Research and Thesis Writing

Chapter 1: Beginning research

The chapter focuses on how to select a research topic, and provides some comments on the issues of choosing a supervisor and how to work with her or him.

1.1 Selecting a research topic

The first task of a research student is probably to identify a research ***area*** and narrow it down to a research ***topic***. In some disciplines, a research topic may lead to a design of one or more research hypotheses on which the whole thesis is based. For example:

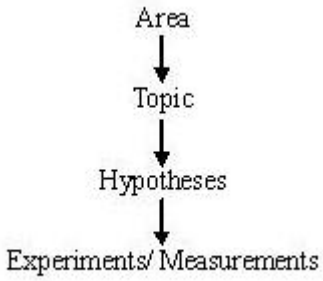
Area:	Diabetes and cardiovascular disease
Topic:	Interaction between lifestyle and genetic factors in the pathogenesis of type 2 diabetes
Hypothesis:	(1) Lack of exercise induces insulin resistance, but (2) the development of diabetes depends on genetic factors

In choosing a topic, the student has to strike a balance between grand ideas (e.g. causes of diabetes) and narrow problems of a technical nature (e.g. the statistical correlation between a particular gene polymorphism and diabetes in Hong Kong males aged from 35 to 65). Grand ideas are challenging and fun, and often attract young people to do research for their career. The best thesis topics often involve reducing a grand idea (or one important aspect of a grand idea) into a series of hypotheses. The testing of the individual hypotheses is a technical problem, which can be solved by using a battery of known techniques. This reduction from grand ideas to individual hypotheses is often much like a piece of artwork, and can only be learnt by reading recent theses and current literature, and most importantly, through advice from and discussion with the supervisor.

Referring to our example, let us focus on hypothesis, which concerns a correlation between exercise and insulin resistance. The literature tells us that insulin resistance can be related to the concentration of insulin and glucose in the blood following an overnight fast. In other words, an abstract concept (insulin resistance) has been *operationalized* to a concrete measurable quantity (concentration).

One experiment that you can now plan is to measure the concentration of insulin and glucose in the blood before and after subjecting volunteers to a four-week exercise programme.

So the overall picture is:



Very often students spend too much effort on a day-to-day basis with experiments or measurements, without enough attention being paid to the overall picture.

Related to the dichotomy between the grand and the concrete is whether the problem is ripe for an attack, and whether the research team has a competitive advantage. Has new information just become available (e.g. a government archive just unsealed)? Has a new technique been developed recently (e.g. the polymerase chain reaction for amplifying DNA signals)? Is a sample population accessible to you but not to other research teams (e.g. a large population of diabetic patients in Hong Kong)? Each of these ingredients may be available to many teams, but your research team here could be one of a few worldwide that can command the necessary combination – then it would be relatively easy to make a useful and unique contribution.

1.2 Choosing a supervisor

There are a lot of different styles of supervision. Some supervisors allow students room for exploration, while others want their students to carry out a series of small tasks, the results of which can eventually be integrated into a thesis. The situation may vary from subject to subject, and person to person. Students thus need to check periodically whether the level of detail of the supervision appears appropriate. If there is any doubt at all, it is important that the issue be openly discussed with the supervisor at an early stage – 'a stitch in time saves nine'.

In the very rare cases where there is an insurmountable difference in style and expectations, the student should think seriously about a change of supervisor. Such differences should be identified early, and there should be a frank discussion about the best way forward. Differences in style and expectations are not anyone's fault, and, in particular, there should be on the one hand no need to assign blame and on the other hand no sense of disloyalty to the original supervisor.

1.3 Working with your supervisor

A good relationship between supervisor and student is fruitful but sometimes difficult. In order to build a meaningful mentoring relationship, you may find the following tips useful.

On the part of the student, genuine initiatives and interest in the project are essential. Do not wait to be told what to do. Do not stop when the assigned tasks are completed – think ahead, speculate and explore. Some of your speculations may be wrong or impractical, and your supervisor will very likely bring you back to earth, and help you turn your vague ideas into concrete ones. Such a process is vital to your postgraduate studies. It is important to keep your supervisor adequately informed and communicate well with her or him because many problems in life are caused by poor communication.

Like every one of us, your supervisor's suggestions sometimes might not work; so do not take your supervisor's word as gospel. Be ready and willing to ask questions and pose a challenge. But do not give up easily if a suggestion does not work. In this regard it is worthwhile to bear the following points in mind.

- One of the main aims of postgraduate education, especially for research studies, is to cultivate an inquiring mind. If a student does not raise any question in the learning process, there will be a sense of possible failure.

- In undergraduate education, professors normally teach known materials. It is therefore unlikely that they would make a mistake. If you feel that there is something wrong, it is quite likely that you have misunderstood something. In the research process, your professor and you both probe for the unknown; therefore false starts or mistakes are

only to be expected. If something seems wrong, it may indeed be wrong.

- Many supervisors feel that the greatest joy of supervision is the involvement in intellectual debates with their students. Very often, the debates can help supervisors sharpen ideas and crystallize logical thinking. In this sense, your challenge is not disrespectful but is much appreciated.

On the part of the supervisor, there has to be a conscious decision to place the education of the student ahead of the progress of the research project. The two are often synergistic – if the research project is going well, the student working on the project learns. Yet there are sometimes tensions.

- Many research projects nowadays use 'black boxes' developed by others – theories, questionnaires, computer programs, instruments, even data. These 'black boxes' can be used without having to understand what happens inside. For rapid research progress – and publications – it seems not to matter if students do not understand these 'black boxes' well, and simply crank the handle to produce the results. But for the student's intellectual growth it would be better to sacrifice some of the research output, and devote time to understanding these tools, occasionally even re-inventing some of these wheels.

- Another source of tension comes from the wish to retain students – to keep a student who has done an undergraduate project in the same group to do an MPhil, or to keep an MPhil graduate to do a PhD. This is most efficient for the project, but not always best for the student's intellectual development.

Any professor who cannot resolve these difficulties should be hiring a research assistant rather than supervising a postgraduate student.

Successful supervisors are not bashful about putting forward their tentative ideas – in the knowledge that some (if not many) will be shown to be wrong in front of the student. Students learn more from seeing scholarship at work than from seeing the polished final product.

