

MASTERS PROGRAM HANDBOOK

FOR GRADUATE STUDENTS

Science Education Department
College of Natural Sciences & Mathematics
California State University, Long Beach

JANUARY 2007

WELCOME!

We tried as hard as we could to make this handbook useful, complete, and accurate. However, there's always the possibility that we missed something or made a mistake. For that reason, you should understand that this is not an *official* university document. For documentation that is complete, up to date, and error free, consult the University Catalog and these web sites:

University Catalog (online): www.csulb.edu/divisions/aa/catalog

Graduate Studies: www.csulb.edu/divisions/aa/projects/grad

Graduate Handbook: www.csulb.edu/divisions/aa/projects/grad/handbook

Enrollment Services: www.csulb.edu/depts/enrollment

Thesis Office: www.csulb.edu/library/guide/serv/thesis.html

ACKNOWLEDGEMENTS

First and foremost, the Science Education Department would like to thank Linda Warner Mank for having the patience and perseverance to compile this Handbook. It was a challenge to synthesize all the “pieces” related to doing a Masters thesis that were scattered across the university and various colleges and departments. This Handbook represents much more than just one unit of Independent Study credit and it is more than just a synthesis. Linda added her own personal touch to what would otherwise be a very dry administrative document. Students who are currently in the Masters program, but also our future students, will appreciate the style and organization of this Handbook. Also, thank you’s go to the Science Education faculty who proof read this document at various stages of its completion and who added their insights and expertise to its pages. This Handbook was a team effort. We are confident that it will make our Masters students’ roller coaster ride seem a little less frightening.

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CHAPTER 1

INTRODUCTION

If you are just beginning or are in the middle of your Masters of Science Education, this handbook is for you! If you have ‘advanced to candidacy’, this handbook is also for you! If you are thinking and dreaming about your thesis, this handbook is for you! It is a road map containing explanations, suggestions, and handy tips for all the stops along the road to graduation. Before you know it, you will be wearing your cap and gown, getting ‘hooded’ by your thesis advisor, and receiving your Masters degree (well, sort of, you actually don’t get the real diploma until later, and you have to come back and pick it up at Brotman Hall).

The length of the road will likely be determined by you. Careful planning and attention to detail will shorten the road and help keep it relatively smooth. However, be prepared for potholes, roadblocks, detours, and hijackers, as they will inevitably appear, and probably at the most inopportune time. Being aware from the very beginning of the twists and turns along the road of your thesis journey will help to keep you from encountering surprises around every turn and, hopefully, eliminate the need for backtracking. Every Master candidate’s road is different—*Map Quest* won’t help you. This handbook will give you directions to all the places you need to visit along the road. But this is just a general guideline, and your *particular* road will be mapped out between you and your thesis advisor. The earlier you do this, the better. And remember what they say about the best laid plans so be flexible (advice number 1 in all the best travel books). Your map will change. Sometimes it will be your idea to make the change and sometimes it won’t.

Plan thoroughly!

Be flexible!

Keep your destination always in sight!

Bon Voyage and enjoy the process!

In addition to this handbook, you will also need the UNIVERSITY STYLE AND FORMAT GUIDELINES FOR MASTER'S THESIS AND PROJECT REPORTS and the university's GRADUATE STUDIES Handbook for Students. You should also attend a Thesis Workshop, provided for your enjoyment by the Thesis Office, located in the Library. At the workshop you'll learn about formatting, filing deadlines, and other useful information. Consider attending one of these workshops when you begin the SCED 697 units. Dates for workshop can be found at: www.csulb.edu/library/guide/serv/thesis.html

The UNIVERSITY STYLE AND FORMAT GUIDELINES FOR MASTER'S THESIS AND PROJECT REPORTS is available at the bookstore for \$9.00 (Feb. '03 version, 2005 price) but it is also available online. We recommend the hard copy. It is formatted exactly like a thesis is supposed to be formatted and, therefore, it is easier to refer to while working. It also tells you interesting things like you can't use contractions in your thesis, unless they're in a quote. (Check it out...there are two contractions in that last sentence alone!) There are rules about ellipses, tables and figures. It may seem weird to read about this now, when you haven't got a clue what your thesis will be, but better to know at the beginning of the journey than upon arrival at the final destination, only to find out you have to turn around and retrace your steps. Get this book and read it early. For a free online copy go to: <http://www.csulb.edu/projects/grad>.

