of thinking' or a 'world view'. A research paradigm thus refers to a perspective or school of thought based on a shared set of beliefs of reality that informs the meaning and interpretation of research and research data. A chosen paradigm constitutes the abstract beliefs and principles, or the 'lens' that shapes how a researcher might see the epistemological, ontological, methodological, and axiological aspects of research. This 'lens' provides the basis for planning, guiding, and interpreting the data of an investigation.

Some authors (Plowright 2011 and others) are in doubt whether paradigms play or should play such a defining role in research - especially at the doctoral level, where most novel researchers operate. They argue that most doctoral candidates are not trained in philosophy. Therefore, they might not fully grasp or embrace the depth of a particular philosophical stance, while the most important aspect of doctoral research is the soundness and accuracy of its chosen research methodology. The question thus follows whether sound methodological choices can be made and research conducted without necessarily locating the investigation within a particular paradigm. The answer is probably affirmative, as most researchers in the natural or 'hard' sciences would tell. However, since research traditions of the social and natural sciences differ in many respects,



doctoral candidates might need to be aware of the potential influence and value of recognised patterns of thinking on their projects – whether in the planning or interpretation stage thereof. They might also need to be aware of these stances to promote consistency in their arguments and research decisions.

The philosophical lenses or world views highlighted earlier all relate to the key ‘cornerstones’ in research, namely epistemology, ontology, methodology, and axiology. To revisit these concepts briefly:

- The Greek term ‘episteme’ means ‘knowledge’. How do we come to know something? How do we know the truth or reality? What counts as ‘new’ knowledge and how do we justify it? Can knowledge be ‘objective’ or is there a relationship between knower and knowledge? These are all examples of questions that relate to the issue of knowledge. Then there are also questions related to the sources of knowledge which have been elaborated on earlier.
- Ontology is concerned with the assumptions we make in order to believe that something makes sense or is real, or to understand the very nature or essence of the phenomenon under investigation. It thus focuses on the nature of existence or reality, of being and becoming, as well as the basic categories that exist and their relations. Such understanding enables one to make sense of data and how that might contribute to solutions to research problems. Examples of questions associated with ontological assumptions might be: Is there a particular reality out there in the social world or is it a construction of your own mind? Is reality of an objective nature or of individual cognition? What is the nature of the situation or the context being studied? What are my beliefs about the nature of being, existence, and reality?
- Methodology involves the approaches, design, methods, and procedures to investigate something. It articulates the logic and flow of the systematic and coherent process to gain knowledge about a research problem. Research methodology assists us to come to know the world or gain knowledge about part of it and includes the assumptions made, the limitations encountered, and how such limitations were mitigated or minimised. The main question here would be ‘How shall I go about to obtain the

desired data, knowledge, and understanding that will enable me to contribute to knowledge?’

- Axiology refers to the philosophical approach to making decisions related to value. In essence, it points to the ethical issues involved in research, in particular defining, evaluating, and understanding concepts of right and wrong behaviour in research. Questions here include: What values will guide your research conduct? How will the rights and dignity of all involved in the research be respected? What moral issues and characteristics need to be considered? What ethical principles will be upheld when dealing with research data?

What seems important is how doctoral candidates might understand and apply paradigmatic lenses or stances to their research in order to ‘locate’ their research appropriately. Be reminded again that not all authors agree that a project should be ‘located’ within any one philosophical paradigm. They prefer the nature of the research problem or question to guide research decisions. However, when research students know about the underpinning differences across a range of philosophical thought, their research planning and decisions might be more informed and consistent than otherwise.

Some researchers (e.g. Candy, 1989) have suggested that paradigmatic views can be grouped into four broad taxonomies, namely positivist, interpretivist, critical, and pragmatic paradigms. What follows is a brief interpretation of what the adoption of each of these views might imply for doctoral studies (also see Kivunja & Kuyini, 2017).

### **c. A positivist paradigm**

Research located in this paradigm relies on deductive logic; the formulation of hypotheses; operational definitions; and mathematical equations, calculations, extrapolations and expressions to arrive at conclusions. It aims to explain phenomena quantitatively and make predictions based on measurable outcomes. Such measurable outcomes are undergirded by four assumptions, explained by Cohen et al. (2000) as determinism (causality), empiricism (verifiability and testable hypotheses), parsimony (the most economical explanations),

and generalisability (applicability to other situations by inductive inferences). Its epistemology is objectivist (understanding is by reason only), its ontology is naïve realism (the world exists of material objects that are perception-independent), its methodology is experimental (manipulation of variables), and its axiology is beneficence (all research should be beneficial). Research located in a positivist worldview is characterised by:

- universal theories and law-like generalisations;
- context that is not important and truth and knowledge that is 'out there' to be discovered;
- cause and effect that are distinguishable, analytically separable and quantified; and
- the 'scientific method' of inquiry and the testing of hypotheses.