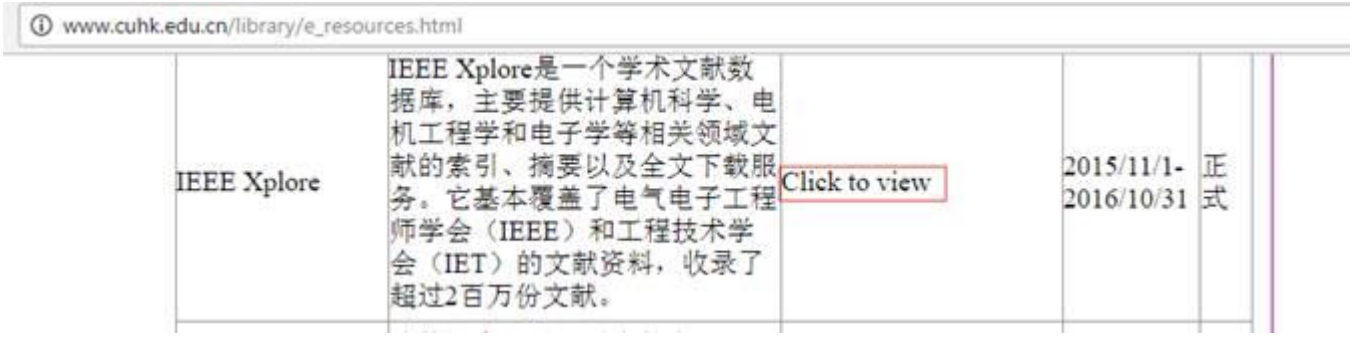
For the student and the supervisor, it is important to be clear and explicit about mutual expectations: what is expected of the student, how independent the student should be, how much help the supervisor is supposed to give, how often the student should consult, what the milestones are month by month (even week by week).

Chapter 2: Effective use of information

- A quality research project requires an effective use of information. The following sections introduce a strategic approach for searching for information in the Library and from the Internet, and suggest ways of citing your sources. Here is a list of **major reference tools** that library can provide:

e-Resources Type	Title	Description
encyclopedias	Oxford Reference Online	Oxford Reference is the home of Oxford University Press's quality reference publishing, bringing together 2 million entries, many of which are illustrated, across two trusted collections: Oxford Quick Reference and Oxford Reference Library. http://www.oxfordreference.com/page/about
	Gale	Gale Virtual Reference Library is a database of encyclopedias and specialized reference sources for multidisciplinary research. http://find.galegroup.com/menu/commonmenu.do?userGroupName=cncuhksz
	Encyclopedia Britannica	thousands of maps, flags, articles and statistics in this interactive World Atlas http://academic.eb.com/levels/collegiate
dictionaries	Oxford English Dictionary	Using the OED for research and in the classroom: http://public.oed.com/resources/for-students-and-teachers/
handbooks	Blackwell Online Reference	The home of quality reference resources for students and scholars, featuring Wiley-Blackwell's acclaimed companions, handbooks, dictionaries and guides from across the social sciences and humanities http://www.blackwellreference.com/subscriber/uid=5790/
biographies statistical sources	Britannica ACADEIC	http://academic.eb.com/levels/collegiate/browse/biography#page=1
audio-visual materials	Gale	http://go.galegroup.com/ps/start.do?p=GVRL&u=cncuhksz
	Britannica ACADEIC	http://academic.eb.com/levels/collegiate/search/videos?query=year%20book&includeLevelThree=1&page=1

- The library has bought several data bases for scientific and technical research to explore journals, books and articles. Such as *ScienceDirect, Web of Science, ACM, IEEE Xplore, Springerlink…*These data bases are also listed in http://www.cuhk.edu.cn/library/e_resources.html. Users can access to these resources by pressing "Click to view".



- Journals contained in the databases listed in http://www.cuhk.edu.cn/library/e_resources.html are all available for researchers.

2.1 Identifying background information

Research students can start with subject-specific reference tools such as encyclopaedias, dictionaries, handbooks, yearbooks, biographies and statistical sources. They can provide you with a broad overview, covering basic facts, statistical data and bibliographies on your research topic. You can also identify alternative items, such as synonyms or terms with a broader or narrower meaning that are related to the key concept of your topic. Such a list can be prepared for searching online at a later stage.

The Library subscribes to a number of electronic reference tools. These collections include: *Encyclopaedias/ Dictionaries, Statistical Data, and Biographies,* that can be found *under Databases [Subject]* of the Library Homepage

The following reference tools are very valuable and should be given special attention: *Blackwell Reference Online, Gale Virtual Reference Library, Oxford Reference Online Premium, Routledge Reference Resources Online, Monthly Bulletin Statistics (UN), International Financial Statistics (IMF), Global Development Finance (World Bank)* and *Source OECD.*

Some important reference tools are available only in print. You may be able to find them by using a keyword search from the Library online catalogue through subject-specific tools, such as human rights or encyclopaedias.

2.2 Locating library materials using the library catalogue

The online catalogue of CUHK(SZ) Library (http://www.old.cuhk.edu.cn/library/default.html) holds books, journals, conference proceedings, reports, theses, government documents, electronic resources, audio-visual materials, microforms, and many other resources, that come from different Libraries at CUHK(SZ). It links to a network of e-resources, such as e-journals, e-books and indexes, which are subscribed to by the Libraries. You may conduct a Keyword search. This is to look for words anywhere in the fields of author, title, subject, table of contents and notes. Putting a quotation mark (‘ ’) before and after the terms you want to search for will help you search for the multiple words as an exact phrase. For example, a keyword search for ‘School of Science and Engineering’ will locate master theses and PhD dissertations of the CUHK(SZ).

2.3 Searching for journal and newspaper articles

You can use indexes to find journal and newspaper articles on your topic. To identify an appropriate index for your topic, you may search on the Library Homepage (http://www.old.cuhk.edu.cn/library/default.html) for a list of databases (mainly indexes) under different subject categories. A search in the index database results in citation information from the articles, including the author, article title, source title (mostly journals), publication date, volume/issue numbers and page numbers. Some index databases provide a PDF or HTML full text that links with the results list, or links to the

e-journals subscribed to by the Library, or directly links to the Library catalogue that holds the journal (including the printed journal). If none of the above is available, search the Library catalogue with the journal name to check whether the Library has subscribed to the journal issue, either in print or digital format.

Search Tips:

AND	All search terms must be present in each retrieved record. Connect different concepts, e.g. civil service reform AND Hong Kong
OR	Only one of the terms is required to be present in each retrieved record. Group synonyms together, e.g. civil service OR public service
NOT	Retrieve record containing one search term but NOT another, e.g. China NOT Hong Kong
*	One of the most common truncation symbols (different databases use different symbols, e.g. +, #, ?, $). Placed at the end of a root word to retrieve various word endings; e.g. comput* retrieves computer, computers, computing etc.

2.4 Finding information on the Internet

The Internet is a vast global source of information that contains self-published materials by laypersons and refereed publications by prominent professional bodies.

Search engines, such as *Google* (http://www.google.com), *Google Scholar* (http://scholar.google.com), *Baidu*(http://www.baidu.com) and *Scirus (for scientific information only)* (http://www.scirus.com), can help you search the full text, images, various media and file formats on the Web. Web directories such as *Intute*(http://www.intute.ac.uk), *INFOMINE* (http://infomine.ucr.edu), and *BUBL* (http://bubl.ac.uk) provide evaluated groups of subject-specific websites or subject specialists that are selected by the directory staff.

Search tips for Google:

- By default, Google combines all search terms with AND.
- Put quotation marks around your search terms (‘ ’) to search for multiple words as an exact phrase.
- To find pages that include either of two search terms, add an uppercase OR between the terms, e.g. ethics OR morality
- Place the tilde sign ‘~’ immediately in front of your search term to search for its synonyms as well, e.g. ~food ~facts searches for food facts, nutrition and cooking information.
- Restrict the search only within one specific website by entering the search terms and the syntax ‘site:’ followed by the domain name, e.g. admission site:www.cuhk.edu.hk
- Use the ‘Advanced Search’ for more precise searching.