You will also need to know about the American Psychological Association's (APA) referencing style. Everything you write for the Science Education Department will need to be in APA style. Get (access to) the latest version. Right now, that's the Fifth Edition. It's \$29.55 new at the CSULB bookstore (Fall, '06 price) or we have several copies in the graduate office, MIC-101, along with other excellent reference books and journals.

All packed and ready to depart? Off you go!

PROGRAM OF STUDY

The faculty and staff of the Science Education department are proud to offer the Master of Science in Science Education program. Science Education is a unique discipline, with its own history, research methods, and areas of expertise. Science Ed. is also interdisciplinary, bridging the natural sciences and the social sciences (via study of science teaching and learning in schools and other educational settings). The Science Education M.S. reflects this diversity, featuring course work in Education, Science, and Science Education.

The M. S. program includes three options: Elementary Education, Secondary Education, and Informal Education. The Elementary Option is aimed at credential holders working in K-8 classrooms. The Secondary Option is aimed at credential holders working in 6-12 classrooms. The option in Informal Science Education is aimed at educators currently working in non-classroom settings such as museums, zoos, and nature centers, as well as those charged with fostering the public understanding of science.

The programs of study for the three options are similar in design. Research and a thesis/project are required for all three options.

Elementary and Secondary Options

Pre-requisites

GPA of 3.0 for last 60 units completed and a CA Multiple Subject Credential. Single Subject Science Teaching Credential or other credential deemed equivalent by the Graduate Studies Committee.

CORE (9 units)

- SCED 550 Current Issues & Research in Science Education
 - SCED 551 Science Teaching, Learning & Curriculum Models
 - SCED 552 Nature of Science
-

SCIENCE (9 units for Elementary Option)

- SCED 500 Life Science Applications for K-8 teachers
 - SCED 501 Earth Science Applications for K-8 teachers
 - SCED 502 Physical Science Applications for K-8 teachers
- (These are content classes with emphasis on connections to classroom inquiry and standards)*

(9 units for Secondary Option)

Graduate science course work in a discipline chosen in consultation with Advisor.

EDUCATIONAL RESEARCH (6 units)

Choose two of the following in consultation with Advisor:

- EDP 519 Quantitative Educational Data Analysis I (pre-req. EDP 419 & EDP 420 or equivalent)
- EDP 595 Qualitative Research Methods
- EDP 596 Program Evaluation in Education (pre-req. EDP 400 & EDP 520 or equivalent)
- EDP 420 Tests, Measurements, and Evaluations (pre-req. EDP 419)
- EDP 520 Research Methods in Education (pre-req. EDP 400 or equivalent)
- ETEC 523 Computer Technology in Education, Level II (pre-req. ETEC 444 or equivalent experience)
- ETEC 553 Instructional Design (pre-req. ETEC 523 or equivalent)
- ETEC 623 Developing Technology-Based Learning (pre-req. ETEC 523 and ETEC 553)

**We recommend that you take EDP 520, followed by either EDP 519 or EDP 595.*

Check to see that these course requirements are up-to-date at URL:

www.scienceteaching.org and then click on Master's Info.

- SCED 697 Directed Research (3 units)
-

- SCED 698 Thesis/Project (3 units)
-

Total Units: 30

Informal Learning Option

Pre-requisites

ONE YEAR OR MORE experience working in an informal learning setting or equivalent experience (letter required).

GPA of 3.0 or better for last 60 units completed.

CORE (12 units)

SCED 550 Current Issues & Research in Science Education

SCED 551 Science Teaching, Learning & Curriculum Models

SCED 552 Nature of Science

SCED 553 Learning Science in Informal Settings (*NEW COURSE—
See Course Description for more Information*)

SCIENCE (6 units)

Two of the following (selected with advisement from your Advisor):

SCED 500 Life Science Applications for K-8 teachers

SCED 501 Earth Science Applications for K-8 teachers

SCED 502 Physical Science Applications for K-8 teachers

(These are content classes, with emphasis on connections to classroom inquiry and standards)

Or Other **graduate level** science classes, with consent.

RESEARCH (3 units)

Choose one of the following:

REC 696 Research Methods in Recreation/Leisure Studies
(pre-req, REC 441, Evaluation and Research)

EDP 520 Research Methods in Education
(pre-req, EDP 400, Introduction to Educational Measurement & Statistics)

MUSEUM/NON-PROFIT MANAGEMENT (3 units)

Choose one of the following:

REC 528 Non-Profit and Volunteer Management

REC 521 Recreation Administration

Or other equivalent course, with approval of advisor.

