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Supervising a Research Thesis: A Practical Guide

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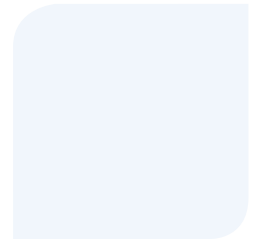
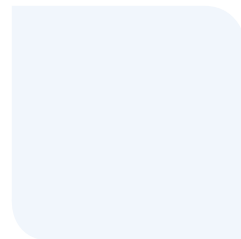
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Supervising a Research Thesis: A Practical Guide



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Introduction (Or... what have I gotten myself into?)

Supervising a thesis student is not difficult. It can, however, be angst-inducing for inexperienced supervisors.

I recall my own insecurity when asked to supervise my first thesis candidate – an Honours student for whom hindsight makes me feel sorry. I remember at the time seeking the advice of a more experienced colleague, bemoaning the fact that I was too inexperienced for the task. His response was simply “so what’s the best way to get experience?”. These words, although perceived as being dismissively callous at the time, have held me in good stead.

The best way to gain the touted ‘experience’ is to operate as an associate under the guidance of a more experienced supervisor. Where this is not feasible, a virtual guide such as this document may be of value.

This work, as the title suggests, is practical in orientation. It is not intended to be an academic treatise, but rather, to act more as a guide for those embarking on the task of thesis supervision. Its production is the result of many years of supervising candidates at Hons through to PhD level study. It is also informed by the examination of dozens of theses on a state, national and international level.

To suggest a ‘one size fits all’ model of thesis supervision would be foolishness in the extreme. Each discipline tends to have its own approach to supervision and there are as many approaches within any given discipline as there are supervisors. Nevertheless, I have found that there are basic process principles which, if understood, can make the task of supervision more manageable and enjoyable. In identifying these, I have been guided by the plethora of available research (see the annotated bibliography) and by my personal ‘experience’ as a supervisor. There’s that word again.

Perhaps the most important lesson I have learned over the years is that the task of supervision requires a systematic, logical and incremental approach. If such fails to materialise, then the candidate quickly becomes frustrated and insecure regarding both topic and supervisor selection. The slide from here tends to be in one predictable direction.

What follows is how I typically approach the task of structuring the process. The process itself is divided into a number of stages. Each stage will inevitably consist of any number of meetings. The precise number will be determined by factors such as candidate competency and motivation, and whether the enrolment is full-time or part-time. Accordingly, the supervisor is in the best position to determine how the process is best paced.

My stages should not be construed as chapters but more as signposts. Each thesis will develop its own chapters and chapter titles as the work develops over time, as it will its own structure. I long ago gave up the idea of attempting to structure a thesis along the lines of some predetermined ‘template’. Each thesis is far too individual to permit such an endeavour and anyway, why restrict a candidate’s creativity by subjecting them to structural straight jacketing?

If my approach is not appealing in terms of the overall conceptualisation, I trust that it will be at least informative. The important thing to remember is that regardless of how the task of supervising a thesis is ultimately approached, any endeavour ought to be mutually rewarding for both supervisor and candidate.

Stage One (or... negotiating expectations)

The first meeting is crucial in that it:

- Gives the supervisor insight into the candidate's degree of passion for the proposed research.
- Sets the stage for the candidate determining their level of confidence in the supervisor's capacities and capabilities.
- Establishes the nature of the working relationship.

Preliminary matters

- Create a relaxed atmosphere right from the outset.

Find out why the candidate wants to undertake the research (e.g. burning desire to have a question answered or is in need of a quick doctorate). How this question is answered will provide, to a significant extent, an indication of the candidate's motivation and commitment. For the supervisor, this invariably translates into whether or not their protégé is likely to be 'hard work'.

- Discuss in a general sense what the candidate has thought about in terms of what they might like to investigate and why. As a result of this discussion the following will be illuminated:

- > If the candidate's interests and those of the supervisor are fundamentally incongruent, read no further, the candidate probably needs to look for another supervisor.
- > If the supervisor feels that the area is of interest but methodology is basically at odds (e.g. a psychometric devotee approached by a candidate with an immovable qualitative bent), then read no further, the candidate probably needs to look for another supervisor.
- > If the supervisor feels, on the basis of preliminary exploration, that sufficient common ground exists for a research relationship to develop, then read on, what follows may be of value.

USEFUL TIP: It is unfair for a supervisor to impose their own research agenda on the candidate, thereby primarily using the candidate to further the supervisor's own research interests. The candidate must be given 'guided freedom' to choose their own topic of research – something they really want to investigate – otherwise motivation and with it impetus for and commitment to the research will remain at a low level, potentially leading to an abandonment of the thesis.

- The candidate needs to understand from the outset that it is they who are responsible for the work and not the supervisor. The supervisor is 'a guide on the side' and not one who virtually writes the thesis. This is especially important to state up front when working with ESL candidates, or those who come from cultures where there may be an assumption that the payment of fees provides a success-guaranteeing amanuensis.

USEFUL TIP: Encourage the candidate to add 'doctoral [or Master by thesis] candidate' to their CV. Having been granted candidature may be valuable for promotional or job application purposes.

Administrative matters

Clarifying administrative protocols early will save a good deal of headache in the future:

- > *Meeting schedule* – e.g. regular or when required by the student?
[I don't hound a candidate, but I do indicate from the outset that my end-of-semester report will accurately reflect the work undertaken to date].

USEFUL TIP: Give the candidate a blank copy of the supervisor report form to peruse early in the process. That way, they will know up-front the criteria stipulated for performance evaluation.



- > *Presentation of work* – e.g. hard copy or electronic? Each chapter in ‘copy ready’ mode without inaccuracies re referencing, spelling, table presentation, etc. OR, content has pre-eminence?
[I normally require candidates to email ‘copy ready’ material to me in Word. I then either use the tracking mechanism for making corrections and comments (Word → tools → track changes → highlight changes – tick all 3 boxes); OR print the document, make my comments, scan and email back].

USEFUL TIP: Create an electronic folder for the candidate where returned work can be stored – this will act as a record of transactions. It then becomes very easy to check whether corrections have been undertaken and advice actioned.

- > Turn-around time for presentation of feedback?
[Personally, I feel a supervisor ought to normally provide feedback within about one week of receiving the work, two weeks at the outside. A candidate can easily lose momentum if it takes months before supervisor feedback is received).
- > When and how is it best to contact each other?
- > Will there be significant periods of absence by either supervisor or candidate during the first year or projected candidature? What contingencies need to be considered?
- > Will there be a co-supervisor, associate supervisor? If so, how will responsibility and work load be apportioned?
- > What sort of resources are available to the candidate – e.g. room, computer, required software, photocopier, admin support, inclusion in research groups?
- > What sort of financial support may be available to the candidate – e.g. APA scholarship, university research grant, grant from relevant Research Council, tutoring position, subsidy for travel to attend an authorised conference.

USEFUL TIP: During negotiating the above, the supervisor should not come across as being overly ‘administrative’. What the candidate is looking for at this early stage of the process is a sense of security and some encouragement. It is ‘relationship formation’ that is being aimed for at this early stage. The task of encouraging the individual throughout the duration of the candidacy needs to remain uppermost in the supervisor’s mind.

- > There may be a need to discuss whether or not the intended thesis has a dual purpose. On occasions, I have found that candidates may want to meet the needs of an employer (e.g. government report, voluntary organisation) as well as satisfy thesis writing requirements. This can be managed, but there are pitfalls. Firstly, the required writing style may differ; secondly, time frames may be at odds; thirdly, trade-offs may work in favour of the employer or agency rather than the candidate; finally, the two tasks may become so confused in the mind of the candidate that neither delivers a satisfactory outcome. Where a request for a dual purpose thesis is made, this needs to be very carefully considered by the supervisor.

A checklist for the above matters has been included as Appendix 1.

Research timeframe

A candidate can get into real trouble by not giving some thought to a commencing and concluding point. Without a proposed timeframe, the study is in danger of becoming purposeless – just floating around in the hope that something will someday happen.

• Commencing Point:

- > Does the candidate need to complete any coursework prior to engaging in the thesis proper (e.g. a research methods unit; professional doctorate units)?
- > Are there competing pressures indicating that the candidate would be better to defer commencement?
- > Does the candidate understand the notion of ‘consuming time’ (from the Institution’s point of view) once the study has commenced? Full time vis-à-vis part time enrolment may need to be discussed here.

• Concluding Point:

- > Be brutal – candidature is not open-ended – the realities of economics come into play. Once the entitled time has been consumed, universities begin to lose money by retaining a candidate. This is further compounded by the fact that a supervisor is tied up with a candidate who is now costing the university and so unable to take a new candidate who is a potential generator of university income.
- > By not having a proposed end date, the candidate may be encouraged to cruise. The longer the cruising, the lower the motivation for completion. A potentially interesting study becomes a life-crushing millstone.
- > Research quickly becomes dated. The longer the candidate takes, the more revisions will need to be made as new information is generated. Further, if in the meantime someone else publishes a similar study, the ‘originality’ aspect of the thesis disappears.

• Thesis Length:

- > It is worth at this stage advising the candidate of the length of the expected thesis. This is a good reality check as it impresses upon them early the extent of the task while at the same time providing the supervisor with an opportunity for supporting them through angst related to thesis size.
- > There are no hard-and-fast rules here but clearly, there must be guidelines to protect both student and examiner! The following ball-park recommendations represent averages typically found in the literature:
 - Honours: 12 000 – 18 000 words
 - Master by Dissertation: 20 000 – 25 000 words
 - Research Master: 30 000 – 40 000 words
 - Professional Doctorate: 50 000 – 70 000 words
 - Research Doctorate: 70 000 – 100 000 words

USEFUL TIP: Initially, candidates tend to be daunted by the prospect of constructing a ‘huge thesis’. Encourage the candidate to view the study as just another assignment – only bigger. Talk them through the notion of ‘chunking and chaining’ – of breaking the anticipated task into manageable parts and then putting them together in a coherent fashion at the end. It’s less frightening to conceive of thesis chunks as pieces of a jigsaw – if each individual piece is well constructed, then together they will form a beautiful whole.



'Homework'

Give the candidate two or three key readings in the area and ask them to familiarise themselves with the content. Indicate that while reading they must make notes on how what is being digested might inform their general area of research interest.