2.5 Evaluating information sources

To avoid using outdated, inaccurate or biased information, evaluate the sources by using the following criteria:

- Authority – if the author/editor/publisher is an expert on an issue
- Currency – if the information covers the time span you require
- Intended Audience – if the depth of the work is appropriate to your needs
- Coverage – if the work is comprehensive enough for your needs
- Objectivity – if the work is free of biased viewpoints and covers every aspect of the topic
- Accuracy – if the information presented is flawless
- Reviews – if other reputable scholars agree or argue with the viewpoints presented in the work

Free information on the Web is diverse and scattered but without quality control. Therefore, it should be evaluated critically. You may also make reference to the organization types of the domain names which indicate the authors' affiliations or the nature of the publishers:

.gov – government
.org – non-profit organization
.edu/.ac – educational
.net – network related
.com – commercial

In a number of Web search engines, you can limit your search to certain organization types, such as the 'Search within a site or domain' function in Google Advanced Search, or domain search at Google with 'site:' e.g. eating disorders site:org

2.6 Citing information sources

The ethics of research requires you to cite the information sources you use in your academic work. There are many citation style manuals available in the Library, e.g.:

- *American Medical Association manual of style* (UL/UL Reference/MD Reference WZ345.A533 1998)
- *The Chicago manual of style* (UL Reference/CC Reference/MD Reference Z253.C57 2003)
- *A manual for writers of term papers, theses, and dissertations*(UL Reference/ARL Reference/CC Reference/MD Reference/NA Reference LB2369.T8 1996)
- *MLA handbook for writers of research papers* (UL Reference LB2369.G53 2003)
- *Publication manual of the American Psychological Association*(UL /UL Reference /ARL /CC General Education /NA General Education BF76.7.p83 2001)

Many websites provide guidelines for citing the sources, e.g.:

- *Honesty in academic work: Citation styles* http://www.cuhk.edu.hk/policy/academichonesty/p03_4.htm
- *The OWL at Purdue* http://owl.english.purdue.edu/owl/
- *APA style guide to electronic references* http://www.apastyle.org/previoustips.html.

Consult your instructor for which citation style to use for your thesis.

Bibliographic software can be used to manage citations and create bibliographies in different formats. The Library provides access to *RefWorks*, a web-based bibliographic management tool for all current CUHK students. *RefWorks* allows you to:

- Create a personal database online – Store an unlimited number of records accessible from any computer linked to the Internet.
- Import references automatically from multiple databases – Search results from a wide variety of databases can be automatically exported into *RefWorks* with the click of a button.
- Organize and manage references – Sort and file references quickly and easily using folders, duplicate search, and author, keyword, and periodical indexes.
- Format bibliographies and manuscripts in seconds – Save hours of typing time and decrease the number of errors made when creating bibliographies in a particular output format (e.g. APA, MLA, Chicago). Easily make changes to your paper and reformat in seconds.
- Share references – Using the Internet, easily collaborate with other students or your instructors.

To access *RefWorks*, you need to create an individual account at http://www.lib.cuhk.edu.hk/refworks, with a personal Login Name and Password.

To create in-text citations and bibliography in your paper, you should also download *Write-N-Cite of RefWorks* at http://www.refworks.com/Refworks/WNCDownload.asp

See http://www.refworks.com/content/quick_start_guide.asp for the *Quick Start Guide of RefWorks and Write-N-Cite.*

Chapter 3: Structuring a thesis

This chapter focuses on the main components of structuring academic dissertations or theses. The basic elements of an academic thesis and their key functions are outlined.

3.1 Your thesis

Your **thesis** is the document which sets out your theory or claim with all the supporting arguments and evidence. It represents all the effort you have put into your study, such that in common English, the word invariably means the document you produce to gain your higher degree.

Like most writing, the thesis has a readily identifiable genre or style which sets it apart from other works. This is a familiar concept, even if the term ‘genre’ may be new to you. Just think how, even with a single glance, you can identify a piece of writing as a newspaper article, novel or report. The best way to identify and absorb the thesis genre is to get hold of several theses and read them. If possible, choose different subject areas to see the presentation of both qualitative and quantitative data and how the same genre can usually be identified in both types of work.

The primary purpose of your thesis is to meet the requirements of your supervisor and other examiners. If you want to write in an innovative way, you can do that after you have completed your thesis, for a different audience and in a different setting. After all, the research and the findings will still be the same.

3.2 The outline of a thesis

When you start to look at examples, do not be tempted to skip pages and go straight to the findings, conclusions or what interests you! You should be reading for content information on another occasion. When you survey the outline, you should focus on the presentation rather than the substance, so that you learn the art of writing and teach yourself the organization and structure of the thesis.

Read everything, including names and dates. Interpret each chapter title, comparing it with its neighbour. Try to see why the headings are in the sequence shown. Ask yourself if you would use the same order. The following gives the more usual sections, but you should refer to the *Guide to Thesis Formatting* (Chapter 6) and, of course, consult your supervisor.

3.3 Abstract or summary

The abstract, sometimes referred to as a summary, appears at the beginning of the thesis. The abstract is usually very brief, usually less than a page, and is intended to whet the appetite of a prospective reader. The abstract should answer the reader’s question, ‘Is it worth my while to read this thesis/ report?’

‘Abstract’ means to pull out, and ‘summarize’ means to reduce to the main points, so clearly this section cannot be written until your actual research is completed. However, it is a good idea to write a draft abstract at an early stage in your studies, based on your anticipated results. There are good reasons for this: you can produce something without pressure, knowing you will revise it later; you will have something to look back on when you do come to write the abstract; it will focus your mind on your project; and it will be on your agenda from the start, and therefore not overlooked.

A good way to write an abstract is to try to answer the following three questions, each in one sentence.

- What is the question/ problem?
- Why is it important/ interesting?
- What is the main result?

3.4 Writing research questions and a hypothesis

This element is intrinsically linked with the next two, **Background** and **Theoretical rationale**. The central research question or hypothesis deserves the most careful consideration since it will probably influence most of your decisions over the next few years. The general topic of study is no problem – you know what interests you and what you are skilled at – but formulating a precise and more importantly an attainable goal in the form of one or more hypotheses or questions is difficult. Once you formulate the hypothesis or question you have already defined the direction of your journey.

It is essential that you search the literature carefully to find out what others have done: not just books or journals, but conference papers and online data as well, to ensure you are not duplicating someone else's work. Whilst a significant contribution need not be earth-shattering, it should be different and novel. Close cooperation with your supervisor will be crucial here. If, as is often the case in sciences, the topic is suggested by your supervisor, it may seem very narrow when you study the literature. The reason may be that you have not been told about the context, and your work is actually a part of a large whole. In that case, you should, with your supervisor's help, try to understand the bigger picture. In this case, it can be expanded or refocused before taking it back (with supporting justification) to your supervisor for comment, and eventually approval.

We can consider several different types of thesis research.