ELECTIVE (3 units)

An additional 3 units, under consultation of the advisor, are required. **Courses related to research methodology or program evaluation are strongly recommended.** Alternative courses may include educational technology or educational psychology or anthropology.

Possible courses include:

EDP 595 Qualitative Research Methods

EDP 596 Program Evaluation in Education

SCED 697 Directed Research (3 units)

SCED 698 Thesis/Project (3 units)

Total Units: 33

CHAPTER 2

COURSE ROTATION MATRICES

It is important for you to give some time to thinking about your whole Masters plan of study at the beginning of your degree process. You need to get a feel for the “big picture” – layout a rough course schedule and research timeline for yourself. This will help both you and your advisor plan for your needs. To aid you in this task, the Science Education Department has planned the Masters Program courses for future semesters. The SCED 500, 501 and 502 series of courses are on a three semester rotational basis. SCED 550 is taught each fall semester and SCED 551, and 552 rotate between Spring semester and a Summer session yearly. The table below offers you a snapshot of the course schedules for the next couple of years:

YEAR	Fall	Spring	Summer (following the academic year)
2006/2007, 2008/2009	SCED 550	SCED 552	SCED 551
2007/2008, 2009/2010	SCED 550	SCED 551	SCED 552

*SCED 553 will be offered on a rotating basis.

Elementary Option Science Courses:

YEAR	Fall	Spring	Summer (following the academic year)
			<i>No summer sections of 500 series will be offered.</i>
2005/2006, 2008/2009	SCED 501	SCED 502	
2007/2008, 2010/2011	SCED 502	SCED 500	

NOTE 1: SCED550 will be taught every Fall semester.

NOTE 2: Remember there are education courses that are also mandatory for the program.

NOTE 3: Plan your Masters Program with the Graduate Advisor to best meet your needs.

We suggest you build “My Program of Study Checklist” (Chapter 3) with all your classes included and then think about adding other program elements (research, professional presentations, etc.). We advise all students to get to know the faculty through conversations, meetings and by collaborating with them on research projects. There is no better way to learn how to do research than by jumping in and “getting your feet wet” and joining a faculty member in their research endeavors. Sometimes there are even opportunities to earn money while you learn. You will find an advisor that best meets your needs through early networking.

Along with courses, you need to schedule SCED 697 and 698 units (more details are provided in Chapter 4 of this Handbook) into your “My Program of Study Checklist”. We suggest you take these 1 unit at a time as you work with your advisor on things such as a) guided reading for your literature review, b) participating in a faculty member’s research study or conducting a pilot study of your own, c) planning your research methodology, d) writing your thesis proposal, e) collecting and analyzing your data, or f) writing your actual thesis. As you work on these tasks you will need faculty support and assistance. If you parse out the SCED 697/698 units one or two units per semester, then you will have active faculty support throughout your research and thesis construction process.

At the end of your first year, you and your advisor should review the “My Program of Study Checklist” and fill out the form for Advancement to Candidacy (page 13). Be sure to keep a copy for yourself so you can move through the program in a timely fashion.

CHAPTER 3
MY PROGRAM OF STUDY CHECKLIST

Courses Taken	Semester Completed
SCED 550	
SCED 551	
SCED 552	
SCED 500/Science 1	
SCED 501/Science 2	
SCED 502/Science 3	
College of Education 1	
College of Education 2	
Research-Informal Option	
SCED 697	
SCED 698	

Thesis Activities	Date & Semester Completed
Take and pass Writing Proficiency Exam (WPE)	
Advance to Candidacy (by completing a form)	
Put Together Thesis Committee of Three Faculty	
Write Thesis Proposal (~20 double-spaced pages)	
IRB Application and Approval	
Thesis Proposal Meeting with Committee Members	
File to Graduate-this is done the semester <i>before</i> you intend to graduate. See catalog or link for deadlines: www.csulb.edu/depts/enrollment/graduation/masters_degree.html	
Copyright Approvals, if applicable	
Oral Defense and Public Presentation of Thesis	
Order your cap and gown, and then participate in graduation ceremonies	
Return keys & library books so degree will be finalized	

Department Activities (Optional but strongly encouraged)	Date & Semester Completed
Work with <i>Head Start on Science</i> or <i>Summer Science Camp</i>	
Research with a Faculty Member	
Attend a Science Department Social Event	
Present a workshop for EDEL 475 preservice elementary teachers	
Attend Long Beach Science Educators Network dinner	
Other	

(con't.)

