795A Seminar: Final Projects (First Semester)  
Master of Arts in Education  
Concentration in Mathematics Education (K-8)  
Mondays, 4:15 p.m. – 6:55 p.m.

Course Instructor  
Dr. Lisa Lamb  
Office: CRMSE 47  
CRMSE Phone: 619-594-0774  
Cell: 858-414-4046  
email: Lisa.Lamb@sdsu.edu

Course Instructor  
Dr. Randolph Philipp  
Office: CRMSE 49  
CRMSE Phone: 619-594-2361  
Cell: 619-972-6446  
email: rphilipp@mail.sdsu.edu

Course Sequence Overview

The 795A/B course sequence is different from the other courses you have taken in this MA program. Rather than reading articles and reacting to the research described in them, you will be selecting your own research topic, designing your own study, collecting and analyzing data, and writing a paper that would be appropriate to share with your peers. In this respect, you should think of this course sequence as one that will support your growth as a teacher-researcher. At the end of this course sequence, we expect that you will have built upon your knowledge base from ED 690 so that you can engage in systematic inquiry long after the program has ended. Specifically, you will:

- select appropriate and timely research topics that allow you to conduct research in your own classroom or at your school site;
- identify and locate relevant research literature to support your own research study and design;
- create several different types of data collection instruments;
- systematically collect data;
- devise coding schemes and analyze data sets;
- triangulate data to synthesize big ideas from your data analysis;
- write a paper about those big ideas that you could share with your peers; and
- communicate your research findings through presentations.

Project Overview

The goal of these projects is to help you better understand how both reading and engaging in research can help you with your practice. Through this experience, we hope that you will recognize that it is not only possible but realistic for you to engage in research even after the masters program has ended. In addition to engaging in research to improve your own practice, we hope that this project will encourage you to add your voice to a broader dialogue on mathematics education – perhaps you will publish an article, speak at a conference, mentor your colleagues, or…

You will work in pairs on your project. We think that a partner can help you stay focused, work through difficult spots, test and extend your ideas, and make the experience more enjoyable.
Each project group will:
- identify a research question and design a study about a topic in mathematics education of mutual interest to all individuals in the project group (1st semester)
- systematically collect data (1st semester)
- analyze data (1st and 2nd semester)
- write a 10-page article similar to those in Teaching Children Mathematics or Mathematics Teaching in the Middle School (2nd semester)
- present selected findings to colleagues outside the program and at a class poster session (2nd semester)
- upload project documents to Blackboard that provide a running record of your project work over the year (1st and 2nd semester)

Each person will:
- prepare an annotated bibliography of references from program coursework and from outside of the program (1st semester)
- write a description of the connections between your other group members’ readings and the project (1st semester)
- write a 5-10 page discussion about practical and/or research implications of your study – more information will be provided in class (2nd semester)

Your project group has already been thinking about something you would like to understand better, and you have begun to consider a specific research question to help you improve your understanding. Early in the first semester you will select at least 3 ways to collect information that addresses your research question. By triangulating your data, you will be able to draw more reliable and believable conclusions for both you and others who will read your results. For example:

Example 1: Suppose you want to better understand how students think about adding and subtracting fractions both symbolically and in context. You might collect data by:
1. giving your students a paper-and-pencil test
2. interviewing a few students individually and then transcribing the interactions
3. videotaping some whole-class discussions about these issues

Example 2: Suppose you want to better understand what the parents at your school understand about the school’s math program. You might collect data by:
1. asking the parents at your school to complete a survey on the issue
2. interviewing some parents individually
3. attending a PTA meeting and leading a discussion about the issue

Teachers are constantly making instructional changes on the basis of their understanding of their students. Researchers, however, seek to understand at a level that is deeper and involves more data points than teachers. Your project will involve you engaging in research, but the goal when collecting data for this project is NOT to change what you are studying (e.g. students’ fractional understanding, your questioning, or parents’ knowledge), but rather, you are trying to understand the situation as it currently exists. After analyzing the data about the existing situation, you will be in a good position to decide how you can use your findings and conduct subsequent related research to improve your practice.
As the final part of your project, your project group will jointly write a 10-page paper similar to the articles found in *Teaching Children Mathematics* and *Mathematics Teaching in the Middle School*. You will need to consider everything you have done up to that point and decide what would make a good paper. In other words, what would other teachers most like to read about what you have done? You will have help from your colleagues and advisors in making this decision and then outlining and writing a paper to tell that story. You will also have an opportunity to share what you have learned through presentations.