This may also be a good time to suggest to the candidate that they familiarise themselves with significant resources in the area, for example:

- Relevant electronic databases
- Key journals in the area
- Important websites
- Important texts
- Key professional associations
- Names of significant researchers in the area

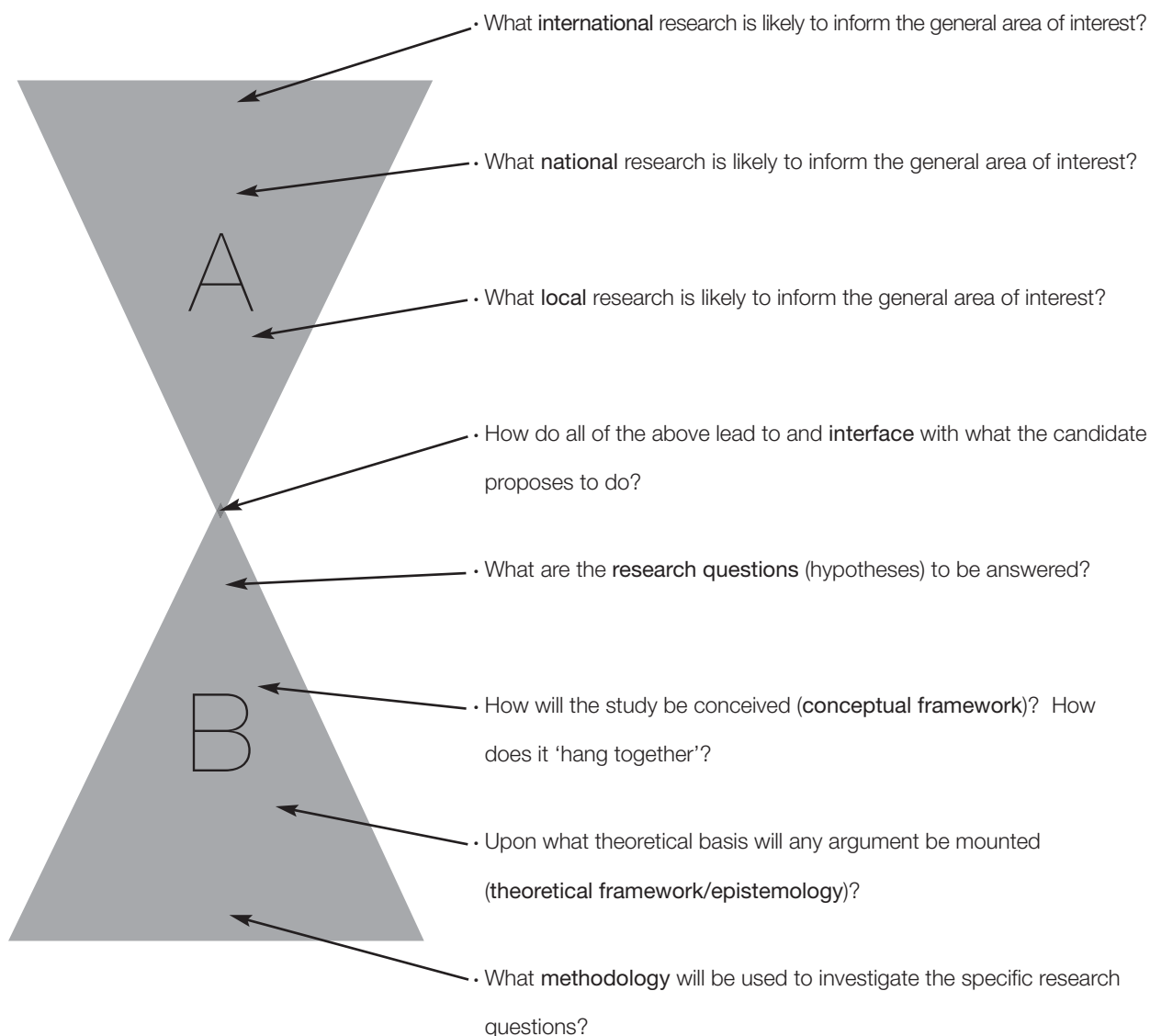
Stage Two (Or... presenting an overview of the research process)

The research model explained

A model is a good way of representing an idea. I find that a model often helps to move candidates from a state of abstractive confusion through to concrete appreciation of the task that lies ahead. Visual representation can be very powerful in the service of scaffolding the thesis-generating process.

- (i) Using Figure 1 below, I indicate that one sound way of conceiving of *any* research is to move from a macro to a micro perspective and back again in a recursive fashion. The model I advocate is presented below and then explained.

Figure 1. A model of the research process.





The Two Triangles

- > The inverse triangle (A) suggests progression which is broad → narrow; general → specific; theoretical → practical in orientation. This triangle anchors the research by relating it to what's already generally known about the topic. The idea is that the candidate is encouraged to distil information in a downward fashion until they develop an understanding of what is directly relevant to their specific study.
- > The bottom triangle (B) suggests progression which is narrow → broad in orientation. This triangle relates to specific aspects of the topic as it develops. Once the topic has been identified, then a layered support base is carefully crafted.
- > The area where the triangles meet represents the relationship between what is known (A) and what the candidate will strive to find out (B).
- > The model is recursive in that both triangles are continually informing each other as the study progresses.

The Dot Points

- > The first 3 dot points (Triangle A) are an investigation of the broad parameters which are likely to inform the research. Greater depth and breadth would be required for a PhD thesis and less for an Honours thesis. The candidate needs to be encouraged to 'read around the topic' and so familiarise themselves with what is already available in the general area of what they hope to research.

The candidate should be pointed in the direction of significant theorists and researchers whose work is so seminal that it must be consulted. Such works are also likely to lead the candidate to discovering other significant works (via the list of references provided in published work). The candidate should also be directed to investigate key government reports.

- > Dot point 4 is the nexus where what is already known is interfaced with what is being proposed. A significant question to ask here is 'how is this connection going to be made?'. This question encourages the candidate to think in terms of anchoring their topic to the broader literature and also asking 'how am I going to make an original and significant contribution to existing knowledge?', which is required for at least doctoral level research.
- > The final 4 dot points (Triangle B) are driven by a clear and concise articulation of the research questions. Once developed, the research questions (hypotheses) tend to lead naturally to an exploration of the dot points. Depth is increased as the candidate drills down into how this particular study is going to be framed. These dot points don't need to be explained at this point – that will come later – they are simply introduced here to complete the model.

(ii) In layman's terms, talk over the what, why and how of the research. Don't get 'technical' at this point. Unless the candidate can first gain a 'plain English' understanding of what they propose to do, they will struggle throughout the proposal-structuring process:

- > *What* is it that you want to research?
- > *Why* do you want to research it?
- > *How* have the readings that I gave you last time informed your responses to the above questions?

(iii) Give the candidate new 'homework':

- i. **Research Driver:** "for next time, come back with a succinct paragraph that responds to these questions. No airy-fairy stuff – tell me precisely what will be happening in plain English".
- ii. **Working Title:** "devise a working title for the study which is clear and succinct. The title must make the intent of the proposed study immediately obvious".

Responses to these questions will become crucial as the next steps in the process unfold.

USEFUL TIP: Advise the candidate to create 'topic folders' for each potential areas that might impact on the thesis... including one for References. As they come across readings relevant to that area of concern, they can simply drop them into the folder for future reference (e.g. folder for: mathematics content knowledge, curriculum management, qualitative methodology, assessment and evaluation).

(iv) Encourage the candidate to begin thinking about the TPYE of research in which they think they will be engaging. A broad category needs to be settled upon before specifics can be considered. The following list from which to make a selection may be a good starting point and was sourced from:

<http://www.disability.wa.gov.au/Research/Definitions/ResearchTypes.htm>

- > **Applied research** is research undertaken to solve practical problems rather than to acquire knowledge for knowledge sake.
- > **Basic research** is experimental and theoretical work undertaken to acquire new knowledge without looking for long-term benefits other than the advancement of knowledge.
- > **Clinical trials** are research studies undertaken to determine better ways to prevent, screen for, diagnose or treat diseases.
- > **Epidemiological research** is concerned with the description of health and welfare in populations through the collection of data related to health and the frequency, distribution and determinants of disease in populations, with the aim of improving health.
- > **Evaluation research** is research conducted to measure the effectiveness or performance of a program, concept or campaign in achieving its objectives.
- > **Literature review** is a critical examination, summarisation, interpretation or evaluation of existing literature in order to establish current knowledge on a subject.
- > **Qualitative research** is research undertaken to gain insights concerning attitudes, beliefs, motivations and behaviours of individuals to explore a social or human problem and include methods such as focus groups, in-depth interviews, observation research and case studies.
- > **Quantitative research** is research concerned with the measurement of attitudes, behaviours and perceptions and includes interviewing methods such as telephone, intercept and door-to-door interviews as well as self-completion methods such as mail outs and online surveys.
- > **Service or program monitoring and evaluation** involves collecting and analysing a range of processes and outcome data in order to assess the performance of a service or program and to determine if the intended or expected results have been achieved.



Stage Three (or... getting serious)

This might also be the appropriate time to refer the candidate to the relevant material contained in *Appendices 2-5*. The information contained here may further assist them in clarifying the nature of the research they will eventually be undertaking.

Three questions drive this session:

- How is your reading coming along and what have you discovered so far?
- How can the prepared *Research Driver* paragraph best be interpreted?
- Does the prepared *Working Title* reflect the Research Driver paragraph?

These are developed in what follows.

(i) How is your reading coming along and what have you discovered so far?

- What seems to be surfacing as current trends in the general area the candidate wants to investigate?
- Is the candidate making links between international, national and local trends?
- Is the candidate able to relate their reading to their own thinking regarding a possible specific topic to be investigated; OR is a topic which is already gelling, gaining greater clarity as a result of the reading being undertaken?
- Is formative writing being structured in a way that reflects the 'shape' of Triangle A of the model previously introduced?

(ii) How can the Research Driver paragraph best be interpreted?

This is perhaps best explained by way of a WORKED EXAMPLE. From their 'homework', the candidate would have produced something such as the following:

I want to investigate whether primary school students today have more or less mathematics content knowledge than their counterparts of 30 years ago. I want to do this in order to determine whether any real advances have been made in mathematics education over time. I intend doing this by comparing how children of today perform on curriculum tasks that were mandated knowledge for students 30 years ago.

The next step is to deconstruct significant (or 'trigger') words and phrases that come directly from the Research Driver. In this WORKED EXAMPLE:

Primary school students

- Precisely what ages are we talking about – all seven (or six in Catholic schools) years? Why?
- Which sector/s will be considered – government, private, alternative?
- Where will the students come from? Why?
- Permission to work with minors → explain the ETHICS CLEARANCE PROCESS and provide the candidate with the appropriate documentation to be completed at a later date.
- What about gender distribution? Girls? Boys? Both? Why?
- What about SES, is that in any way significant? Why?
- Is rural/urban distribution important? Why?
- Any other important factors? Why?

Note the importance of the word 'why'. The candidate must begin thinking in terms of *justifying a position* rather than merely stating one.

USEFUL TIP: A good supervisor does not so much provide answers as pose the right questions...that's the difficult part! The candidate then has to think about the *what* and the *why*. For example, it is unwise to allow a candidate to get away with a sentence such as "It is interesting to note that X", without explaining precisely *why* X is 'interesting'.

More / improved / real advances

- These words imply that there is a change or quantitative difference between groups. What is the nature of this difference and how will it be measured?
- Is the idea to compare 1980 results with 2010 results? How is this possible? Where will the 1980 data come from? What about historical cohort differences?

USEFUL TIP: It might be an idea to introduce the notion of delimiting factors at this point – what are potential limitations (inherent or desired) of the study?

- Will descriptive and/or inferential statistics be used? If so, which ones? Why? Parametric or non-parametric? Why?

USEFUL TIP: You may want to refer the student to a psychometrician at a later date if you do not have the a strong statistical background yourself. There is absolutely no shame in referral. We all have strengths in different areas AND it's better to get advice early rather than mess the candidate around by feigning unpossessed knowledge.

- How will the data be collected, analysed, interpreted?

Mathematics content knowledge

- What is the nature of this content knowledge? Whose content?
- 'Knowledge' for which group of students?
- How is mathematics being defined? Which aspect/s of mathematics?
- Whose writing is seminal in the area of maths content knowledge?
- How is knowledge itself going to be defined? What is the role of epistemology here?
- In terms of any curriculum, how might a benchmark in content knowledge be established?

Thirty years ago

- Why this time frame? What changes occurred between these times that may explain any difference in results? [here's where an interface with the readings begins to occur – Triangle A of the Model].
- Talk about issues related to comparing cohorts across historical time-frames. Basically, is it even possible to make a valid comparison?

Mathematics education

- Whose writing is seminal in the area of primary school mathematics?
- What is 'education' vis-à-vis education for what?
- Has the teaching of mathematics between 1980 and 2010 been influenced by a changing understanding of 'education'?
- How important ought mathematics education be anyway? Why?

Comparing

- Same question as previously: how can one compare over time?
- Comparing what, and what's the purpose of the comparison anyway?
- Comparing how?

Curriculum tasks / mandated

- How are such tasks defined? By number, complexity, developmental sequencing, etc?
- How has the very notion of 'curriculum' changed over 30 years?
- Should certain knowledge ever be mandated anyway? Are there basic skills that are important for every generation or are some skills advocated 30 years ago (e.g. memorising 'times tables') no longer relevant?