Presentation

(One required to complete MS program)

Date & Semester Completed

Orange County Science Educators Association (OCSEA)	
Greater Los Angeles Teachers of Science Association (GLATSA)	
California Science Teachers Association (CSTA)	
National Science Teachers Association (NSTA)	
Other	

Above & Beyond!

Semester Completed

Submit a grant for funding	
Get a grant funded!	
Practitioner article published	
Scholarly/research article published	
Public relations article published	
Awards and Honors	
Other	

California State University, Long Beach
 College of Natural Sciences and Mathematics
 Science Education Department

Advancement to Candidacy Form

Student Name	ID #	Signature	Date
Email	()		
Address		City/Zip	

Graduate Program for the Master of Science in Science Education:

Option in _____

	Dept.	No.	Title	When Taken	Grade	Units
<i>Core Science Education Courses</i>	SCED	550	<i>Current Issues & Research in Science Education</i>			3
	SCED	551	<i>Science Teaching, Learning & Curriculum Models</i>			3
	SCED	552	<i>Nature of Science</i>			3
<i>Graduate Science Courses (Secondary Option)</i>						
<i>Research Methodology Courses</i>						
<i>Research Project</i>	SCED	697				
<i>Thesis units</i>	SCED	698	<i>Thesis</i>			
Total Units:						

(con't.)

Deficiencies: _____

WPE Passed: _____ Professional Presentation: _____
Date Title, Location and Date (to be completed before graduating.)

Proposed Thesis Title: _____

Approvals*

Thesis Committee:

Thesis Chair: _____ Date: _____

Thesis Advisor: _____ Date: _____

Graduate Advisor: _____ Date: _____

Department Chair: _____ Date: _____

Associate Dean (CNSM): _____ Date: _____

** Any modification to this program requires the approval of the student's Thesis Chair, the Department Chair, and the Associate Dean, CNSM*

CHAPTER 4

RESEARCH and THESIS UNITS: SCED 697/ 698

As part of your degree program, you will be required to take six units involving directed research and the preparation of your thesis: SCED 697 (Directed Research) and SCED 698 (Thesis). These six units are to be used not only for the development and implementation of your thesis research or project, but for building the skills and knowledge that will support your project.

There is some flexibility in how these 6 units can be used and this breakdown should be mutually agreed upon by both student and advisor. Although each of these courses represents three units, it is not recommended that you take all three units at the same time. That is, you will be required to take a total of 3 units of each, but those three units should be spread out over several semesters if you can (*e.g.*, one or two units per semester).

While SCED 698 is a culminating class to be taken only after the thesis proposal is approved, SCED 697 units can be taken at any time throughout the program of study. Of those 3 units, two should be used for development of the proposal (including the literature review). The remaining unit should be used to participate in research or a related project within the Science Education department. In this way, you will be able to better familiarize yourself with the methods and research within the field. We encourage you to consider completing some of the SCED 697 units early in the program, concurrent with other coursework, as those experiences may help direct your decisions regarding the thesis. You will need departmental and Advisor consent to enroll SCED 697/698. This involves completing the “Independent Study Form—SCED 697/698” (page 16).

You must be enrolled in the university during the entire time that you’re working on your MS degree, including the semester your thesis is submitted. But be careful. The submission dates are always early in the semester. For example, the submission dates for Spring 2006 were February 21 to March 21 but the semester did not end until mid-May. Your thesis has to be completely finished early in the semester to be submitted that semester. If your thesis isn’t going to be completed during the first part of SCED 698, then you’ll need to enroll in GS 700 (through University Extension Programs) the following semester in order to submit your thesis. (GS 700 is a university designation for students who have completed course work and are still working on their thesis. The course fee is minimal.) Therefore, most of the thesis should be finished before the semester has even started!

Independent Study Form (for SCED 697/698)

Department of Science Education
California State University Long Beach

Student _____ Campus ID _____

Address _____ Phone # _____

Address con't. _____

City State Zip

Email 1 _____

Email 2 _____

Course Prefix and Number _____ Section _____ Course Call # _____

Number of Units: _____ Semester: **Fall** **Spring** **Summer** Year: _____
(Circle One Semester)

Each student enrolled in a supervised independent study, research, or reading course must have an agreement on file in the department office where the course is offered. The agreement is to be made between the student and the instructor prior to the course and must include the following: a) brief description of the work to be accomplished, b) the nature of the final product outcome, and c) the basis for determining the final grade. The agreement must be signed by the instructor, student and the student's advisor. After obtaining signatures, please return this form to the administrative assistant in the Department Office (F05-118). Upon return of this sheet to the office, the student will be "permitted" into the course.