First, there can be **exploratory research**. The field is defined; the general questions are known. However, the specific questions are still open and there is not yet an existing theory (right or wrong). Hence even the concepts may be vague. One is not yet able to measure *Y* as a function of *X*, or conduct a large-scale quantitative survey. Often it is a case of playing around with the phenomena, doing small-scale qualitative surveys – and of course reading widely.

For a more mature subject matter, one could be **testing** an existing theory. This kind of research is often the most straightforward. Typically the theory is known (though it may or may not be correct); hence the concepts are clearly defined. It is often a case of measuring *Y* as a function of *X* (of course controlling other variables), or doing a quantitative survey and subjecting the data to statistical analysis. Known and standard methods and instruments are just applied to a new problem or new situation.

Finally, one could try to **solve a practical problem**: provide a better treatment for a disease, predict the weather, recommend a better strategy for teaching language. This is typical in more applied fields of research, and often very satisfying – we all have a burning desire to change the world for the better. But this type of research is more risky, since there is no guarantee that you will actually solve the problem.

If we look at research more broadly, not just within the confines of a thesis, then very often all three stages are involved.

Sometimes a thesis will include more than one stage as well. Thus one could

- perform exploratory research leading to a theory or hypothesis;
- perform measurements to test the hypothesis; and
- with the hypothesis confirmed, solve a practical problem with this new knowledge.

3.5 Background and significance of the research question

If you feel intimidated by the idea of claiming any significance for your proposed research question, you are just like the vast majority of students embarking on higher study. At least you know what first interested you or prompted you to think about your particular question; that is why it is significant to you, and that is already a good starting point.

It is worth sounding a note of caution here about your choice of project. However worthwhile a project, it must fit into the limitations of postgraduate studies. For example, a study of the effects of teaching on career choice and development may require longitudinal research over a dozen or more years, too long even for a PhD. Such a topic may not be **workable** for your thesis. A study into the effects of Japanese whaling may be impossible because of restricted access to data. Such a topic is not **supportable** because you cannot get the data needed to back up your hypothesis. A study on the love between parents and children may be too general and too vague to allow a development of testable hypotheses. Such a topic would then run the danger of not being **analytical**.

To make it easy to remember, it should be a **SAW** (**S**upportable, **A**nalytical, **W**orkable research questions) to help you cut through all the obstacles.

In your past work or study, was there some point you feel was not justified? Perhaps the evidence was weak? Was there an apparent paradox? When you were studying findings in one area, were you prompted to think of another unrelated area? These, or similar questions, should point the way to questions asked by previous research in the area of your question and a brief description of this will provide the essence of background.

With regard to significance, you should demonstrate that your study is worth doing. It should have the potential to add new knowledge in your field. You have investigated and found conflicting results in other studies. You have established a new method to collect data to shed light on a controversial issue. In short, you show explicitly why the proposed research is valuable.

3.6 Theoretical rationale

How does the theoretical rationale differ from the background and significance? The theoretical rationale allows you to postulate your question exclusively in terms of known theories. This should have been discussed with your adviser or supervisor at an early stage, and should in any case be clear to you since it probably first pointed you to the study. Very often, research papers in the literature cite areas which ‘could be suitable for further research’, or suggest possible ‘applications of this model in other environments’. This is the type of information which you can draw on for your theoretical rationale.

The process of committing the theoretical rationale to paper is often valuable. The process forces you to make decisions

about any grey areas, which could be glossed over when just thinking. One method of presentation is to use a model (tabular or graphic representation); while we recommend it, this is not obligatory, nor indeed always possible. As with many other aspects of your thesis, this aspect is likely to evolve because of ongoing work by others. You should fix a date at which this applied, and refer to the effect of any changes on your work, in other sections.

As usual, it is essential that you keep adequate records of your work in writing this question, as they will probably be of great assistance in writing your literature review.

3.7 Literature review

Literature review has two major and quite different functions: it is valuable as a source of knowledge, and it demonstrates to others that you have an expert knowledge of the field, an essential element in qualifying as a PhD. The second is in practice the more important, but the first dictates that you will be gathering data that can usefully contribute to the second throughout your study. It is therefore a good idea to start writing this section early, and add to it as you go. This reduces the amount of writing you have to do later when you edit it with the benefit of all your recently acquired knowledge.

The biggest danger when studying is a *failure to keep adequate records*. At this stage of your study, you will probably be all too familiar with the frustration of knowing some piece of evidence or law you have seen, but not being able to locate it. It is essential to keep full, accurate records of the source of any data. You should also record the date, time, place and even details of the person who facilitated your access to the material. In the case of broadcast material, including that from the Internet, it is also a good idea to keep a copy yourself (subject to the restrictions of copyright laws) rather than relying on being able to access it again in the future.

A further consideration is the need for adequate referencing to avoid the charge of plagiarism. If you reproduce someone else's work, you must acknowledge it, and if you cannot remember the source, you might have to spend days trying to locate the reference. Having to search twice is inefficient. For your acknowledgements, it is easiest to follow a clearly laid-out convention such as the APA style, or whatever is appropriate for your field.

3.8 Methodology and results

Methodology will be guided by your research topic. In describing the methods you have used, you will need to cite research methodology literature and describe similar studies. The style of presenting research results vary. Across disciplines, the main rules are that the results should be:

1. Easily read (especially by an examiner!) – This may mean having summaries in the main thesis or full results in appendices. Consult your supervisor for the style preferred in your discipline area.

2. Complete and accurate – this means great attention to detail about
    - sampling methods,
    - dates, terms, places,
    - units, quantities, etc.

3.9 Discussion/ Conclusion

The major pitfall to beware of is insufficient time! This is probably the part of a thesis which will be read most frequently (apart from the abstract) and since it is the result of all your efforts, it requires your very best endeavours.

If, as suggested, you have written the abstract at the beginning of your study, now is the time to glance back at it. It could well pinpoint areas where your study did not produce the intended results and these may be worth discussing. In any case, your discussion should aim to examine possible tensions between parts of your study. Try to think, with your supervisor, what you could argue against, and give competing justifications. Do not be tempted to discuss anything not connected with the research you have done – this work is the discussion and conclusions of *your* research!

Your conclusions should follow logically from your discussion, and both sections should be short yet comprehensive. Your writing style should provide clear links back to relevant issues in the discussion/research.

3.10 Project writing

Good housekeeping, keeping adequate records to ensure traceability and review, is the essence of all good research, and this is what you will be converting into the central body of your thesis. Your target is cogency and coherence and to achieve this you must have a story line, a logical thread, which runs from the beginning to the end linking together the methods, results, dead ends, backtracking and final successful destination. Particularly on a long project there is the danger of drifting off the topic; so check constantly the relevance of what you produce.

At the outset, you should try to set up categories for your work, even if you have to revise or add to them later. Possible categories could be *Introduction, Review of literature, Procedure, Findings, Conclusions and Implications.* This will help you organize your writing. Another important skill for achieving cohesion is to make sure you link your writing backwards and forwards, with prose where possible, rather than page references. This gives much improved readability.