USEFUL TIP: Encourage the candidate to write as they read and to cut-and-paste and move things around as new information surfaces. This way they are already beginning to build a rudimentary structure for the proposal and later the thesis (including the Reference List). 'Write as you go' ought to be their mantra. Impress upon them not to leave the writing till 'later'!

(iii) Does the Working Title reflect the Research Driver paragraph?

Again from their 'homework', and following the above WORKED EXAMPLE, the candidate would have produced something such as:

The mathematical literacy of Western Australian primary school children in 2010 when compared to that of their 1980s counterparts.

At this meeting, talk around questions such as:

- Is there a clear relationship between the title and the key phrases and questions identified above?
- 1980s is quite broad. Was education the same in 1981 as in 1989?
- Is the proposed study, as suggested by the title, feasible?
- What new knowledge might such a study add to the existing knowledge base in the area? Why might the results of such a study be of value?

USEFUL TIP: Discourage students from pre-empting results. With regard to the last dot point, for example, it would not be wise to ask a question such as "What do you think the results of such a study are going to tell us?". To which the candidate might reply "that today's mathematical knowledge is worse than it was 30 years ago". In so doing, they have already determined the outcome and interpreted the findings without having undertaken the study!

The whole point of research is find out something that is not already known.

Send the candidate away to think about the questions raised above and formulate some responses...that should keep them busy for quite awhile!

Stage Four (or... let's talk about organisational integrity)

There are four areas to be considered here:

- Organisation
- Research Questions
- Conceptual Framework
- Theoretical Framework

These are developed in what follows.

(i) Organisation

- What discoveries have you made while addressing the questions raised at the previous stage?

USEFUL TIP: Advise the candidate that as they're writing, they should cut but not delete. Take what they think they will no longer need and drop it into a separate folder for possible later reference. Get rid of nothing permanently until the thesis has been passed is the golden rule! They never know what they might need to retrieve at a later date.

- Have any of your readings informed the questions raised previously? How so?
- What are you still wrestling with that requires an answer and how will you obtain the required information?

(ii) Research Questions

- Research questions (in quantitative research perhaps *hypotheses* is a more appropriate term) should focus the research.

Once clarified, they ought to be used to:

- > generate a pretty much final version of the title;
 - > frame the abstract;
 - > motivate the literature review;
 - > underpin the conceptual framework;
 - > inform the theoretical framework;
 - > establish methodological imperatives;
 - > focus interpretation and discussion; and
 - > springboard to conclusions and consequent recommendations.
- In short, *the research is all about answering the research questions (hypotheses)*. As such, it is important that the questions:
 - > are not introduced until about this stage in the process – when the candidate is better able to make an informed decision about exactly what is going to be researched;
 - > should be closely aligned with the Research Driver established earlier;
 - > are clearly and precisely structured;
 - > do not elicit a simple yes/no response (e.g. “do men smoke more than women?”);
 - > have a footprint that is evident throughout the whole research.

USEFUL TIP: It is better to have a few robust and accurately focussed questions (hypotheses) than a plethora of poorly formulated and only generally relevant ones.



- From all of the reading that the candidate has undertaken to date, they should have sufficient clarity to enable them to structure the research questions. From the WORKED EXAMPLE presented earlier, research questions might take the following form [although an overarching question may not always be necessary]:

Overarching Question:

How might student performance on mathematics syllabus content generated for a past generation be an indicator of current ability levels?

Subsidiary Questions:

1. *How is 'mathematics ability' being defined in the literature and how might such a notion have changed over time?*
2. *How might year six students of today perform on a material that was mandated for their counterparts in 1980?*
3. *What differences might surface when results are analysed by sector (Government, Catholic, Independent)?*

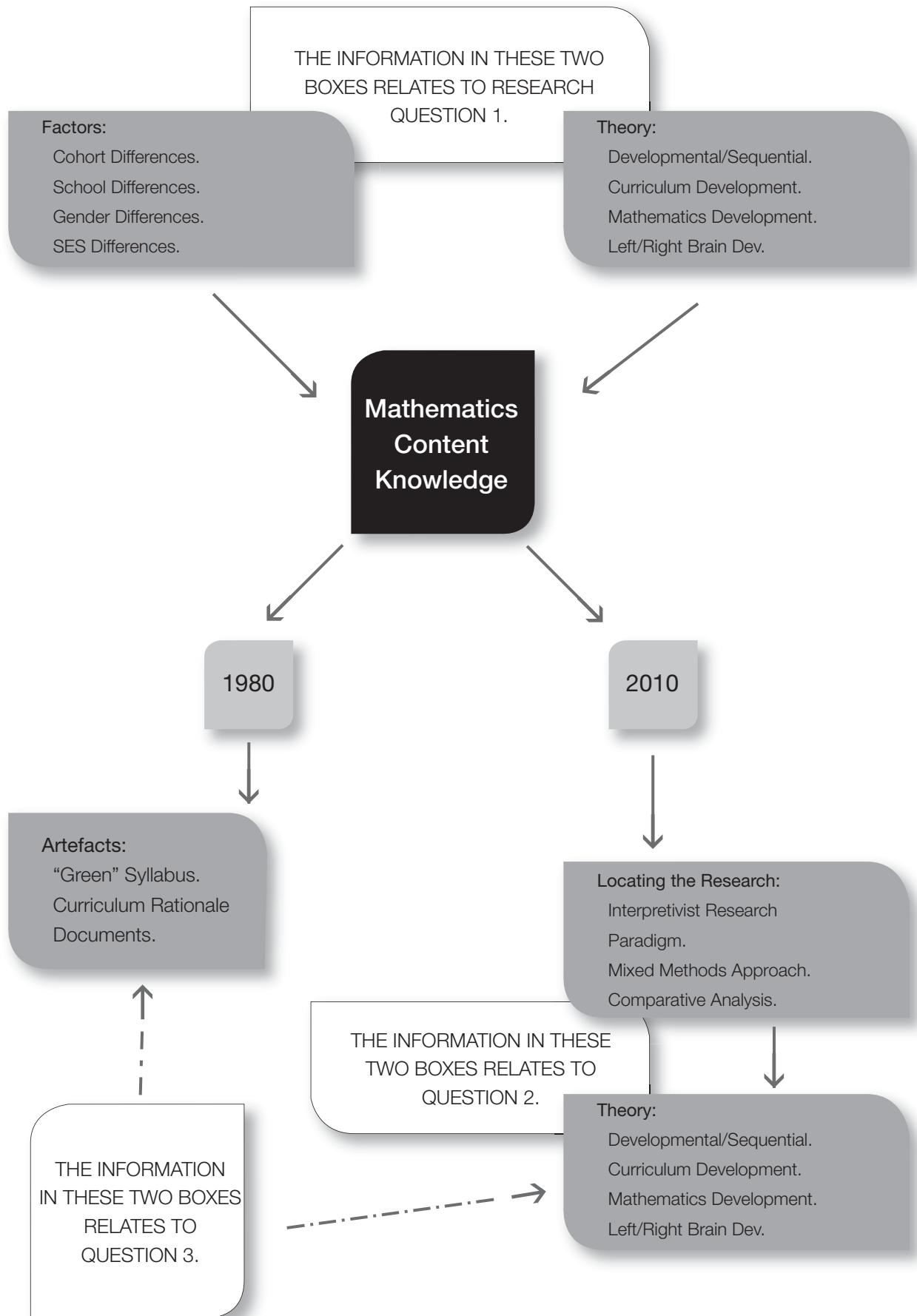
USEFUL TIP: This may be an appropriate juncture for recommending to the candidate that they have a look at completed theses to see how others have structured their research questions. At the same time they can have a look at the overall structure of completed theses by examining tables of contents.

(iii) Conceptual Framework

- A conceptual framework is a set of coherent ideas formulated in such a fashion as to make them readily communicable to others.
- A conceptual framework basically answers the questions 'how am I conceiving this study given the focus of the research questions?' and 'how do the various aspects of my study hang together?'
- Where possible, I again like to use a model (figure; flow chart) to show how the study is being envisaged. I subscribe to the adage that a picture is worth a thousand words...if you can see it, the likelihood is that you will have a better chance of understanding it.
- To reduce confusion, I find that a conceptual framework is best worked out in conjunction with the candidate rather than leaving the candidate to their own devices. Once it has been sketched out in a preliminary fashion, the candidate can then take it away for refinement.
- For the *Research Driver* introduced in the WORKED EXAMPLE, and based on the *Research Questions* as presented, a conceptual framework might look something like the this:

USEFUL TIP: As serious writing is soon to commence, this might be the time to impress upon the candidate that Less is More – it's not how much you write, it's how well you write it that counts. The doctoral thesis of Louis de Broglie, for example, the French Nobel Laureate in physics, was only a few pages in length – but what a thesis!

Figure 2. Example of a Conceptual Framework





(iv) Theoretical Framework

- This is the section that often causes candidates the greatest amount of grief – the question of how to ‘interpret’ their own research in terms of the bigger scheme of things (i.e. how Triangle A relates to Triangle B in the model introduced earlier).
- A theoretical framework is a rationale for integrating a proposed study into the existing literature base. Essentially, the process consists of inter-relating what is being proposed into a certain understanding of the world in order to answer certain questions from within a given paradigm (or for very clever people, creating their own paradigm).
- The study may ‘attach’ itself to, and be explored in terms of, frameworks such as qualitative vs. quantitative; confirmatory vs. exploratory; positivistic vs. phenomenological; empirical vs. rational. The theory to which the study attaches itself will ultimately be used to establish the methodological parameters and aid in the explanation and interpretation of the data.
- Crotty (1998) astutely ties the theoretical framework (rationale) into an overarching epistemology (world view) which is then related to methodological imperatives (operationalised). The model, replicated below, may be worth exploring with the candidate.