Description of the work to be accomplished, product outcome and basis for grading:

Instructor's Signature date Student's Signature date

Thesis Advisor's Signature date Advisor's Last Name (Printed) phone-ext

Date form was submitted to Department Coordinator ____/____/____

CHAPTER 5

FINDING A THESIS CHAIR AND FORMING A COMMITTEE

SCIENCE EDUCATION DEPARTMENT THESIS LINGO

Graduate Programs Advisor: The Graduate Programs Advisor oversees the overall Masters program for the department. Dr. Allan Colburn is presently your Graduate Advisor. It is not necessary for the Graduate Advisor to sit on your “thesis committee”, but he may if he is a good fit with your research/project. The Graduate Program Advisor’s signature is sometimes required. Check with the Graduate Program Advisor if you have a department-related question to which you can’t find the answer or you find conflicting thesis information.

Department Chair: The Department Chair chairs the Science Education Department. Dr. Laura Henriques is presently the Chair. It is not necessary for the Department Chair to sit on your thesis committee, but she may if she is a good fit with your research/project. The Department Chair’s signature is required at the very end of the thesis submission process.

Thesis Committee Chair: The Thesis Committee Chair is the lead person on your committee. He or she must be a tenured or tenure-track Science Education professor at Cal State Long Beach, University. The Thesis Committee Chair may be, but is not required, to be your Thesis Advisor.

Thesis Advisor (in some publications referred to as Thesis Director): Normally, the Thesis Committee Chair also serves as your Thesis Advisor, but not always. The Thesis Advisor must be a person qualified in the specific area of your thesis, but need *not* be a tenured or tenure-track faculty member. Your Thesis Advisor will be the key person you work with during the thesis development, research, and writing process. This person will have more influence than anyone else in deciding what you must do for your thesis, and deciding when the work is satisfactorily completed.

CHOOSING YOUR THESIS ADVISOR AND COMMITTEE

The Thesis Advisor you choose must, of course, agree to work with you. The Advisor receives relatively little workload credit for working multiple semesters with an advisee. Faculty you approach may already be working with several students. Don’t take it personally if your first choice for a Thesis Advisor is unable to work with you. Choose Committee members with whom you have, or feel you can develop, a good rapport. Ideally you will choose Committee members who have areas of expertise which will support your project—either methodological expertise or content/context specific expertise. You will be in very regular contact with your Thesis Advisor, and fairly regular contact with your other

Committee members. It will make the meeting-scheduling process much easier if your Committee members are accessible and available. All of the Committee members must be able to attend the thesis proposal and oral defense. Communication is key throughout the thesis process, so be sure to open strong channels of communication with your Committee members early on in the process.

The Thesis Committee is responsible for the guidance of the student throughout the thesis effort. The Thesis Committee members advise and direct students in their thesis work and ensure that the thesis meets the standards and definition of a thesis specified by the University. The Thesis Committee members determine the letter grade to be awarded for the completion of the thesis. The Committee may establish timetables to be followed to ensure completion of the thesis in a reasonable time. The Committee will arrange for the oral (and public) defense of your thesis.

The Committee itself is made up of at least three people, including at least two faculty members from the Science Education Department. At least two members must be full-time faculty members at CSULB, *one* of whom must be tenured or tenure-track. Your Thesis Advisor will be one of the three Committee members and s/he will work with you in selecting the rest of your Committee. The third Committee member will frequently also be a member of the Science Education Department, but may also be a faculty member from another CSULB department (*e.g.*, Teacher Education) or anyone else permitted by University regulations to serve on a Thesis Committee.

More information about Thesis Committee requirements can be found in the University Catalog as well as the University Style and Format Guidelines for Master's Theses and Project Reports mentioned earlier.

CHAPTER 6

WRITING THE THESIS PROPOSAL

THESIS OVERVIEW

A thesis, typically, is a document with five chapters. [If that sounds intimidating, think of it as writing five separate term papers, spread out over a couple of semesters. You can do that, right?] Traditionally the chapters are (1) Introduction, laying out your study idea, the rationale for the study, and helping to relate the study to the bigger picture of science education, (2) Literature Review, where you show the reader you've done relevant background reading related to your topic(s), (3) Research Methods, where you tell the reader what you will do and how, (4) Results, what you found out when you did it, and (5) Discussion, where you describe what the data means, how you interpret it, and what are the implications of your study.