Probably the most important rule is: do not leave everything to the last minute! In the past, when theses had to be handed over to a typist, this just was not an option. Your typist provided the discipline. Now, with the advent of the computer, there is the temptation to leave the writing up to the last minute. *DON'T!* However, the computer allows you to keep your work in a neat properly typed-up form. If you are disciplined, the final writing of your thesis could be a much less arduous editing exercise.

Now that we have presented an overview of the structure of a thesis, we will proceed to discuss the actual writing process of each section of a thesis. We will cross-reference some parts of Chapter 4 to relevant sections of Chapter 3.

Chapter 4: Writing a thesis

This chapter focuses on the practical issues of writing an academic thesis and outlines the essential skills needed in the learning process. In addition, the key concepts in writing an academic thesis and the relevant approaches, such as signposting and persuasive writing, are introduced.

4.1 Defining the research question

The research question is normally informed by research findings, and by theories and models advanced by professionals in the field. It is often defined by discussions with your supervisor(s) and co-researchers. The literature review is an essential element in presenting the historical background, rationale and significance of study; it also helps to narrow the scope and refine the research questions. Your research questions should define the scope and depth of the work to be done. They form the backbone of your thesis and all chapters should be linked to the research questions in one way or another. A research question should be **supportable**: that is, you can get data/ materials/ evidence to answer the research question within the extent of your study. It should be **analytical**: that is, you can investigate and break it into sub-questions and narrow down the topic as shown in the example below. It should also be **workable**: that is, the question has to be specific and manageable.

In brief, a well-defined research question should:

- serve as the central organizing principle of your thesis: it determines the substance/ materials used, how the approach or methodology being undertaken is employed, and the possible scope of your scientific inquiry;
- serve as a good starting point for addressing some contemporary issues, such as responding to current debates and discussions; and
- be answerable, honest, flexible, analytical and supportable.

The following is a checklist for evaluating your research question:

- Does it tell you the central concern of the research focus?
- Does it tell you the approach/ method of the experiment/ scientific inquiry?
- Is it going to fill any gap in the field of research?
- Is it realistic and doable?

4.2 Setting up a research question or hypothesis

Hypotheses can be written in a variety of ways. The following is a typical example of presenting a hypothesis.

> *It is predicted that a traditional Chinese diet is related to improved survival or better health outcomes as measured by the Mediterranean score on dietary habits. In addition, the Mediterranean score of dietary habits of the Chinese populations in four geographic regions throughout the world may differ due to the effect of age, gender, urbanization, acculturation, and indirectly, the effect of public health education in different countries* (Woo et al., 2001).

It can be seen that the use of the terms ‘predicted’ and ‘may differ’ creates a climate of exploration. It is worth noting that

a well-grounded hypothesis will normally have the following characteristics:

- It is informed by theories and models advanced by professionals in the field.
- It is a rigorous exercise in prophecy: a prediction about what you will find after you have conducted your experiment based on existing theory, evidence, and logic.
- It is prompted by genuine problems identified in your research inquiry.

In order to formulate a well-grounded hypothesis, you should do the following:

- Read widely about your research area and identify relevant theories and/or models which will inform or support your hypothesis.
- Ask yourself what you expect your experiment to reveal.
- Ask yourself why you expect a certain phenomenon or outcome.
- Ask how your hypothesis will directly answer the question posed by the problem.

The following table is an example showing the relationship between research problems and hypotheses. It can be seen from the table that the research problems link well with the statements of the hypotheses.

Research problem	Hypothesis
Is there a relationship between the traditional Chinese diet and improved survival or better health outcomes?	The traditional Chinese diet may be related to ...
Does the Mediterranean score of dietary habits of the Chinese populations in four geographic regions throughout the world differ due to the effect of age, gender, urbanization and acculturation?	The Mediterranean score of dietary habits of the Chinese populations in four geographic regions may differ ...
What is the impact of public health education on the Mediterranean score of dietary habits of the Chinese populations in four geographic regions throughout the world?	The absence or presence of public health education may indirectly affect the Mediterranean score of dietary habits ...

Adopted from: Woo et al. (2001)

After setting up research questions and hypotheses, you should place them in either the *General Introduction* section or *Chapter 1* or *Introduction* of your thesis. This is because one of the basic functions of an introductory chapter is to provide background information. Thus, you are supposed to (1) introduce the readers to your project by providing relevant information (e.g. how former research findings have paved the way for your own project); and (2) *state explicitly* what exactly you want to investigate, i.e. your research focus/ questions/ hypotheses.

4.3 Writing an introductory paragraph and an introduction

In each chapter you should start with an **introductory paragraph** telling readers explicitly what you intend to do. That paragraph in turn should start with a **topic sentence**. The following is an example.

> *To provide the background and theoretical framework upon which this experimental study is based, four bodies of literature are reviewed. First, the two major psychological/ psycholinguistic paradigms are briefly described to show the position of Krashen's Input Hypothesis within the paradigms. Second, the status of his theory on second language acquisition research is considered. Third, …*

Having told readers what you intend to say in this brief introduction, you can then go on to give a fuller description of the topic by providing supporting evidence.

An **Introduction** establishes the background and purpose of the study, and helps readers to understand how your research fits into the field of study. In other words, you try to develop a frame of reference. You should provide the background or the context, refer to some crucial studies related to your research question, but leave the quotations and full referencing to the literature review chapter. You should also briefly stress the significance of your study. The following is an example from a thesis produced in 1991. Note that you have to tell your readers what you plan to say at the start, as in the second paragraph below.

> *English language teaching in Hong Kong schools is becoming more and more difficult since the introduction of nine-year compulsory education in 1978. … It is against the background of poor and deteriorating attainment in English proficiency among secondary graduates that the present study on second language acquisition was undertaken.*

> *This chapter, as an introduction, describes the background for the study and shows how the use of extensive reading is linked with Krashen's Input Hypothesis, the theory under examination in this study.*

4.4 Signposting

In your thesis, you must have a **position** you want to argue for. You support your argument by designing experiments to collect data, by conducting surveys to get first-hand information or by relating to previous research papers. Whatever means you have chosen, you have to support your position convincingly and systematically. One way of doing this is to have one main idea expressed in a topic sentence in one paragraph and to link sentences together using **signpost** words. The following text is quoted from an inaugural lecture about wireless communication in the 21st century. It illustrates cohesion very well.

> *Although one can paint a glowing and exciting picture of wireless communication in the 21st century, the path to this vision is full of technical challenges. I will name a few here. As more and more commercial wireless systems are deployed, the ultimate bottleneck for mobile communication, the radio spectrum, or at least the easily usable part of it, will become increasingly critical. … A second challenge is mobility management. … A third challenge is power efficiency. A fourth challenge is multi-rate multiple access. … These are some of the challenges faced by wireless researchers today. …* (Wong, 1998)

As you can see, the writer prepares readers for the technical challenges he is going to describe by using the sentence *I will name a few here*. Then he talks about the first challenge – the spectrum bottleneck. He then explains why there is such a bottleneck. In the following paragraphs, the writer reminds the readers that he is talking about challenges by **signpost sentences**:

- A second challenge is mobility management.
- A third challenge is power efficiency.
- A fourth challenge is multi-rate multiple access.