Table 1

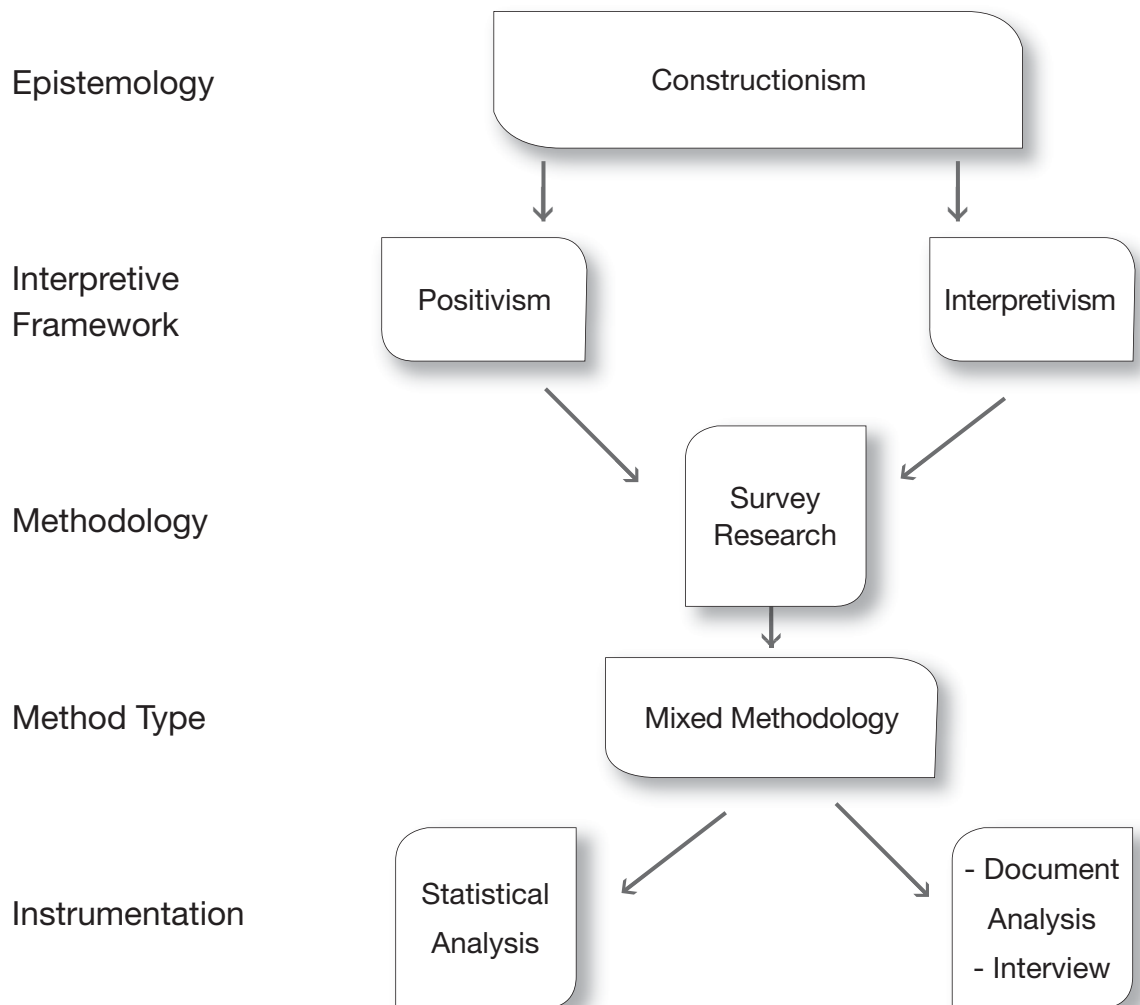
Four Elements Framing a Research Study

Epistemology	Theoretical perspective	Methodology	Methods
Objectivism Constructionism Subjectivism <i>(and their variants)</i>	Positivism (and post-positivism) Interpretivism • Symbolic interactionism • Phenomenology • Hermeneutics Critical inquiry Feminism Postmodernism <i>etc.</i>	Experimental research Survey research Ethnography Phenomenological research Grounded theory Heuristic inquiry Action research Discourse analysis Feminist standpoint research <i>etc.</i>	Sampling Measurement and scaling Questionnaire Observation • participant • non-participant Interview Focus group Case study Life history Narrative Visual ethnographic methods Statistical analysis Data reduction Theme identification Comparative analysis Cognitive mapping Interpretative methods Document analysis Content analysis Conversation analysis <i>etc.</i>

[After Crotty, M. (1998). Table 1; p. 4. See annotated bibliography for details]

• With reference to the WORKED EXAMPLE, a theoretical framework, a la Crotty, may look something like the following:

Figure 3. Example of a Theoretical Framework



• Theoretical frameworks for interpreting how the world works can be found in abundance. A candidate may be pointed to following website by way of exemplifying available theories in, for example, the discipline of psychology:
<http://tip.psychology.org/theories.html>

A valuable synopsis of general social science related theories can be found at
http://www.arena.uio.no/publications/wp99_33.htm

The following site is also informative in the development of social science theories:
<http://www.eshoppingmall.bizland.com/columbiacollege/id57.html>



Stage Five (or... precisely what's going to be done, when and how?)

At this point, the candidate has made considerable inroads into both Triangles of the research model:

- > The literature repository is being investigated
- > The driving questions have been considered
- > A working title has been proposed
- > The research questions have been formulated
- > A conceptual framework has been devised
- > A theoretical framework has been constructed

Three further tasks need to be considered at this stage:

- Research Methodology
- Ethics in Research
- Research Timeline

These are explained in what follows:

USEFUL TIP: Encourage the candidate to be involved in and attend as many departmental seminars, university training and information sessions, and thesis proposal presentations as possible. Encourage them to also spend time chatting with other thesis students. Setting up graduate seminars for just such a purpose may be a worthwhile undertaking on the part of the supervisor.

(i) Research Methodology

Methodological considerations go to the heart of any study. Prior to selecting a preferred methodological orientation, the candidate must first acquaint themselves with available models. Teddlie and Tashakkori (2009) present a Table (Appendix 6) which may assist the candidate in determining the methodological orientation of the proposed research.

There are basically ten questions to be asked here to help the candidate avoid methodological transgressions. Expected responses from the WORKED EXAMPLE have been embedded (*italics*) into these:

- > What over-riding research paradigm is going to be adopted for the study (**quantitative or qualitative or mixed methodology**)?
 - *Mixed methodology.*
 - *drawing on the work of Cresswell and Plano Clark.*
- > With whom is the study going to be undertaken (**sample** in quantitative language; **participants** in qualitative language)?
 - *Year 6 students from 9 classes.*
 - *Mixed gender.*
 - *Purposeful sampling:*
 - *3 government schools; 3 independent schools; 3 Catholic schools.*
 - *Only mixed gender schools will be selected.*
 - *one school from each of low, mid and high SES area, as identified in DEEWR school funding formula.*
 - *Selected schools will not have grades that are ability-streamed.*
 - *20 Teachers who have been teaching for at least 30 years (expert opinion).*
- > How is data going to be collected (**procedure**)?
 - Obtain 1980 results for the year 6 term 2 'number' stream which is available from the Department of Education's archived statistical records.
 - Select 20 problems from the 'number' stream covered in term 2, from the WA Dept of Education year 6 1980 ('Green') primary syllabus.
 - Administer the problems to one randomly selected year 6 class in each of the 9 schools.
 - Using semi-structured interview procedures, obtain perceptions of the 20 teachers regarding changes in maths content and student performance over the past 30 years.

- > When is the study going to be undertaken (**timing and duration**)?
 - Year 6 testing will be administered in the final week of term 2.
 - A pilot study has shown that 90% of students can complete the 20 problems in 30 minutes.
- > How is data going to be examined (**analysis**)?
 - Test results:
 - Descriptive and inferential statistics using SPSS software. As the sample is purposeful rather than random, non-parametric analysis will be undertaken (Wilcoxon-Mann-Whitney test).
 - Global scores will be matched with 1980 global scores.
 - Specific problem categories will also be identified and matched with the 1980 cohort.
 - Interviews:
 - Tape-recorded and transcribed.
 - Coding as per qualitative protocols, ending with an identification of themes and sub-themes.
 - Member-checking will ensure response accuracy and authenticity.
 - Variables:
 - Any gender differences?
 - Any SES differences?
 - Any school differences?
- > How will you determine that you are measuring the same thing every time (**reliability** in quantitative language; **dependability** in qualitative language)?
 - A verification of the trustworthiness of the data will be undertaken.
- > How will you know that you are measuring what you think you're measuring (**validity** in quantitative language; **credibility** in qualitative language)?
 - Expert opinion will be sought.
 - Tentative language will be used and the language of causality will be specifically avoided.
- > How will you ensure that your presence does not contaminate the data (**objectivity** in quantitative language; **neutrality** in qualitative language; Hawthorne Effect. Note: Some qualitative approaches do recognise the value of data co-construction between respondent and researcher, but even here bias is not permitted).
 - The students' regular classroom teacher will administer the test.
 - With interview responses, member-checking will ensure response accuracy and authenticity.
 - 'Bracketing', as defined by Interpretative Phenomenological Analysis, will be adopted while coding information.
- > How will you try to understand the results (**interpretation/discussion**)?
 - How do the results relate to those found in the literature? Reasons?
 - What do the results indicate about potential mathematics ability difference between the two historical cohorts? Reasons?
 - What do the results indicate about potential mathematics ability difference between 2010 schools? Reason?

USEFUL TIP: Candidates need to be encouraged to explain and ponder rather than simply state. Hence, the word 'reason?' at the end of each sentence is important? In the WORKED EXAMPLE, this also relates to the 3rd research question.

- > Of what value beyond the immediate study are the results likely to be (generalisability in quantitative language; transferability in qualitative language)?
 - How may the study be of value to the schools from which the results have been generated?
 - What may the results reveal about the direction of year 6 mathematics competency across two points in time?
 - What can be said about differences between school sectors?



(ii) Ethics in Research

Ethical research is crucial. The candidate needs to understand this from the outset so that all parties are protected against unethical conduct. The candidate also needs to know that no data can be collected prior to the necessary ethics clearances being obtained. Ensuring that the candidate pays due attention to the following is a key consideration at this stage of the research process:

- The candidate should be introduced to guiding statements such as the *National statement on ethical conduct in human research* OR the Australian Association for Research in Education *Code of Ethics* (see annotated bibliography).
- In addition to the above, the candidate should know the Institution's requirements and become familiar with any proforma documentation that must be completed.
- The candidate should consider the forms that need to be created for signing by involved parties (e.g. in the WORKED EXAMPLE: participants, parents, principal, teachers, sector authorities). These may be available from the Institution in template form or may need to be created.
- The candidate needs to be informed that the study is not all about them obtaining a qualification. There must be discernable benefits for all parties. Again, in the WORKED EXAMPLE, what's in it for the children, their parents, their teachers and schools?
- The issue of de-identifying data needs to be raised early. This enables the candidate to consider the use of pseudonyms and codes from the outset without having to make ethics-related adjustments later in the process.
- The candidate will also need to be given guidance regarding when the ethics documentation needs to be completed and submitted (e.g. prior to the proposal, with the proposal, after the proposal presentation?). Institutional guidelines should be followed here.

USEFUL TIP: Advise the candidate not to engage in thesis-related discussions with those who might later be approached as either reviewers or examiners. Getting such people involved in the process might disqualify them from later acting in these capacities.

(iii) Research Timeline

During Stage 1 of the process, the candidate was introduced to a *Research Timeframe* – basically, when will the research be commenced, when will it be concluded? The candidate is now sufficiently far through the process to allow the plotting of iterations along a continuum (month and year). This can be completed as increments along a horizontal line, or as a vertical Table. There are several advantages of taking the time to complete such a timeline:

- It represents a commitment to a task, which then acts as a motivator.
- It allows the candidate to comprehend the scope of the undertaking at a glance.
- It allows the candidate to tick off deadlines as they're met, thus giving them a sense of achievement and progression.
- It permits recalibration when it becomes obvious that deadlines cannot be met.

Stage Six (Or... how are we going to structure this behemoth?)

Three matters now require detailed attention:

- The introduction
- The literature review
- The provisional Table of Contents

(i) Thesis Introduction

The Introduction is normally a stand-alone chapter and quite short – 10-15 pages I would recommend. It provides an overview of the thesis.

Recalling the **Model** introduced in Stage Two, the Introduction might be structured along the following lines which may also provide the rudimentary subheadings:

- > *Introduction*: A brief explanation of the purpose of the research, right up front. The reader needs to know in the first paragraph what the study is about. Also, specify the parameters of the problem that is being considered – everything about the topic cannot be researched (see Stage Two).
- > *Originality and Significance*: What is the value of the research? Why is it being undertaken? What do we already know, what is in conflict, what needs to be investigated (see Stage Two)?
- > *The International Scene*: What body of scholarship is available to inform the present study - overview (see Stage Two)?
- > *The National Scene*: What body of scholarship is available to inform the present study - overview (see Stage Two)?
- > *The Local Scene*: What body of scholarship is available to inform the present study - overview (see Stage Two)?
- > *Summary*: Conclude by summarising what the literature says about the three 'scenes' above and reiterate why there is a need to investigate the current topic.
- > *Research Questions (Hypotheses)*: These need to be clearly stated, preferably in point form for ease of reference. These questions frame the whole study (see Stage Four).
- > *Structure of Remaining Chapters and Content Synopsis*: In Lev Vygotsky's terms, this is 'scaffolding' the remainder of the thesis for the reader. This subheading provides a conceptual roadmap of direction and proposed destination. This need not be longer than half a page.