The Research Proposal

The thesis proposal is often a rough draft of the first three chapters of a typical five chapter thesis. If you and your Advisor work out an alternative format for your proposal, approved by everyone on your Committee, then an alternative format may also be fine. There's more leeway in the thesis process than you may be used to in formal classes but it's certainly not "anything goes."

Once your proposal has been approved by your Advisor, he or she will help you schedule a meeting/conference with all members of your Thesis Committee. You will need to provide each Committee member with a copy of the proposal at least one week before this meeting. After the meeting, each Committee Member formally approves the proposal by providing their signatures on the "Thesis Proposal Cover Sheet" form(see page 21). Your Advisor will submit this form on your behalf to the Science Education Department.

In most cases, you should have your proposal completed and approved before you take SCED 698 and begin your actual research. You will also likely need to have your plans approved by the university's Institutional Review Board for the Protection of Human Subjects (see Chapter 10), **AND THIS TAKES ADDITIONAL TIME.** The IRB approval process could take two months. Discuss the IRB approval process early on—don't procrastinate on this step!

Chapter 1—Introduction

The introduction sets the stage for the rest of the proposal. It should grab the reader's attention by providing interesting background information related to your research problem, an anecdotal story from your classroom or teaching experience, and/or a rationale for why this study is important and relevant. The introduction also provides the context for the study and briefly describes the nature of the research, participants, theoretical/conceptual

framework, and gives brief definitions of any key terms that may have several meanings. Your research questions should be presented in a numbered list. Describe how your thesis will address these questions. Describe what is significant or original about your research, give an overview of your proposed methods, and discuss any anticipated implications and practical applications of your results.

Chapter 2—Literature Review

Your proposal should represent a partial-to-almost complete draft of your thesis' Chapter 2. What scholarly literature will you draw upon to build your ideas for the research? What are the 2-3 major scholarly areas informing your study? Who are the key authors you'll draw upon? Without providing the complete literature review, discuss the kind of literature you'll be examining, and show readers you've found a relevant body of literature upon which to draw. You need to demonstrate that the scholarly literature you need for your review exists, and that you have the ability to synthesize and write about this literature.

Also, describe the gaps in the current literature and how your study will fill part of this gap. Doing this will provide a measure of the significance of your study. Lastly, describe what your review of the literature says about *your* study.

Chapter 3—Research Method

In writing this chapter, it is quite appropriate to reference it with text and sources from your EDP 520 class and other research methodology courses you have taken.

Introduction

What general type of research will you be doing (*e.g.*, evaluation or assessment, descriptive, interpretive, action research, quasi-experimental, etc.) Will you be conducting a pilot study? Give more details on the nature of your study than what was mentioned in Chapter 1.

Setting or context

Discuss where this study takes place. What are the key attributes of your participants and their environment that readers should know in order to meaningfully understand your study?

Sample/Participants

From whom or from what sources will you gather data? And what population will your sample be representative of? Tell your readers any pertinent background or demographic information they need to decide what larger population your sample population is representative of.

Data Collection

What kind of data will you collect (*i.e.*, qualitative, quantitative or mixed method)? What techniques will you use to collect the data (*e.g.*, interviews, questionnaires, video,

examinations, previously published data or test scores)? A strong study will have multiple data sources and multiple data types (i.e., triangulation).

Data Analysis

How will you organize and analyze your data to address your research questions? If you will use particular statistical methods, discuss them here. This is also the place to discuss your plan to assure your data is valid & reliable or otherwise trustworthy. For quantitative studies that use questionnaires, describe the instrument you intend to use and how it will be modified and/or combined with another instrument. Include a copy of the instrument in the Appendix. Discuss the instrument's validity and reliability. For qualitative studies, briefly describe your role relative to the research setting and participants, as well as the "analytic induction" process that you will use to make sense of your data. Will you use a software program to analyze your data (e.g., SPSS, NVivo, Atlas.ti)?

Proposed Time Scale.

The time line could be done with a Gantt chart, flowchart, or other diagram. Don't overdo it—this isn't a dissertation. Be realistic.

Formatting Your Research Proposal

We anticipate that most thesis proposals will be 10-30 double-spaced pages. Your entire proposal (and, in fact, your entire thesis) should conform to APA style guidelines. The university has a number of rules and procedures that all candidates **MUST** follow when writing a thesis (that's **must** with a capital M-U-S-T. The thesis office is detail-oriented and **VERY** thorough.) It's easier to do it mostly right the first time and to use the writing and formatting of your proposal as practice. This is easier than going back and reformatting the entire thesis just when you thought you were finished! And you'll soon find out that formatting is a very time-consuming task.