Positivist research is validated by internal validity (the extent to which confounding variables can be eliminated), external validity (the degree of generalisability), reliability (consistency of results), and objectivity (sources of bias limited and personal/subjective ideas eliminated where possible). The designs and methods associated with a positivist stance include experiments, quasi-experiments, correlational studies, causal comparative studies, randomised control trials, surveys, and more.

**d. An Interpretivist paradigm (also referred to as constructivist paradigm)**

Research within this paradigm tries to understand the subjective world of human experience and emphasises a socially constructed reality. It assumes a subjectivist epistemology, a relativist ontology, a naturalist methodology, and a balanced axiology. Epistemologically, researchers make meaning of data through their own thinking and cognitive processes as informed by their interactions with participants. Such interactions include actions of dialogue, listening, reading, writing, interviewing, and social observation. From an ontological perspective, researchers assume that social situations have multiple realities which can be explored through a variety of researcher-participant and participant-participant interactions. A naturalist

methodology is guided by the researcher being an active participant and meaning-maker in data processes, while a balanced axiology implies that the research outcome will reflect both the values and a balanced view of the researcher. Research located in an interpretivist worldview is characterised by:

- an admission that the social world cannot be understood from an individual standpoint;
- a belief that realities are multiple and socially constructed;
- an acceptance that context is vital for knowledge and knowing; and
- an acceptance that findings can be value laden and that values need to be made explicit.

Interpretivist research is validated by criteria such as credibility (data are believable, trustworthy and authentic), dependability (dependent on the researcher's ability to ensure true findings from data), confirmability (findings are confirmed by others in the field), and transferability (sufficient contextual data provided to enable other researchers to relate findings to their own contexts). The designs and methods associated with an interpretivist stance include: narrative inquiry, case study methodology, grounded theory methodology, phenomenology, hermeneutics, ethnography, phenomenography, heuristic inquiry, and action research designs.

**e. Critical paradigm (also referred to as transformative paradigm)**

Research in a critical paradigm looks at social justice issues, and addresses political, social and economic issues which might lead to oppression, conflict, struggle and power structures. Research located in this paradigm strives to change things for the better and uses a transactional epistemology (researchers interact with participants), a historical realism ontology (especially as it relates to histories or occurrences of social justice issues), a dialogical methodology, and an axiology that respects cultural norms. Research in a critical worldview is characterised by:

- a concern with power relationships within social structures;
- a recognition of the consequences of privileging versions of reality;
- a treatment of research as an act of construction rather than discovery; and
- efforts to uncover agency, leading to liberation and emancipation.

Research designs and methods associated with a critical paradigm include neo-Marxist methodology, feminist methodology, cultural studies, critical race studies, postcolonial/indigenous methodology, disability studies, and action/participative action research.

#### **f. Pragmatic paradigm**

The paradigm arose among philosophers who argued that it was impossible to access ‘truth’ about the real world by virtue of the existing paradigms in use. They sought for methods to highlight the behaviours of participants and in conjunction uncover the beliefs behind, as well as the consequences of, such behaviours. Thus the need for a pragmatic way to understand reality. This paradigm advocates a relational epistemology (research relationships are best determined by what is best for a study), a multiple reality ontology (individuals have own unique interpretations of reality), a mixed methodology (involving the types of data required to solve a problem), and a value-laden axiology (research has to benefit people and be of practical application). Research located in a pragmatic worldview is characterised by:

- an emphasis on ‘workability’ in research;
- a choice of research designs and methodologies best suited for the problem or phenomenon;
- rejection of the divide between ‘qualitative’ and ‘quantitative’ research; and
- an understanding of the findings from the research in terms of its applicability to solve or resolve problems.

Research designs and methods associated with a pragmatic worldview include mixed methods designs, naturalist inquiry, narrative inquiry,

case studies, phenomenology, ethnography, experimental and quasi-experimental designs, and causal comparative studies.

From the limited information thus far, one might derive that the role of philosophical views, stances or paradigms in research, and doctoral studies in particular, cannot be underestimated. A broad perspective on how philosophies and paradigms have developed over centuries, as well as how they may apply to the human endeavour of research and inquiry, can and should provide a solid foundation for scholarly research.

## Main sources

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This compendium is aimed at those involved in research education at the Central University of Technology – research students, research supervisors and institutional managers who have responsibilities for research education. The term ‘compendium’ means a collection of ‘things’ such as ideas, facts, illustrations, examples and so forth, gathered and presented as a group – especially in the form of a printed document or a book. In this case the compendium represents a collection of proven and well-researched ideas, guidelines and hints that might assist the promotion of research education on brief topics such as key research concepts, practices of supervision, academic writing, thesis structuring, literature reviews, feedback, examination criteria, institutional support systems and others.

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