(ii) The Literature Review

Some may argue that the structure of the Literature Review ought to have been finalised earlier in the process. My counter argument, based on experience, is that prior to this point the various components are fragmented and still lacking a Gestalt-type clarity. The creation of a thesis is a developmental endeavour. It is at this juncture that the candidate has sufficient information regarding the various components. They can now, like a jigsaw, be correctly assembled.

Given what has been considered thus far, together with the fact that the candidate has been writing all along, creating the Literature Review becomes a relatively easy task. 'Easy' in the sense of being structurally undemanding – the actual writing of course, still requires considerable effort.

USEFUL TIP: This may be an opportune time to further encourage the candidate by noting that this is a significant milestone in the process. By recommending that the candidate begins writing their Literature Review in earnest, you are affectively stating that they now possess the required knowledge for the task.

It is important to advise the candidate regarding what the Literature Review is NOT:

- > an annotated bibliography;
- > a disjointed summary of each citation;
- > a description of the historical context of the topic.



The candidate should also be informed that sources SHOULD:

- > provide authoritative rather than lightweight argument;
- > be relevant rather than general;
- > be current (and so updated regularly) as well as historically significant;
- > be correctly cited;
- > be insightfully analysed so as to provide ideas and conclusions from the literature;
- > point out similarities and differences, strengths and weaknesses, opinion and fact in the literature.

Recalling again the **Model** introduced in **Stage Two**, the Literature Review, like the Introduction (at least for the first four dot points), might be structured along the following lines:

- > *Introduction*: A brief explanation of the purpose of the Literature Review and how it will be structured.
- > *The International Scene*: What body of scholarship is available to inform the present study - detailed (see Stage Two)?
- > *The National Scene*: What body of scholarship is available to inform the present study - detailed (see Stage Two)?
- > *The Local Scene*: The Local Scene: What body of scholarship is available to inform the present study - detailed (see Stage Two)?
- > *Methodology*: Evaluate appealing research methods to answer the research questions (hypotheses), select one and defend its use. It is here that the methodology is 'motivated'. That is, questions related to choices made for this particular study are discussed – e.g. qualitative, quantitative or mixed method? Which 'type' under the selected methodology (see Appendices 2-6)? We are concerned here with defending the theory of the chosen methodology and not with presenting a description of what's going to be undertaken and how – that is done in the Methodology chapter (see Stage Five). Strengths and weakness might also be discussed, as might studies that used similar methodologies under similar circumstances.
- > *Summary*: Conclude by summarising what the literature says about the three 'scenes' above, how they relate to the present study, how the chosen methodology will facilitate such investigation, and reiterate why there is a need to investigate the current topic.

(iii) Provisional Table of Contents

A Table of Contents is likely to surface naturally as a result of the work already undertaken to this point. It is now time, however, to formalise this so that the candidate can get a sense of the whole picture. Appealing again to the jigsaw analogy, a Table of Contents shows which sections require further work and which are still missing, and does so from a bird's eye perspective.

In terms of structural considerations, the candidate might benefit by remaining cognisant of the following:

- > Chapter headings and (intended) subheadings ought to be included.
- > Five or six chapters are normally sufficient for structuring the thesis, although there is no hard and fast rule regarding this.
- > Using the automatic numbering and Table of Contents functions of the word processing software will result in automatic updating as the body of the work grows. This is a handy time-saver.

All Content Tables are very individual, reflecting the nature of the study itself. It is therefore difficult (and unnecessary) to be overly prescriptive. However, in general terms, the following might be included:

- > Introduction
- > Literature Review
- > Methodology
- > Discussion (including Implications)
- > Conclusions and Recommendations
- > References

The Table of Contents will normally be **preceded** by (order may vary by Institution):

- > A Title page
- > A 'use of this thesis' statement
- > The Abstract (to be written once the thesis has been completed).
- > A declaration attesting to originality and fair dealing.
- > Acknowledgements

The Table of Contents will normally be **followed** by (order may vary by Institution):

- > List of Tables
- > List of Figures
- > List of Appendices

The candidate might also be assisted in the above matters by being referred to material contained in *Appendix 7*.

USEFUL TIP: The candidate might be introduced to two useful software time-savers. The first is the creation of a Table of Contents in Word in such a way that headings and subheadings are tied automatically to the correct section within the document, with page numbers being automatically updated as the document grows. The second is Endnote – a useful way of creating and automating a list of references.



Stage Seven (or... What? They've actually got to present this stuff to other people?)

It is now time to bring together the areas previously discussed which will help to structure the thesis, namely:

- > Provisional Title
- > Literature Review
- > Research Driver
- > Research Questions
- > Conceptual Framework
- > Theoretical Framework
- > Research Methodology

This collating can be managed as the candidate begins to thinking about and structuring the **Proposal**.

USEFUL TIP: Over the years, I have collected a number of exemplar Research Proposals. After de-identification, I share these with current candidates so that they can get a feel of the type of document that they are being asked to construct.

It is normally expected that thesis candidates will have their Proposal reviewed by experts in the field (the number of reviewers will vary by Institution). This process provides a final opportunity for any weakness that surface to be addressed prior to admission into full candidature. This stage consists of three substages:

(i) Proposal Preparation

- > *Purpose:* This experience (albeit often daunting) provides the candidate with the opportunity to shine – to really show that they know what they're talking about and to impress the audience with what has been accomplished to this point. It also facilitates the student receiving valuable feedback which may be later incorporated as appropriate.
- > *Length:* This will vary by institution. My personal view is that if it can't be said in about 30 pages, then the candidate does not yet have sufficient clarity about the proposed research, or, does not yet know how to write concisely. Further, reviewers are typically busy people who shouldn't be expected to plough through something approximating the completed thesis!
- > *Structure:* Within the suggested page limit, the Proposal might be structured as follows:
 - 1 page – Title, degree and personal details.
 - 1 page – Table of Contents, list of figures, tables, appendices, etc.
 - 1 page – Summary (not Abstract – which can't be done until after the study has been completed).
 - ≈ 1 page Introduction to the study including purpose, significance and ethics statement.
 - ≈ 12 pages – Literature Review including, theoretical and conceptual frameworks, research questions (hypotheses).
 - ≈ 10 pages – clear description of the Methodology.
 - 1 page – Timeline for completion and proposed budget.
 - ≈ 3 pages of key References.

USEFUL TIP: Most universities have funds set aside for thesis level study. The supervisor should know what amounts are available for which degrees (e.g. Hons vs. PhD) and advise the student to plan thesis expenses within the established budget.

> *Guiding Reviewers*: Reviewers might be asked to comment on the following:

- Does the *Title* accurately represent the content?
- Are sources cited in the Literature Review appropriate?
- Does the proposed *Research Framework* undergird the study theoretically and conceptually?
- Are the *Research Questions* (hypotheses) clear, appropriate, sufficient, and achievable?
- Is the *Methodology* appropriate for answering the research questions (hypotheses)?
- Is the *Reference List* relevant, current, comprehensive?
- Are there any obvious/major deficits?

Reviewers would be asked to present an \approx one page Report.

USEFUL TIP: For obvious reasons, reviewers can not later be invited to examine the thesis, therefore, it's unwise to approach individuals to review who may serve the candidate better as examiners.

(ii) Proposal Presentation

> *Time*: The whole session need not be longer than about one hour if well chaired:

- 20 mins presentation by the candidate
- 10-15 mins comments by each Reviewer
- 10-15 mins open discussion

> *PowerPoint?*: Most candidates nowadays tend to make the presentation using PowerPoint or a similar program. Slides ought to be a summary of the Proposal itself and stick to the same categories.

> *Summary Handout*: Of the people who are likely to be at the presentation, it is likely that only the Reviewers have seen the Proposal. I ask candidates to prepare a one page handout for distribution to members of the audience. The handout can be thumbnails of the PowerPoint slides.

> *Equipment and Venue*: The venue needs to be booked, relevant people advised of the event, and necessary equipment provided and tested prior to the presentation, and an independent Chair for the session appointed (therefore, normally not the supervisor). The supervisor is the key person initiating these tasks.

> *Reviewers' Role*: Reviewers would basically have two tasks:

- Speak to their \approx one page prepared Report for \approx 10-15 mins. A copy of the report is also left with the supervisor.
- Ask questions of, and respond to questions from, the candidate.

(iii) Post Presentation Modifications

The supervisor should meet with the candidate as soon as possible after the event (when what has transpired is still fresh in the mind) to:

- Assure the candidate should the session have been somewhat 'rougher' than expected. From my experience, this is not normally the case. However, there are rare occasions when what should have been a collegial exchange, wasn't. Conversely, what may in fact have been quite normal, may be perceived by the candidate as a savaging, more so by a 'fragile' candidate. It is the supervisor who provides a reality check regarding the session.
- Discuss Reviewers' comments, determine which ones require further consideration, and determine how this is best handled.
- Set a date by which the revised (final) Proposal is to be presented to you.
- Once revisions have been ratified by the supervisor, the Higher Degrees Office (or equivalent) is advised that the School is satisfied that the candidate has met the required proposal rigours and is now being recommended for full candidature.



Stage Eight (Or... All hurdles jumped, now what?)

Once the Proposal has been approved, the candidate has received Ethics clearance, and full candidature has been granted in writing, data collection may commence.

(i) Data Collection

- Advise the candidate that the timeframe for data collection needs to be carefully calibrated. Is collection manageable in the time assigned, without unnecessary breaks and delays occurring? It's important not to collect data in an ad hoc or 'when I get to it' fashion. Once momentum has been generated, unnecessary intrusions into the process make it so much more difficult to control for reliability and validity. Encourage the candidate to carefully consider what might go wrong and how proactive endeavours may circumvent potential problems.
- Ensure that the quality of any material that goes out (e.g. questionnaires, permission letters) is high. Participants ought not to have to wade through 'rubbish' which has no face validity or internal cohesion – many in fact won't bother.
- Collected data may need to be categorised prior to being analysed, i.e., ordered and organised. Collecting piles of data while not really having thought about how it will be categorised is likely to lead to managerial chaos.

Post data collection, the candidate needs to be guided through four more steps:

(i) Data Analysis

- What is being analysed is data which will answer the Research Questions (hypotheses). The candidate must never lose sight of the fact that the research is all about answering these, i.e., the goal of the analysis is to produce findings pertinent to the Research Questions.
- As the analysis techniques and instruments have already been determined (Stage Five), the supervisor now needs to ensure that these are understood, correctly applied and data appropriately analysed and interpreted (e.g. via the use of SPSS, NVivo – see annotated bibliography). It is now time for theory to be put into practice.
- The candidate also requires guidance regarding which results are and are not to be reported. For example, should statistically non-significant results be reported and if so, which ones and why? What material from protocol (text) analysis should be reported and why? How should results from specific statistical tests be reported in-text?
- Attention also needs to be given to ensuring that the presentation of Tables and Figures accords with the selected style guide.

(ii) Discussion

In terms of discussing the results, the candidate might be advised to remain cognisant of the following:

- Any discussion should confine itself to interpreting the results. Bringing into the discussion extraneous information not directly or at least potentially arising from the results should be avoided, put simply, it's irrelevant.
- Dialogue around the results should be interpretive and not merely summative. A discussion is an interaction with the results rather than a descriptive repetition of them.
- Determine the subheadings under which the discussion is to proceed. This will reduce the chance of concept and content duplication occurring.
- Subheadings and consequent discussion should proceed in a logical and incremental direction toward a goal.
- The 'goal' is to discuss findings as these relate to the Research Questions (hypotheses); the 'journey' is the skill with which this is undertaken. As such, it may be prudent to consider findings and discussion by research question (hypothesis).
- Bring into the discussion works from the Literature Review. The present research will either corroborate or disagree with these. Reasons for either position ought to be considered.

USEFUL TIP: To assist with the refining of ideas, further develop writing skills, and begin developing a research and publication profile, the candidate ought to be encouraged to present portions of the research at appropriate conferences (e.g. results of analysis) or publish in discipline-specific journals (e.g. the literature review).