Have you noticed that most of this Handbook is formatted according to APA style guidelines? As examples, APA style for chapter titles is that they should be:

CENTERED, ALL CAPITALS, NO UNDERLINE

And for levels of heading, level 1 to 4 should be:

CENTERED, ALL CAPITALS HEADING

Centered, Uppercase and Lowercase Heading

Centered, Underlined, Uppercase and Lowercase Heading

Flush Left, Underlined, Uppercase and Lowercase Side Heading

You can find information on the web at <http://www.csulb.edu/library> and clicking on the photo-link marked "Thesis Office" or in the *University Style and Format Guidelines for Master's Theses and Project Reports* available in the university bookstore and/or online.

Science Education
THESIS PROPOSAL COVER SHEET

Student's Name

ID #

Student's Signature

Date

Email

Phone

Address

City/Zip

ATTACH A THESIS PROPOSAL WITH THE FOLLOWING: TITLE, INTRODUCTION, LITERATURE REVIEW, METHODS, TENTATIVE TIME-LINE, & REFERENCES.

TITLE OF THESIS: _____

Do you have IRB approval?

- Yes
- Not yet
- Not required for this study

Approved: _____

Thesis Advisor

Date

Committee Member 1

Date

Committee Member 2

Date

CHAPTER 7

THESIS COMPLETION & DEADLINES, LIBRARY THESIS OFFICE, THESIS BINDING & OTHER HELP

DATE OF THESIS COMPLETION

The Thesis Office has established a window of time to receive theses each semester. Once received, the thesis will be reviewed in the order received, but within a 4-week window. If there are significant errors found upon review, the thesis will be returned to you with a list of errors found. You will be asked to correct the error(s) identified (usually within one week) and others which may appear later in the thesis. When the thesis is reviewed for a second time and errors still persist, you will need to work on the thesis and resubmit within the defined window of time the **following semester**. So, if your thesis is not yet acceptable in its current edition, complete the corrections/amendments before submitting to the Thesis Office. Please note filing your thesis with the library Thesis Office is separate from filing to graduate. You must file to graduate the semester before you intend to graduate. See catalog for details.

THESIS PAPER AND BINDING

In the past, the University had specified that certain copies of the thesis need to be printed on special thesis paper. Now, the thesis may be done on regular #20 copy paper for submission to the Thesis Office. The University Library still requires a bound copy for the Thesis Collection; other copies (if needed) may have a different binding but they need to be done through *49er Bookstore*.

THESIS ASSISTANCE

Prior to the window of times indicated above that theses are being received by the Thesis Office, the personnel in the Thesis Office would be happy to come to classes to review thesis formatting and any other questions students may have about theses. During this same time period, the personnel are also happy to work with students on a drop-in basis or by appointment to answer questions about style and formatting of their theses. They also have handouts on questions not addressed by the Thesis Handbook. Faculty are encouraged to ask students to submit their assignments using the thesis format so students will become more familiar and comfortable with thesis requirements. The Library's Thesis Office is working on having the *Thesis Manual* as a PDF file so thesis formatting will be able to be observed online and facilitate formatting by the students, but having access/copy of the *Thesis Manual* is strongly urged for those who are producing the finished copy of their own thesis.

Email: thesis@csulb.edu

Please visit the Thesis Office in the library or their website for updates, deadlines, and changes to policy. www.csulb.edu/library/guide/serv/thesis.html

CHAPTER 8

INSTITUTIONAL REVIEW BOARD (IRB)

Most of you will need to have your thesis protocol approved by a university committee called the Institutional Review Board for the Protection of Human Subjects, usually just abbreviated as IRB. The IRB exists because of federal requirements. The basic purpose behind the whole IRB process is to assure the rights of your research subjects. The government wants to be sure that people acting as research subjects know what they are getting into, that they are not being coerced to participate against their will, that the researcher will not be harming subjects, and that the researcher will protect the rights of his or her subjects (including rights that extend beyond the time when your study is finished, *e.g.*, you must keep your collected data secure and eventually destroy it).

Researchers sometimes view IRB as a bureaucratic hoop to jump. The process, however, is designed with the best of intentions. Most—though not all—our graduate theses represent low risk studies, which should garner IRB approval quickly with little or no changes to their protocols. Make sure your advisor reads your application and helps you with the process. He or she will need to write a letter supporting your application.¹ And make sure you start the process at least a couple months before you would like to begin collecting data. Giving yourself plenty of time makes the process much less stressful than if you wait until close to the time you would like to begin collecting data.