Your final assignment will be to make sure you have uploaded all of your documents that provide a running record of your work throughout the year. For the first semester, this should include the following

- Progress Reports after meetings with advisors, and any other email exchanges that were particularly useful in helping you progress in your project.
- Reference annotations (within program)
- Reference annotations (outside program)
- Reference Switch Reflections
- Drafts of data collection instruments (surveys, interview questions, etc.)
- Final set of data collection instruments (surveys, interview question, etc.)
- Preliminary Project Design and Data Catalog
- Final Project Design and Data Catalog

**Grading Policy**

We hope that we all recognize that grades are designed to reflect what one *knows* and what one has *learned*, but they do so inadequately. All grading systems are subjective, even those that are based solely on objective tests. But we do not want grades to interfere with your learning in this course, and we know how important grades are to some people, so we have decided that if your work is less than acceptable on any assignment, we will let you know so that you may redo the assignment. Because this is a graduate course, students are expected to maintain at least a *B* average. Therefore, if you turn your work in on time, you may assume that, unless we speak to you, we consider your work to be thoughtful and you are maintaining a passing grade. To earn an *A*, you should consistently grapple with the ideas at a deeper level, and we will expect this depth to be reflected both in your submitted work and in your comments during class and project-meeting discussions.

Because this course is focused on personalized group projects, attendance and participation are essential, and we will consider both in your final grade. **If you miss a class or meeting, you should email your advisor the assignment by the date that it is due unless you have made other arrangements with your advisor.**

Many of you are currently serving as full-time teachers while enrolled in two graduate courses, so we know how busy you will be this semester. However, we have found that students with busy schedules who fall behind find it difficult to catch up. Therefore, we will note assignments that are turned in late, and if you consistently turn in late work, this will result in a lower final grade. We also understand that life presents circumstances for which we cannot plan, so please come speak to us if you find you are having difficulty keeping up with the work, and we will do what we can to work with you.
<table>
<thead>
<tr>
<th>Date</th>
<th>Group Meeting</th>
<th>Assignments for each person</th>
<th>Assignments for each project group</th>
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<tbody>
<tr>
<td>Aug 26</td>
<td>Whole-Class Meeting</td>
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<td>Be prepared to discuss projects</td>
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<tr>
<td>Sept. 9</td>
<td>Group A meets</td>
<td>Course Reference Annotations due</td>
<td>DRAFT Research Question(s) due; Progress Report due after meeting</td>
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<tr>
<td>Sept. 16</td>
<td>Group B meets</td>
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<tr>
<td>Sept. 23</td>
<td>Group A meets</td>
<td>Outside Reference Annotations due</td>
<td>FINAL Research Question(s) due; Progress Report due after meeting</td>
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<tr>
<td>Sept. 30</td>
<td>Group B meets</td>
<td></td>
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<tr>
<td>Oct. 7</td>
<td>Group A meets</td>
<td>Reference Switch Reflection due</td>
<td>Customized assignments for instrument development &amp; piloting; Progress Report due after each meeting</td>
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<td>Oct. 14</td>
<td>Group B meets</td>
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<td>Oct. 21</td>
<td>Group A meets</td>
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<td>Oct. 28</td>
<td>Group B meets</td>
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<tr>
<td>Nov. 4</td>
<td>Whole-Class Meeting</td>
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<td>DRAFT Project Design &amp; Data Catalog due</td>
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<td>Nov. 11</td>
<td>Campus Holiday</td>
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<td>Nov. 18</td>
<td>Group A meets</td>
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<td>Data Collection and Preliminary Analysis</td>
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<td>Nov. 25</td>
<td>Group B meets</td>
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<td>Progress Report due after each meeting</td>
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<td>Dec. 2</td>
<td>Group A meets</td>
<td>Read and be ready to discuss 3 articles (posted on Blackboard)</td>
<td>FINAL Project Design &amp; Data Catalog due (Dec 16)</td>
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<tr>
<td>Dec. 9</td>
<td>Group B meets</td>
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<tr>
<td>Dec. 16</td>
<td>Whole-Class Meeting</td>
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*Note:* Group A & B membership and schedules will be distributed after the Aug. 26 class, but this information is subject to revision due to project needs.
**Project Timeline**

- **August 26**
  Each project group will share a current version of their research question, plan for 3 data sources to investigate that research question, and 1-2 things that they are struggling to resolve.