(iii) Implications

- This section is all about answering the 'so what?' question as it pertains to the findings. That is, 'so what does this mean?' OR 'how are these findings best interpreted for practice?'
- The implications of the findings can either be woven into the Discussion (possibly with a summary of them all at the end of the section), OR considered under separate heading. I personally favour the former.
- Again, this section consists of dialoguing rather than merely repeating what has been previously covered.

USEFUL TIP: Around now might be a good idea for the supervisor to begin thinking about sourcing potential thesis examiners. Details regarding this task are provided in Stage Nine.

The above three sections can possibly be dealt with in one chapter, although some supervisors, on the basis of the particular study being undertaken, may prefer separate Analysis and Discussion into two chapters.

(iv) Conclusions & Recommendations

- This section is normally a final and separate chapter. It does not need to be lengthy – ten pages maximum I would suggest.
- It's here that the various components of the study are drawn together, culminated and potential future trajectories plotted.
- This chapter normally consists of four subsections:
 - > Summary: In two or three pages the intent, process, findings and implications are reiterated to give the reader a 'feel' for the totality of the journey.
 - > Conclusions: This section can be divided into conclusions which arise directly from the study (specific), OR those which warrant generalisability (general). What this section answers is the question 'how has this study better informed us about the phenomena under investigation?'
 - > Recommendations: This section looks at what could be done in terms of specifically operationalising the findings. It is usually, although not always, more practical than theoretical in orientation.
 - > Directions for future research: Basically, 'where to from here?'. What further investigations could be undertaken that could springboard from this study? What's the next logical step? The word 'logical' is important here – what's not being looked for is some sort of unrelated left-field suggestion.

(v) Abstract Construction

- The Abstract should be relatively easy to write now that the whole study has been completed. I would recommend that the length be no more than one to two pages of double-spaced type (about 300 – 500 words, written in plain English). The art lies in making the Abstract both concise as well as precise.
- Although somewhat formulaic, reference to the following structure is generally appreciated by a reader as it provides all the required information in a nutshell:
 - > What is it that is being investigated?
 - > Why is it being researched?
 - > What methodology is utilised?
 - > What were the findings?
 - > How is this study likely to be of value?
- Let's be honest, when it comes to doing a journal literature search, if a reader doesn't find the Abstract appealing and informative, it is unlikely that the eye will ever make it to the whole article. It's not much different for a thesis – it needs to capture the reader's imagination from the outset. This fact needs to be impressed upon the candidate – capture the examiner's attention right from the start!



Stage Nine (or... "I knew I could, I knew I could" [courtesy The Little Red Engine, paraphrased])

The thesis is almost ready to leave the hands of the nervous candidate (and perhaps supervisor too). Prior to that happening, though, several important matters still require attention.

(i) The Examination Process

- Universities will differ on how this is to be undertaken. From my experience, the supervisor presents four or five names to the Higher Degrees Office (or equivalent), from which three (usually) are selected as examiners. Before this happens, though, the supervisor needs to attend to several tasks.
- Selection of examiners:
 - > *Cold canvassing* is less than ideal. Searching university WebPages to see who might fit the examiner bill, for example, is fraught with danger. An 'unknown quantity' (e.g. methodologically) could yield a disastrous result.
 - > Referral is a better option. Someone who is known, albeit by someone else, is better than an experimental choice.
 - > By far the best method of selection is through engaging the *supervisor's own contacts* sourced through such mechanisms as membership of professional bodies, attendance at conferences and seminars, incidental meetings at functions. Regardless of where I find myself, I am always on the lookout for potential examiners. As opportune, I ask for a business card – you never know when the contact may come in handy!
 - > It may also be valuable to ask the candidate whether they, through their readings, attendance at conferences, etc have come across any individual who they might recommend. This needs to be handled carefully though, ensuring that any potential examiner has not been 'contaminated' by prior contact with the candidate.
 - > The final shortlist is usually determined after the following matters have been considered:
 - Ensuring that the examiner has the requisite level of expertise in the field;
 - Ensuring that there is methodological congruence between the examiner and the work to be examined;
 - Ensuring that they hold at least one qualification above the one they are being asked to examine (with a doctorate being the highest);
 - Once selected, the supervisor contacts potential examiners (normally by email) ascertaining their willingness to undertake the task and indicating when the work is likely to be ready for examination. An Abstract is attached so that the examiner has some idea of the area of investigation they are being asked to examine.
 - Once responses have been received, recommendations are made to the Higher Degrees Office, often using a standardised form, with order of examiner preference (sometimes) being provided. From here, the Higher Degrees Office normally accepts responsibility for formally contacting approved examiners.

(ii) Checking the Final Draft

- The whole document is substantially complete at this juncture. Internal coherence and structural integrity must now be tested.
- In terms of *internal coherence*, the following ought to be considered for a final time:
 - > Do the research questions (hypotheses) have central focus in the way the literature review has been structured; the conceptual and theoretical frameworks articulated; the methodology motivated; and the findings and subsequent discussion controlled?
 - > Is clarity of argument evident throughout? Are assertions defensible and conclusions justifiable? Is sequencing logical and chapter structuring coherent?
 - > Does the Abstract make it immediately obvious to the reader what the thesis is about?
 - In terms of structural integrity, the following must be clearly demonstrated:
 - > Are both in-text and end-text referencing conventions adhered to in a consistent and accurate fashion?
 - > Has the document been checked for 'typos', spelling errors and inappropriate page breaks? Have all the pages been correctly numbered and do these agree with the numbering in the Table of Contents?

> Are the thesis components presented in the correct order? This may differ slightly from institution to institution but ordinarily follows the pattern:

- Title page
- Abstract
- Acknowledgements
- Dedication
- Table of Contents
- List of Tables
- List of Figures
- List of Appendices
- List of Acronyms (perhaps)
- Chapter headings (thesis proper)
- References
- Appendices

- The thesis should now be passed through some sort of internal School process (e.g. School Research Committee) as a way of securing collegial verification that it is now ready for forwarding to the Higher Degrees Office (or equivalent).
- Doubtless, institutional examination guidelines will be forwarded to examiners. These do not tend to differ greatly between institutions. Accordingly, Appendix 7 presents a checklist of what examiners are generally asked to look for in examining a thesis. The supervisor might like to present this checklist to the candidate as a final way of ensuring that all important matters have received due attention.

(iv) Thesis Printing, Temporary Binding and Forwarding

- Once the final draft has been verified by the supervisor, the candidate normally accepts responsibility for printing the required number of documents (ordinarily, one for each examiner plus one for a reserve examiner, in case required).

USEFUL TIP: As an examiner myself, I have been encountering more and more frequently, theses that have been printed on both sides of the paper. Anathema in the past, this is now becoming common practice, perhaps in the service of saving trees. Personally, I don't favour this change as I find that it makes the work unnecessarily cumbersome to read. Consequently, as a courtesy to examiners, I insist that my candidates print on one side of the paper only.

- Final copies are then placed in temporary binding, which is normally of the plastic spiral type. Again, the candidate normally attends to this task.
- Finally, all copies are forwarded to the Higher Degrees Office for delivery to examiners. From here on, the outcome is in the lap of the gods.

(v) Monitoring Progress

Unfortunately, there are times when the gods cannot be blamed for unfortunate outcomes. I am aware of an incident in a sister university where the Higher Degrees Office found itself in the midst of a relocation. During the transition, one student's examination copies were placed in the bottom of a box and forgotten about. An enquiry by the supervisor, some six months later, led to the copies being found. The whole process had to be reinitiated to ensure that examiners were still available. The candidate was understandably distressed!

Such an experience would suggest that the prudent supervisor remains in close contact with the Higher Degrees Office throughout the examination process.



Stage Ten (Or... I thought I was done!!!)

Not quite done. Once the examination process has been completed and the reports received, these need to be acted upon. Again, processes will differ from university to university. A typical process may consist of the Higher Degrees Office convening a confirmatory meeting at which reports are discussed and recommendations made. These are then relayed to the supervisor who is responsible for ensuring that the thesis is progressed to the next stage. Whether it is the Higher Degrees Office or supervisor who contacts the candidate regarding the determination of the confirmatory meeting will be articulated in each university's policy documentation.

(i) The Good, the Bad and the Ugly

- The Good consists of the thesis being passed unconditionally. In this case, it is normally minor typographical and spelling errors that need to be attended to before the document is permanently bound.
- The Bad relates to quite a bit of work having to be undertaken, but on the basis of it being completed to the satisfaction of the supervisor, the thesis being passed. Such extra work may take many forms, for example, greater attention being given to methodology; embellishment with important reference material which has been missed; or a general polishing of the language (which may be the case if the candidate is from an ESL background).
- The Ugly takes the form of the candidate being required to either resubmit the thesis, or the thesis being failed outright with no prospect of resubmission. Such scenarios tend to be uncommon, as they should be. Serious deficits which may have led to such a situation ought to have been picked up much earlier in the process. Having said that however, it is possible that an examiner, for any number of reasons, may present as a 'hostile witness'. Where such a case is clear, the confirmatory meeting may assign greater weighting to the other reports should they be in agreement with each other but in conflict regarding the 'outlier'.
- The supervisor needs to be absolutely unambiguous about what revisions need to be completed. The candidate will likely be looking for guidance regarding precisely what needs to be done so that revisions can be undertaken in the shortest time possible. A question that seems to come up regularly is 'how broadly do I need to revise?'. It is here that the supervisor brings his/her expertise to the task.

(ii) Final Tasks

- Once all clearances are in place, the thesis is then placed in permanent binding. Higher Degree Office protocols normally indicate how this is to be undertaken, so the supervisor needs to be familiar with these. Once bound, the university library receives a copy. It is also customary for the supervisor to be presented with a copy. The number of other copies is at the discretion of the candidate.
- The supervisor would also be wise to ensure that the candidate has been informed regarding graduation procedures. Again, established protocols will make this an easy task.
- The supervisor may also wish to speak with the candidate about publishing from the completed work. This may take the form of turning the thesis into a stand-alone publication (if suitable), or taking sections of the thesis and revamping them for journal publication. In the case of a journal article, the supervisor may offer to co-author, thus potentially giving the work greater credibility and so assisting the candidate with developing a publications profile.

USEFUL TIP: As intellectual property needs to be safeguarded, authorship in all publications resulting from this body of work needs to be agreed upon as does the question of senior authorship (first listed author). This is especially important when you have more than one supervisor involved.

Any commercial gain matters should also be clarified to obviate potential controversy at a later date.

- It may also be worthwhile encouraging the candidate to share their research outcomes with others. A university or a least School-based seminar might be offered to inform colleagues. Other thesis candidates, still on the journey, might find such a session rewarding and personally encouraging.
- As the candidate's journey continues, and within the bounds of possibility, the supervisor might want to take an interest in how the graduate's career develops. Over time, there may be further possibility for collaborative work to occur.

* * *

I began this work by suggesting that the thesis writing journey ought to be a mutually satisfying experience for both candidate and supervisor. Now that we have reached the end of our journey, I hope that this has been the case. I trust that future sojourns will enable you to traverse a more familiar terrain.



Annotated Bibliography

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[Presentation of a variety of perspectives impacting upon doctoral studies. You could do a lot worse than referring your candidates to this text for general information about how to approach doctoral studies].

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Quantitative Research

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Appendix 1

Thesis Supervision Administrative Matters Checklist

Have we discussed...

A meeting schedule

- Regular
- As required

Presentation of work

- Hard copy
- Electronic copy
- 'Copy ready' format

Turn-around time for feedback

- One week
- Two weeks
- Other _____

Best way to contact each other

- Phone _____
- Email _____
- Other _____

Will either party be absent for any extended period?

- How long? _____
- When? _____

Will there be...

- Co-supervisor

- Associate supervisor

- Neither

What resources are available to the candidate?