In most cases there are two key IRB requirements for which you will need to be aware. First, the federal government wants to be sure you keep your data secured. If you collected data about, say, student science achievement, standardized test scores, or students' opinions about classmates & teachers, and somebody saw the information, the potential exists that the data could be used in a way that embarrasses or otherwise harms one or more of your research subjects. For this reason, you need to consider some minimally secure ways to store your data. A password protected computer and a filing cabinet with a lock are fine—you don't have to go to extremes, as if you were protecting nuclear launch codes. You just need to show you are taking some measures to protect your data.

Perhaps more importantly, regulations also require that potential research subjects know what you are asking them to get into—no surprises—and that you have evidence no one was coerced into participating. The government wants to know, for example, that you (as teacher and authority figure) did not force your students to participate in your study. For this reason, you will probably need to create an Informed Consent form and secure signatures. Depending on the age group you are working with, you may need informed consent from *both* students and their parents. You will probably also need a brief letter from an official at the school(s) in which you will be collecting data, saying that you have permission from the school to do so. You do not, however, need to create the bulk of the informed consent form by yourself. Boiler plate text and guidance are available on the web.

¹ *Details on the letter and every other aspect of the process are described on the IRB home page. We didn't write this chapter to be complete and definitive, just to introduce you to the IRB process.*

The IRB home page is: www.csulb.edu/divisions/aa/research/our/compliance/irb/. From this page you will find links that will help you with the various procedures you need to follow to complete your IRB application. For example, a generic consent form is provided at (www.csulb.edu/divisions/aa/research/our/compliance/irb/consent/sample/index.html). Use this as your guide. (See page 25 for additional links.)

There are three broad types of IRB applications—*administrative*, *expedited*, and *standard*. Most Science Education research requires an *administrative* or, sometimes, *expedited* application. You can check to find out whether your work requires only administrative review here: www.csulb.edu/divisions/aa/research/our/compliance/irb/decisiontree/. Virtually all work, however, requires an IRB application. Don't be fooled—if your work qualifies for the “exempt” status, that means it's exempt from full review, *i.e.*, it qualifies for administrative level review.

Standard applications are the “hardest,” and would probably only happen if the board felt your research involved something beyond minimal risk with a vulnerable population. Sensitive populations we might work with include children with special needs, homeless children, children in foster care, etc. Even young children in general are sometimes considered a vulnerable population. That said, be not afraid—our work is rarely deemed to require more than administrative review. And even standard review isn't scary—it just takes longer.

No matter what kind of application you are going to complete, the starting point is the same. You are required—by federal law—to know a little bit about IRB, and demonstrate your knowledge by passing a short quiz (20 true/false questions). The university created an online module for you to use as the basis of your training. The module is found at www.csulb.edu/divisions/aa/research/our/compliance/orientation/modules/. It is completely OK for you to zip to the end of the module, look at the quiz questions, and even have a copy of the quiz in front of you as you go through the module. The educational module is set up in such a way that you can pretty much spend as much time as you'd like going through it—there's lots of optional links if you would like to learn more.

Once you have completed the module and passed the quiz, talk to your advisor. Figure out whether your project qualifies for administrative review, and download the necessary form to begin filling out your application. Ultimately, that's all you submit—a single form.

LINKS FOR ADDITIONAL IRB REVIEW APPLICATION FORMS

Policy Statement

http://www.csulb.edu/divisions/aa/grad_undergrad/senate/documents/policy/2000/03

Application Form for Standard or Expedited Review of Protocol Applications

<http://www.csulb.edu/divisions/aa/research/our/compliance/irb/form1/>

Instructions for Completing the Form for Standard or Expedited Review of Protocol Applications

<http://www.csulb.edu/divisions/aa/research/our/compliance/irb/instructions/index.html>

Application for Administrative Review of Research Protocol

<http://www.csulb.edu/divisions/aa/research/our/compliance/irb/exemptform/index.html>

Instructions for Completing the Form for Administrative Review of Protocol Applications

<http://www.csulb.edu/divisions/aa/research/our/compliance/irb/exemptinst/index.html>

Faculty Supervisor's Statement

<http://www.csulb.edu/divisions/aa/research/our/compliance/irb/statement/>

Check-off List for New & Renewal Submissions: *(Revised 6/15/05)*

<http://www.csulb.edu/divisions/aa/research/our/compliance/irb/checklist/> This check-off list is to assist you in submitting a complete application to the IRB. Please note that an incomplete submission is almost certain to delay the process of your application.