After he has finished with the challenges and wants to move on to some specific research topics, he uses a bridging/ transitional device as shown. Read the sentences before and after the **transitional sentences** to grasp the technique.

You should also use transitional sentences to link your ideas together to make your thesis a cogent whole.

- These are some of the challenges faced by wireless researchers today. Much work needs to be done to overcome these challenges. In the following discussion, a number of specific research topics will be highlighted to illustrate some concrete problems and their solution approaches.

4.5 Writing a conclusion

The Conclusion will be the final chapter of your thesis. It should summarize all the pertinent findings in relation to the research question you set at the beginning. You should base your conclusions on data analyzed, and include points brought up and discussed in the earlier chapters.

Your most important task in the concluding chapter is to link it up with the purpose of your study by showing how the findings support (or refute) the hypotheses. You should not put in anything new in this part. Suggestions or inferences should be put earlier. The following is the last paragraph of the Conclusion chapter of the same thesis. You can see that it answers the research question and reiterates the main focus of the study.

> *Conclusion*
>
> *In short, this study has provided only partial support for Krashen's Input Hypothesis. At the same time, it has also provided evidence which supports specific criticism of Krashen's theory. Findings of this study point to future research which would help to strengthen second language acquisition theory. Findings also point to a number of ways in which extensive reading needs to be modified in the Hong Kong context if its effectiveness as a component in a language teaching programme is to be maximized.*

Note also that the conclusion echoes the introduction.

In brief, the functions of an introduction are to:

- introduce the background and significance of your research inquiry;
- state your aims or research questions which are situated within the theoretical background previously discussed; and
- explain briefly how you have approached the research questions experimentally in order to prepare your readers for your Results chapter.

Reminders:

(1) Even though the General Introduction section/ chapter appears at the beginning of your thesis, it is often the last chapter you finish writing. This is mainly because you will need to highlight some key information obtained from the Results section/ chapter to build up the significance and credibility of your study.

(2) The general approach to writing the Introduction is to start with related broad issues in the field (through literature review), and then move on to *your own research focus*. This allows your readers to know the *why* (significance), the *how* (approach) and the *what* (research focus) of your study.

The functions of a conclusion are to:

- give a brief and concise summary of the whole research project and state how it manages to address the original aims posed in the Introduction;
- make clear claims about what you have discovered through your scientific inquiry and to make sure these claims are supported by your data and discussion;
- highlight any new insights your research work may bring about, especially on established knowledge and theories;
- address limitations and possible approaches for improving your work; and
- direct attention to any interesting future research areas that arise from your work.

Reminders:
Be sure to end on a positive note. This is to highlight the contribution your research findings have made to the field of inquiry.

4.6 Drafting an abstract/ summary

This is usually done *after* you have finished writing the first draft of the whole thesis, because you will then know exactly what you have achieved, proved, or argued for.

As mentioned, paragraphs should have topic sentences. Research shows these to be predominantly (but not exclusively) the first sentence in each paragraph. A useful exercise is therefore to collect all these topic sentences together and organize them by subject area and importance. This gives you an overview of the entire thesis, and the starting point for distilling the main points into an abstract. As an abstract is brief, many of these points will have to be discarded, and only the most important points retained in your abstract. What you are left with should then be organized to produce a cogent reason for the reader to read your work. A popular way to present this argument is to show:

- what motivated your research or investigation: e.g. other research you have seen, or personal observations made;
- your methodology and high-level analysis of your data; and
- the results and implications of your research.

Thus, an abstract is a precise and concise account (1–2 pages) of your whole thesis that covers the following areas:

- Research questions or research aims (WHY)
- Theoretical framework/experimental system adopted for your research work (WHAT & HOW)
- The results and conclusion (WHAT)

An abstract/summary can be presented differently in different disciplines. While some disciplines use *categories*, such as Background (Objective + Subjects), Methods, Results, and Conclusions, others prefer a descriptive and narrative style. This prose form is commonly found in the fields of science and applied sciences.

Reminders:

- You must check that your abstract includes the purpose, methods, findings and conclusions, and that it is concise, specific and self-contained. No matter which format you adopt, make sure it is the one commonly used and expected by your discipline. In addition, you must cover the 3 Cs in your content,

i.e. Cause (why), Course (what and how) and Consequence (what).

- Although the Abstract is presented at the beginning of the thesis, it should only be written *after* the experiments are conducted and results analyzed with sufficient background knowledge in the field of research. Try to note the key information as you approach the above-mentioned areas. Then organize and present your Abstract in a coherent manner based on these notes. Be positive, direct and concise.

4.7 Persuasive writing

In non-technical writing (e.g. in the Literature Review and Discussion sections/ chapters), a paragraph consists mainly of a *topic sentence* and its *elaboration*. The former announces the topic/subject matter under discussion, while the latter further supports the main idea with detailed descriptions, explanations, examples or illustrations.

Elaboration operates at two levels: paragraph and discourse. A skilful use of topic sentences will achieve different purposes, e.g. for *persuasion* or as an *advanced organizer*.

Situation 1: Persuasion

When putting forward an argument or a position (persuasive writing), you should make an **explicit claim** in the form of a **topic sentence**. Then substantiate it by presenting concrete support or proofs in order of importance. If possible, anticipate objections to your claim and reject them. Finally, restate your claim using slightly different wording. The structure of a coherent paragraph for persuasion looks like this:

Topic sentence + Elaboration	·state the claim ·list positive support in order of importance ·reject anticipated objections ·restate the claim

For example:

The most publicly justifiable application of human cloning, if there is one at all, is to provide self-compatible cells or tissues for medical use, especially transplantation. Some have argued that this raises no new ethical issues above those raised by any form of embryo experimentation. I argue that this research is less morally problematic than other embryo research. Indeed, it is not merely morally permissible but morally required that we employ cloning to produce embryos or fetuses for the sake of providing cells, tissues or even organs for therapy, followed by abortion of the embryo or fetus.
Source: Savulescu (1999)

4.8 Organizational pointers

When the complexity of a document requires many subsections, a topic sentence should be used to organize these

lower levels of information, as in this example:

> There are five categories of processing operations: input, arithmetic, logical, output and storage. Input operations place data in computer memory. Arithmetic operations include addition, subtraction, multiplication, and division. Logical operations compare data sorted in computer memory. Output operations transfer data to a screen or printout. Storage operations save data in electronic storage.
> Source: Woolston et al. (1990)

This paragraph is in fact a *summary paragraph* which *functions as a topic sentence* by forecasting the content and organization of subsequent paragraphs. In the preceding example, listing the five categories of operations, could serve as an introductory paragraph to five more paragraphs, each dealing with one type of operation in detail.

4.9 Referencing

In your thesis, especially in the Literature Review chapter, you will refer to previous work conducted in your field. Make sure you acknowledge others' work properly. You should make reference to their work in the text by using phrases such as:

As Pearson (1997) and others have noted, …
… used the speech act theory of Austin (1975) and Searle (1969) to argue that …
A study by Lai (1996) of students' attitudes towards the learning of English indicated that …
The work of Holland (1985) and Super (1990) made it very clear that …

You should also summarize the main points relevant to the discussion. If you want to quote some material, make sure you indicate that clearly by indenting that short paragraph and by including the page number of the original text in the book or journal.