- Room
- Photocopier
- Printer
- Software
- Admin support

What financial support (if any) is available?

- Scholarship
- University grant
- Subsidy for travel

Is there a 'dual purpose' to the research?

- Yes
- No

Timeframe

- Start point _____
- End point _____



Appendix 2

Summary Table of the Characteristics of the Main Statistical Techniques

[after Pallant, 2007, pp.116-117 – see Annotated Bibliography for details]

Purpose	Example of question	Parametric statistic	Non-parametric alternative	Independent variable	Dependent variable	Essential features
Comparing groups (cont.)	Is there a change in participants' anxiety scores from Time 1 to Time 2?	Paired samples t-test Chapter 17	Wilcoxon Signed-Rank test Chapter 16	one categorical independent variable (two levels) <i>Time 1/Time 2</i>	one continuous dependent variable <i>Anxiety scores</i>	Same people on two different occasions
	Is there a difference in optimism scores for people who are under 35 yrs, 36-49 yrs and 50+ yrs?	One-way between groups ANOVA Chapter 18	Kruskal-Wallis Chapter 16	one categorical independent variable (three or more levels) <i>Age group</i>	one continuous dependent variable <i>Optimism scores</i>	Three or more groups: different people in each group
	Is there a change in participants' anxiety scores from Time 1, Time 2 and Time 3?	One-way repeated measures ANOVA Chapter 18	Friedman Test Chapter 16	one categorical independent variable (three or more levels) <i>Time 1/Time 2/Time 3</i>	one continuous dependent variable <i>Anxiety scores</i>	Three or more groups: same people on two different occasions
	Is there a difference in the optimism scores for males and females, who are under 35 yrs, 36-49 yrs and 50+ yrs?	Two-way between groups ANOVA Chapter 19	None	two categorical independent variables (two or more levels) <i>Age group, Sex</i>	one continuous dependent variable <i>Optimism scores</i>	Two or more groups for each independent variable: different people in each group
	Which intervention (maths skills/confidence building) is more effective in reducing participants' fear of statistics, measured across three time periods?	Mixed between-within ANOVA Chapter 20	None	one between-groups independent variable, (two or more levels) one within-groups independent variable (two or more levels) <i>Type of intervention, Time</i>	one continuous dependent variable <i>Fear of Statistics test scores</i>	Two or more groups with different people in each group, each measured on two or more occasions
	Is there a difference between males and females, across three different age groups, in terms of their scores on a variety of adjustment measures (anxiety, depression and perceived stress)?	Multivariate ANOVA (MANOVA) Chapter 21	None	one or more categorical independent variables (two or more levels) <i>Age group, Sex</i>	two or more related continuous dependent variables <i>Anxiety, depression and perceived stress scores</i>	
	Is there a significant difference in the Fear of Stats test scores for participants in the maths skills group and the confidence building group, while controlling for their scores on this test at Time 1?	Analysis of covariance (ANCOVA) Chapter 22	None	one or more categorical independent variables (two or more levels) one continuous covariate variable <i>Type of intervention, Fear of Stats test scores at Time 1</i>	one continuous dependent variable <i>Fear of Stats test scores at Time 2</i>	
Exploring relationships	What is the relationship between gender and dropout rates from therapy?	None	Chi-square Chapter 16	one categorical variable <i>Sex: M/F</i>	one categorical variable <i>Dropout/complete therapy: Yes/No</i>	The number of cases in each category is considered, not scores
	Is there a relationship between age and optimism scores?	Pearson product-moment correlation coefficient (<i>r</i>) Chapter 11	Spearman's Rank Order Correlation (<i>rho</i>) Chapter 11	two continuous variables <i>Age, Optimism scores</i>		One sample with scores on two different measures, or same measure at Time 1 and Time 2
	After controlling for the effects of socially desirable responding bias, is there still a relationship between optimism and life satisfaction?	Partial correlation Chapter 12	None	two continuous variables and one continuous variable for which you wish to control <i>Optimism, life satisfaction, scores on a social desirability scale</i>		One sample with scores on two different measures, or same measure at Time 1 and Time 2
	How much of the variance in life satisfaction scores can be explained by self-esteem, perceived control and optimism? Which of these variables is the best predictor?	Multiple regression Chapter 13	None	set of two or more continuous independent variables <i>Self-esteem, perceived control, optimism</i>	one continuous dependent variable <i>Life satisfaction</i>	One sample with scores on all measures
	What is the underlying structure of the items that make up the Positive and Negative Affect Scale? How many factors are involved?	Factor analysis Chapter 15	None	set of related continuous variables <i>Items of the Positive and Negative Affect Scale</i>		One sample, multiple measures
Comparing groups	Are males more likely to drop out of therapy than females?	None	Chi-square Chapter 16	one categorical independent variable <i>Sex</i>	one categorical dependent variable <i>Drop out/complete therapy</i>	You are interested in the number of people in each category, not scores on a scale

Level of measurement	Two-sample case			k-sample case		Measures of association (Chap. 9)
	One-sample case (Chap. 4)	Related or matched samples (Chap. 5)	Independent samples (Chap. 6)	Related samples (Chap. 7)	Independent samples (Chap. 8)	
Nominal or categorical	Binomial test (4.1) Chi-square goodness-of-fit test (4.2)	McNemar change test (5.1)	Fisher exact test for 2 X 2 tables (6.1) Chi-square test for r X 2 tables (6.2)	Cochran Q test (7.1)	Chi-square test for r X k tables (8.1)	Cramer coefficient, C (9.1) Phi coefficient, r_ϕ (9.2) The kappa coefficient of agreement, K (9.8) Asymmetrical association, the lambda statistic, L_B (9.10)
Ordinal or ordered	Kolmogorov-Smirnov one-sample test, $D_{m,n}$ (4.3) One-sample runs test (4.4) Change-point test (4.5)	Sign test (5.2) Wilcoxon signed ranks test, T^+ (5.3)	Median test (6.3) Wilcoxon-Mann-Whitney test, W_x (6.4) Robust rank-order test, U (6.5) Komogorov-Smirnov two-sample test, $D_{m,n}$ (6.6) Siegel-Tukey test for scale differences (6.8)	Friedman two-way analysis of variance by ranks, F_r (7.2) Page test for ordered alternatives, L (7.3)	Extension of the median test (8.2) Kruskal-Wallis one-way analysis of variance, KW (8.3) Jonckheere test for ordered alternatives J (8.4)	Spearman rank-order correlation coefficient, r_s (9.3) Kendall rank-order correlation coefficient, T (9.4) Kendall partial rank-order correlation coefficient, $T_{xy,z}$ (9.5) Kendall coefficient of concordance, W (9.6) Kendall coefficient of agreement, u (9.7) Correlation between k judges and a criterion, T_C (9.7.4) Gamma statistic, G (9.9) Somers's index of asymmetric association, d_{BA} (9.11)
Interval		Permutation test for paired replicates (5.4)	Permutation test for two independent samples (6.7) Moses rank-like test for scale differences (6.9)			

A Summary of the Differences among Approaches to Social Research
 [after Neuman, 2006, Table 4.1, p. 105 – see Annotated Bibliography for details].

	Positivism	Interpretive Social Science	Critical Social Science	Feminist	Postmodern
1. Reason for research	To discover natural laws so people can predict and control events	To understand and describe meaningful social action	To smash myths and empower people to change society	To empower people to advance values of nurturing others and equality	To express the subjective self, to be playful, and to entertain and stimulate
2. Nature of social reality	Stable preexisting patterns or order that can be discovered	Fluid definitions of a situation created by human interaction	Multiple layers and governed by hidden, underlying structures	Gender-structured power relations that keep people oppressed	Chaotic and fluid without real patterns or master plan
3. Human nature	Self-interested and rational individuals who are shaped by external forces	Social beings who create meaning and who constantly make sense of their worlds	Creative, adaptive people with unrealized potential, trapped by illusion.	Gendered beings with unrealized potential often trapped by unseen forces	Creative, dynamic beings with unrealized potential
4. Human agency	Powerful external social pressures shape people's actions; free will is largely illusion	People have significant volition; they develop meanings and have freedom to make choices	Bounded autonomy and free choice structurally limited, but the limits can be moved	Structural limits based on gender confines choices, but new thinking and action can breach the limits	People have great volition, and all structures are illusory
5. Role of common sense	Clearly distinct from and less valid than science	Powerful everyday theories used by ordinary people	False beliefs that hide power and objective conditions	False beliefs that hide power and objective conditions	The essence of social reality that is superior to scientific or bureaucratic forms of reasoning
6. Theory looks like	A logical, deductive system of interconnected definitions, axioms, and laws	A description of how a group's meaning system is generated and sustained	A critique that reveals true conditions and helps people take action	A critique that reveals true conditions and helps people see the way to a better world	A performance or work of artistic expression that can amuse, shock, or stimulate others
7. An explanation that is true	Is logically connected to laws and based on facts	Resonates or feels right to those who are being studied	Supplies people with tools needed to change the world	Supplies ideas/tools to help liberate people from oppressive relations	No one explanation is more true; all are true for those who accept them
8. Good evidence	Is based on precise observations that others can repeat	Is embedded in the context of fluid social interactions	Is informed by a theory that penetrates the surface level	Is informed by theory that reveals gender structures	Has aesthetic properties and resonates with people's inner feelings
9. Relevance of knowledge	An instrumental orientation is used; knowledge enables people to master and control events	A practical orientation is used; knowledge helps us embrace/share empathetically others' life worlds and experiences	A dialectical orientation is used; knowledge lets people see and alter deeper structures	Knowledge raises awareness and empowers people to make change	Former knowledge has no special value; it can amuse or bring personal enjoyment.
10. Place for values	Science is value free, and values have no place except when choosing a topic	Values are an integral part of social life: no group's values are wrong, only different	All science must begin with a value position; some positions are right, some are wrong	Values are essential to research, and feminist ones are clearly preferred	Values are integral to research, but all value positions are equal

Characteristics of Common Qualitative Research Types.

[after Ary et al., 2006, p. 468 – see Annotated Bibliography for details].

Type of Qualitative Research	Key Characteristics
Case study	<ul style="list-style-type: none"> Focuses on a single unit Has multidisciplinary roots (business, law, medicine) Produces an in-depth description Is anchored in real life Provides a rich, holistic description of context, themes, issues Uses multiple data collection techniques Time spent examining the “unit” is important Can be combined with other qualitative approaches The basic question is “What are the characteristics of this particular entity, phenomenon, person, setting?”
Ethnography	<ul style="list-style-type: none"> Studies the naturally occurring behavior of a group Focuses on culture and societal behavior Has roots in anthropology Describes the beliefs, values, and attitudes of a group Participant observation is the primary data collection tool Immersion in the site is important Provides a holistic description of context and cultural themes The basic question is “What are the cultural patterns and perspectives of this group in its natural setting?”
Phenomenology	<ul style="list-style-type: none"> Is concerned with the essence of a phenomenon Interprets the meaning of the participant's experience Has roots in philosophy Includes the investigator's firsthand experiences Interview is the primary data collection tool Typically interviews multiple subjects Attempts to determine the meaning of statements Provides a rich description of invariant structures (common characteristics or essences) The basic question is “What is the experience of an activity or concept from the perspective of these particular participants?”
Grounded theory	<ul style="list-style-type: none"> Its goal is to inductively build a theory about a practice or phenomenon It is “grounded” in the real world Has its roots in sociology Is a cyclical process of building a tentative theory and testing it against the data Interviews and observation are the primary data collection tools Typically involves observations and interviews with multiple participants or settings Uses a coding process that ends in description and presentation of theory and propositions The basic question is “How is an inductively derived theory about a phenomenon grounded in the data in a particular setting?”
Basic interpretive	<ul style="list-style-type: none"> Describes and interprets a phenomenon or process Seeks to understand participants' point of view Has its roots in the social sciences Identifies recurrent patterns or themes Can be based on a variety of disciplinary lenses May use a variety of data collection techniques The basic question is “How are events, processes, and activities perceived by participants?”
Content/document analysis	<ul style="list-style-type: none"> Uses analysis of written or visual materials Describes the characteristics of the materials Has its roots in communication studies The basic question is “What meaning is reflected in these materials?”
Historical	<ul style="list-style-type: none"> Focuses on the past Written documents and artifacts are the primary data sources Has its roots in the study of history Seeks to authenticate sources and determine their consistency with other artifacts and documents The basic question is “How can historical events and reports be interpreted?”

<i>General Issue (Chapter in Text)</i>	<i>QUAL Position</i>	<i>MIXED Position</i>	<i>QUAN Position</i>
Statements of research purpose (Chapter 6)	Most (but not all) QUAL research is exploratory in nature; most QUAL research involves the statement of research questions.	MM may involve the statement of both research questions and hypotheses (both exploratory and confirmatory).	Most (but not all) QUAN research is confirmatory in nature; QUAN research may involve the statement of research hypotheses or research questions or both.
Design traditions (Chapter 7)	Ethnography; grounded theory; phenomenological research; biography; case study.	All design traditions are included in these studies including unique MM designs.	Research may be causal comparative, correlational, quasi-experimental, or experimental.
Sampling (Chapter 8)	Purposive sampling is emphasized in QUAL research; QUAL research may also involve probability sampling.	MM sampling includes both purposive and probability sampling.	Probability sampling is emphasized in QUAN research, though purposive sampling may also be involved.
Data collection strategies (Chapters 9 & 10)	QUAL may include all types but typically involves unstructured observations, open-ended interviews, focus groups, and unobtrusive measures.	All data collection strategies are included.	QUAN may include all types but typically involves structured observations, closed-ended interviews, questionnaires, and tests.
Data analysis (Chapter 11)	QUAL includes qualitative (thematic) data analysis (categorical strategies, contextualizing strategies).	MM data analyses, both thematic and statistical analyses plus data conversion techniques, are used.	Statistical analysis (descriptive, inferential) is used.
Validity or inference quality issues (Chapter 12)	Trustworthiness, credibility, transferability, dependability, and various authenticity criteria are emphasized.	All inference and validity issues are subsumed under inference quality and inference transferability.	Statistical conclusion validity, internal validity, construct validity, and external validity are emphasized.

Journal Article Reporting Standards (JARS)

Information Recommended for Inclusion in Manuscripts That Report New Data Collections Regardless of Research Design

Table 1

Journal Article Reporting Standards (JARS): Information Recommended for Inclusion in Manuscripts That Report New Data Collections Regardless of Research Design

Paper section and topic	Description
Title and title page	Identify variables and theoretical issues under investigation and the relationship between them Author note contains acknowledgment of special circumstances: Use of data also appearing in previous publications, dissertations, or conference papers Sources of funding or other support Relationships that may be perceived as conflicts of interest
Abstract	Problem under investigation Participants or subjects; specifying pertinent characteristics; in animal research, include genus and species Study method, including: Sample size Any apparatus used Outcome measures Data-gathering procedures Research design (e.g., experiment, observational study) Findings, including effect sizes and confidence intervals and/or statistical significance levels Conclusions and the implications or applications
Introduction	The importance of the problem: Theoretical or practical implications Review of relevant scholarship: Relation to previous work If other aspects of this study have been reported on previously, how the current report differs from these earlier reports Specific hypotheses and objectives: Theories or other means used to derive hypotheses Primary and secondary hypotheses, other planned analyses How hypotheses and research design relate to one another
Method	
Participant characteristics	Eligibility and exclusion criteria, including any restrictions based on demographic characteristics Major demographic characteristics as well as important topic-specific characteristics (e.g., achievement level in studies of educational interventions), or in the case of animal research, genus and species
Sampling procedures	Procedures for selecting participants, including: The sampling method if a systematic sampling plan was implemented Percentage of sample approached that participated Self-selection (either by individuals or units, such as schools or clinics) Settings and locations where data were collected Agreements and payments made to participants Institutional review board agreements, ethical standards met, safety monitoring



Table 1 (continued)

Paper section and topic	Description
Method (continued)	
Sample size, power, and precision	Intended sample size Actual sample size, if different from intended sample size How sample size was determined: Power analysis, or methods used to determine precision of parameter estimates Explanation of any interim analyses and stopping rules
Measures and covariates	Definitions of all primary and secondary measures and covariates: Include measures collected but not included in this report Methods used to collect data Methods used to enhance the quality of measurements: Training and reliability of data collectors Use of multiple observations Information on validated or ad hoc instruments created for individual studies, for example, psychometric and biometric properties
Research design	Whether conditions were manipulated or naturally observed Type of research design; provided in Table 3 are modules for: Randomized experiments (Module A1) Quasi-experiments (Module A2) Other designs would have different reporting needs associated with them
Results	
Participant flow	Total number of participants Flow of participants through each stage of the study
Recruitment	Dates defining the periods of recruitment and repeated measurements or follow-up
Statistics and data analysis	Information concerning problems with statistical assumptions and/or data distributions that could affect the validity of findings Missing data: Frequency or percentages of missing data Empirical evidence and/or theoretical arguments for the causes of data that are missing, for example, missing completely at random (MCAR), missing at random (MAR), or missing not at random (MNAR) Methods for addressing missing data, if used For each primary and secondary outcome and for each subgroup, a summary of: Cases deleted from each analysis Subgroup or cell sample sizes, cell means, standard deviations, or other estimates of precision, and other descriptive statistics Effect sizes and confidence intervals For inferential statistics (null hypothesis significance testing), information about: The a priori Type I error rate adopted Direction, magnitude, degrees of freedom, and exact <i>p</i> level, even if no significant effect is reported For multivariable analytic systems (e.g., multivariate analyses of variance, regression analyses, structural equation modeling analyses, and hierarchical linear modeling) also include the associated variance-covariance (or correlation) matrix or matrices Estimation problems (e.g., failure to converge, bad solution spaces), anomalous data points Statistical software program, if specialized procedures were used Report any other analyses performed, including adjusted analyses, indicating those that were prespecified and those that were exploratory (though not necessarily in level of detail of primary analyses)
Ancillary analyses	Discussion of implications of ancillary analyses for statistical error rates
Discussion	Statement of support or nonsupport for all original hypotheses: Distinguished by primary and secondary hypotheses Post hoc explanations Similarities and differences between results and work of others Interpretation of the results, taking into account: Sources of potential bias and other threats to internal validity Imprecision of measures The overall number of tests or overlap among tests, and Other limitations or weaknesses of the study Generalizability (external validity) of the findings, taking into account: The target population Other contextual issues Discussion of implications for future research, program, or policy

Table 2

Module A: Reporting Standards for Studies With an Experimental Manipulation or Intervention (in Addition to Material Presented in Table 1)

Paper section and topic	Description
Method	
Experimental manipulations or interventions	<p>Details of the interventions or experimental manipulations intended for each study condition, including control groups, and how and when manipulations or interventions were actually administered, specifically including:</p> <ul style="list-style-type: none"> Content of the interventions or specific experimental manipulations Summary or paraphrasing of instructions, unless they are unusual or compose the experimental manipulation, in which case they may be presented verbatim Method of intervention or manipulation delivery Description of apparatus and materials used and their function in the experiment Specialized equipment by model and supplier Deliverer: who delivered the manipulations or interventions Level of professional training Level of training in specific interventions or manipulations Number of deliverers and, in the case of interventions, the <i>M</i>, <i>SD</i>, and range of number of individuals/units treated by each Setting: where the manipulations or interventions occurred Exposure quantity and duration: how many sessions, episodes, or events were intended to be delivered, how long they were intended to last Time span: how long it took to deliver the intervention or manipulation to each unit Activities to increase compliance or adherence (e.g., incentives) Use of language other than English and the translation method
Units of delivery and analysis	<p>Unit of delivery: How participants were grouped during delivery</p> <p>Description of the smallest unit that was analyzed (and in the case of experiments, that was randomly assigned to conditions) to assess manipulation or intervention effects (e.g., individuals, work groups, classes)</p> <p>If the unit of analysis differed from the unit of delivery, description of the analytical method used to account for this (e.g., adjusting the standard error estimates by the design effect or using multilevel analysis)</p>
Results	
Participant flow	<p>Total number of groups (if intervention was administered at the group level) and the number of participants assigned to each group:</p> <ul style="list-style-type: none"> Number of participants who did not complete the experiment or crossed over to other conditions, explain why Number of participants used in primary analyses <p>Flow of participants through each stage of the study (see Figure 1)</p>
Treatment fidelity	Evidence on whether the treatment was delivered as intended
Baseline data	Baseline demographic and clinical characteristics of each group
Statistics and data analysis	Whether the analysis was by intent-to-treat, complier average causal effect, other or multiple ways
Adverse events and side effects	All important adverse events or side effects in each intervention group
Discussion	
	<p>Discussion of results taking into account the mechanism by which the manipulation or intervention was intended to work (causal pathways) or alternative mechanisms</p> <p>If an intervention is involved, discussion of the success of and barriers to implementing the intervention, fidelity of implementation</p> <p>Generalizability (external validity) of the findings, taking into account:</p> <ul style="list-style-type: none"> The characteristics of the intervention How, what outcomes were measured Length of follow-up Incentives Compliance rates <p>The “clinical or practical significance” of outcomes and the basis for these interpretations</p>



Appendix 8

What Examiners Tend to Look for.

[Considerably adapted from Brown, G., & Atkins, M. (1988). *Effective teaching in higher education*. London: Routledge.]

Review of the Literature

- Literature review is relevant to the research topic (knowledge base)
- Reported studies are interpreted and not merely described
- Reported studies are related to a developing theme
- Mastery of technical and theoretical aspects of the literature is evident
- Explicit links are made between literature review and methodology
- The thesis makes an original and substantial contribution to knowledge (specifically relevant to a doctoral thesis)
- A summary 'closes' the literature review

Research Methodology

- Precautions have been taken against likely sources of bias
- Methodological limitations have been discussed
- Data collecting mechanisms are appropriate
- Attention has been given to ethical considerations
- Appropriate analysis techniques have been utilised
- Appropriate analysis instrumentation has been selected
- Methodological preferences have been justified

Presentation of Results

- Results are presented in a clear, logical and sequential fashion
- Results presented conform to selected publication manual guidelines
- Results reported come directly from the data collected
- Research questions (hypotheses) have been answered
- The level and form of analysis is appropriate for the data
- Software used appears to work satisfactorily

Discussion and Conclusions

- Discussion is based directly on the results found
- There is reference back to the literature review as appropriate
- Cautious interpretation is preferred over dogma
- Any speculation is grounded in the results
- Reference is made back to the theory which framed the study
- Conclusions are warranted from the results/discussion
- Conclusions are reasonable and well founded

Overall Thesis Presentation

- Printing is clear and 'sensible' fonts have been selected throughout
- There are minimal spelling and typographical errors
- Sentence structure, paragraphing and subheadings are accurate
- Page breaks are appropriate
- Pagination is accurate and accords with the Table of Contents
- The presentation order of the overall thesis makes sense

Author Information

Professor Richard G. Berlach is the Associate Dean (Teaching) in the School of Education at The University of Notre Dame Australia, Fremantle Campus. He holds undergraduate qualifications in education, psychology and theology; graduate qualifications in Divinity; and a PhD in education from the University of Western Australia. He is a member of the Australian College of Educators and the International Society for Teacher Education. Apart from teaching, drowning in administrative duties, and publishing on a regular basis, he has a strong interest in and commitment to strengthening postgraduate education. On an ongoing basis, he reviews thesis proposals, supervises thesis candidates and engages in thesis examination. He also has a key role in guiding and mentoring less experienced staff in the task of thesis supervision, both within the School of Education and across the University more broadly.

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