At the end of your thesis, you must provide details of the author, date, title of book or paper, place of publication, publisher; or volume and page number in the case of a journal. The Harvard Style of Citation is commonly used.

Why should you reference?

- To acknowledge prior work done by other researchers
- To acknowledge established knowledge shared in the public domain
- To acknowledge information obtained through various channels
- To allow your readers to consult the original sources for extra information
- To strengthen your own viewpoints or arguments by enlisting support from reliable sources
- To avoid plagiarism (i.e. copying without permission or acknowledgment)

How many references should you present?

- There is no fixed number of references, but the collection should be reflective of a sufficient coverage of background knowledge assumed by your study.
- Apart from classics, you must cite up-to-date references to show that you are keeping up with current development in your own field.
- Consult your supervisor for the adequacy of your reference list.

How should you present the references?

- There are two basic components of a documentation system: in-text citation and reference list. The former requires you to cite the source immediately after the quoted information is used; while the latter requires you to list all the references together. Both are expected in documenting sources.
- There are several documentation systems for presenting academic references (e.g. Number system, Author-date system and the Alphabet-number system). The key is consistency. Use the same convention throughout your thesis and do not mix things up in your presentation.
- Even within the same convention of academic referencing, there are different ways to present different types of materials, such as books, journal articles, theses/dissertations, conference proceedings.
- Consult your supervisor for the kind of referencing convention acceptable to your department. Past theses are ideal sources for reference.

Chapter 5: Proofreading

This chapter deals with proofreading skills and introduces how to check for inconsistency at micro and macro levels. In this chapter, the awareness elements and main methods of proofreading are highlighted.

5.1 Proofreading skills

Proofreading is one of the most arduous and highly skilled aspects of producing written work. If you can possibly get help from your peers, do! If you are working in a language that is not your mother tongue, getting help is all the more important.

Whether or not you proofread at the macro or micro level first is not important, since you will need to proofread more than once. However, the bibliography should be the last thing you do, just to be certain that you are up to date at the time of examination.

You will be working to the style guide given by the Graduate School. If you are working on a computer (which is most likely), make sure you take advantage of all the facilities and that the required spelling conventions, type face, formatting and all the other stipulations are chosen as default settings. Add all special terminologies, including biographical names, to your custom dictionary as you find them.

Always make a backup disk after you finish your work each day. That way, it does not matter if your computer is stolen or all your files are destroyed by a virus.

5.2 Checking for inconsistency at micro level

As the author, you will no doubt understand the content and the ideas you want to convey, however bad the structure. So as reorganisation invariably necessitates some sentence reconstruction, it is a good idea to adopt a top-down approach to your ‘micro’ proofreading by reading through the whole document and noting any paragraphs which need moving or restructuring. If you view words, phrases, clauses, sentences and paragraphs as collections of ideas, each being a logical grouping of the next smallest group, it becomes easier to group them. Watch out for danger words at the beginning of a paragraph, such as conjunctions (moreover; however; on the other hand) which often indicate adjacent paragraphs are a logical grouping and could be combined in one paragraph.

When you are reasonably happy with the paragraph structure, turn your attention to the sentence and grammar structure. Be warned that grammar checkers do not indicate errors; they only suggest a construction is unusual. When prompted by your grammar checker, the first thing you should check is punctuation (e.g. missing comma or apostrophe) and then word class (e.g. beautiful adj. instead of beautify v.). If you cannot find an error, leave it or get help; it may well be correct. Spelling checkers are easier to use, but also do not find all errors. If you write, ‘stampede self addressed envelope’, the spell checker will not find the incorrectly spelt ‘stamped’.

Short sentences are easier to write than long sentences, and very sound advice is to ‘do the easy thing and do it well’. Avoid large numbers of embedded clauses – make more short sentences. Make English sentences, not English words strung together in a Chinese sentence structure. Check the common auxiliaries – be, have, do – for tense, person and number agreement – the simple errors. Check articles ‘a’, ‘an’ and ‘the’ (if they are indicating singular notions), and be careful of vowels.

Finally, words! There will be some technical or specialist vocabulary that you need to use, for technical reasons. However, a very good rule is ‘never use a difficult or unusual word when a simple and well understood word will do’.

5.3 Checking for inconsistency at macro level

The first thing you should do is to check the contents to see if there are any errors of sequence, or omission.

Coherence in writing is achieved largely through ties (links) which connect ideas across the entire document. Cohesion can be destroyed by missing links, or links which appear to point to the wrong place. Consider, for example, a work on the advantages of soil types. If a claim for increased crop yields was claimed for a certain soil type (say alkaline), a reference to high yields from a district where the soil had been described as acid, would appear to be an error. Of course it might not be an error, but might be due to missing information, or information which the reader had not been specifically directed to in the text. A similar undesirable state of affairs can arise because of careless or inadequate captions for tables and charts.

Another way to check coherence can be done by checking through topic sentences. Highlight all topic sentences in the thesis and read to see if they hang together logically. While you are reading, think back to the research question set to see if you have actually written so as to answer that question.

To check for cohesion, read the complete document and highlight all references forward or backward, and what appear to be opinions and unsupported claims. Then go through the document again and find a link for each one, crossing them off when you find one. Any that you cannot find need to be checked carefully. By the time you have completed this exercise, you should be thoroughly familiar with your thesis. Most people are surprised to find they are not really familiar with the work they have written until they have actively read it as suggested here.

5.4 Updating a bibliography

This section provides perhaps the clearest example of the benefit of disciplined records keeping during your study. If you have full and accurate records of documents you have referred to during your study, including what you found, and when, the task of updating your bibliography is greatly simplified.

The bibliography (as opposed to the reference list) is a list of all the works which provided guidance or information useful to your project, but which you have not specifically referred to. This is therefore something which grows out of your work over an extended period. Since you are likely to have amassed considerable data during your research, this task is normally one of pruning out those works which proved of little value. One criterion is to ask whether reading a work in your bibliography would enhance a reader’s understanding of your work.

Chapter 6: Guide to thesis formatting

The objective of this *Guide to Thesis Formatting* is to provide quick and general reference for postgraduate students of The Chinese University of Hong Kong in preparing their theses. The actual format, style and abbreviations should be decided by the Graduate Division in accordance with normal practice adopted by journals or other publications commonly used in the field.

6.1 Order of contents

A thesis should contain the following parts in the order shown:

i) Title page

A title page should contain the following information:

- the thesis title
- the name of the student, to be identical with that shown on the HKID card or passport
- the degree for which the thesis is submitted
- the name of the programme
- the name of the University
- the month and year of submission

(Sample title pages are given in Figures 1 and 2 below)

ii) Abstract

A short abstract, in both Chinese and English, should be included in each copy of a thesis submitted.

For Master's theses, the length of the abstract should be 200-500 words.

For doctoral theses, the abstract shall not exceed 800 characters in Chinese or 500 words in English. The abstracts of doctoral theses will be microfilmed by ProQuest Information and Learning Company and its editors will shorten any abstract which exceeds 350 words.

The heading of the abstract should be as follows:

Abstract of thesis entitled:

_____

_____

Submitted by: _____

For the degree of _____

at The Chinese University of Hong Kong, Shenzhen (month and year)

iii) Acknowledgements (if any)

iv) Table of contents, paginated

Where applicable, a list of tables, figures, symbols or abbreviations may be included.

v) Text

vi) Appendices, if any

vii) Bibliography

6.2 Format

i) Paper size

The thesis, whether in Chinese or in English, should be typewritten on international A4 size paper (210 mm x 297 mm). Either traditional Chinese or simplified Chinese is acceptable.

ii) Margins

The margin at the binding edge should be at least 4 cm, and the margin at the outer edge, 2.5cm.

iii) Spacing

Double or one-and-a-half line spacing should be used, except for quotations, footnotes, references and captions, which may be single-spaced.

iv) Pagination

All pages, except the title page, should be numbered.

Small Roman numerals (i, ii, iii, ...) are used for the preliminaries (e.g. abstract, acknowledgements, table of contents).

Arabic numbers (1, 2, 3, ...) are used for the text, appendices and bibliography.

v) Loose material

For easy identification all loose material which cannot be bound in the text (such as slides and tapes) should be marked with the student's name and degree for which the work is submitted.

6.3 Sample title page

Figure 1: Sample title page in English

(Title of Thesis)

(Name of candidate)

A Thesis Submitted in Partial Fulfillment

of the Requirements for the Degree of

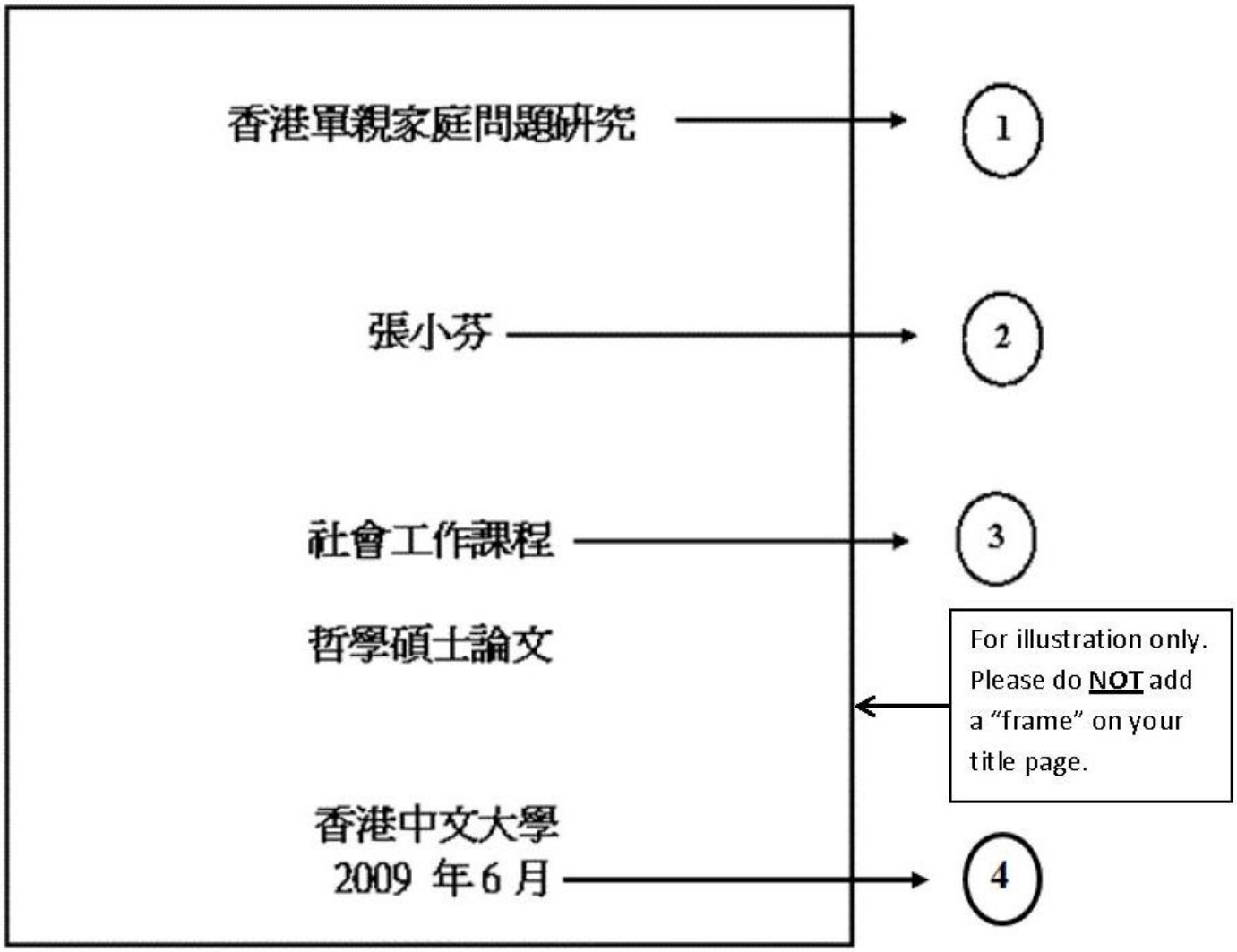
Doctor of Philosophy

in

Computer and Information Engineering

(Month Year)

Figure 2: Sample title page in Chinese



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Appendix: A checklist for the final manuscript

The final manuscript should be a complete, cohesive, logically sequenced and persuasive document. The following list provides a quick check of presentation techniques to help the writer avoid any oversight.

- The introductory chapter states the origin, purpose and scope of the study, and the plan of development of the paper, as appropriate.
- The concluding chapter is consistent with the claims of the introductory chapter. The overall conclusion is justified with identification and interpretation of the findings.
- Content chapters develop the subject in an appropriate logical order.
- All necessary materials are included to eliminate any gaps in content, and all unnecessary materials are excluded to avoid digressions from the central theme.
- All parts and pages are in the correct order.
- Headings and subheadings are clear, properly worded and grammatically parallel.
- Single subdivision is not used (e.g. Section 1, Section 1.1 without Section 1.2), the reason being that a whole cannot be logically subdivided into only one part.
- Paragraphs are well organized and of reasonable length.
- Significant ideas are highlighted and supporting details are put in secondary positions.
- Supplementary materials, related to the subject but too detailed or bulky for the text, appear in the appendix section. Specific reference in the text is made to the appropriate appendix materials.
- Visual aids are simple and clear - that is, free of clutter.
- A title and number are assigned to each visual aid. The caption should aim to be self-contained, so that the visual aid can be understood without reference to the text.
- Visual aids appear in the text as close as possible following their first mention. The text refers to each visual aid by number and discusses the significant features.
- The manuscript satisfies format requirements for order of contents, paper size, margins, and so on.
- The manuscript is free of mechanical flaws, such as spelling and typing errors, which will detract from the research content.