- **September 9 – December 9**
  **Progress Reports due after each meeting**
  After every meeting with your advisor, each project group will email their advisor with the following information:
  
a) summary of the issues discussed/decisions made in the meeting just completed  
b) summary of what you are working on for the next meeting  
c) summary of any long-term tasks you are currently working on

  **Note:** These progress reports are due the Thursday after a Monday meeting with your advisor.

- **Sunday September 8 (for Group A) and Sunday September 16 (for Group B)**
  **DRAFT Research Question(s) & Course Reference Annotations Due**
  Each project group must submit their draft research question(s). Each person must turn in 2-3 annotated references from references they have already read in M. A. courses. Each person should select and annotate these references individually. We realize that individual selection may mean that within a project group, some of the references will overlap. Overlap in reference selection is fine, however, each person should write his/her own annotations.

  **Note:** Each person must have a total of 8 references in the annotated bibliography. See the Guidelines for the Annotated Bibliography (at the end of the syllabus) for possible distributions of course references versus outside references.

- **Sunday September 22 (for Group A) and Sunday September 29 (for Group B)**
  **FINAL Research Question(s) & Outside Reference Annotations Due**
  Each project group must submit their final research question(s). Each person must turn in annotated references from 5-6 references that are outside of M. A. course readings. The outside references that you select must be different from the references that your other group members select. The advisors and your colleagues can give you some guidance in selecting these articles. You should also use databases such as Education Full Text to help you. You may need to provide your advisors with copies of readings from sources that they do not have. Check with them to determine if this is necessary.

  **Note:** If you have not already shared your readings with your group members, you should bring copies of your outside readings for them.
• **October 7 (for Group A) and October 14 (for Group B)**
  
  Reference Switch Reflection Due
  
  Previously, group members should have exchanged and read copies of each other’s outside references. Each person should write one page describing the connections between her group members’ readings and the project. (That’s right, you only need to write a total of one page, not one page per reading!)

• **October 7 – November 4 – Customized Assignments for Instrument Development & Piloting**
  
  During this time, each project group will work with their advisor on how to best address the following: describing in detail what is under investigation, identifying the three ways data will be collected and analyzed, and creating data collection instruments and piloting them.

• **November 4 – DRAFT Project Design & Data Catalog Due**
  
  Each project group must turn in information about their project design and data collection and analysis. Your Project Design and Data Catalog should include:
  
  • your research question(s)
  • a short summary of your study
  • what data will be collected (include copies of your interview protocols, survey questions, tests, observation protocols, etc); and
  • a description of how data will be analyzed (include potential coding schemes, as appropriate).

• **November 5 – December 15 - Data Collection and Preliminary Analysis**
  
  During this time, each project group will collect data and conduct preliminary analyses as needed to complete data collection. (All other analyses will take place during the second semester.)

  **If you have special circumstances because, for example, you are “off track” during this time, please see the advisors and adjustments may be possible.**

• **December 16 – Final Project Design & Final Data Catalog Due**
  
  Each person should read and be ready to discuss the 3 articles (on Blackboard):
  
  - Marcial & Marcial, “Put the One on the Top”: A Peer Into Third Graders’ Understanding of Place Value, 2004 Master’s Project.

  Consider the following questions as you read each article:
  
  • Was this article interesting? Why (or why not)?
  • Were the results believable? Why (or why not)?

  After you have reflected on each article, identify characteristics these readings have in common that might serve as general guidelines for analyzing and writing up your study. Pay attention to how the results from different data sources were communicated.
  
  Each project group must provide some evidence of data collection by turning in:
  
  • Final Project Design (originally submitted on November 4)
  • A catalog of the data you have collected.
Guidelines for Annotated Bibliography

You will be developing an Annotated Bibliography as part of your final project. This document will demonstrate that your project builds on ideas and issues that others in the field of mathematics education have explored and consider important. It will show that your project is part of the “Chain of Inquiry” that scholars believe is critical in a field of knowledge. It will show that your research does not come out of the blue, but is a natural outgrowth of the research that has preceded it. In other words, your Annotated Bibliography should show that your research questions deserve the attention that you are devoting to them. Specifically, your annotated bibliography will help you to:

a) learn about research that has been conducted on your topic;
b) build a case for the significance of your research; and
c) identify tasks or methodologies you might use in your research.

Number of References
Each group member will need to summarize a total of at least 8 references for the annotated bibliography. Some of the readings that you have done during the Masters Program should be relevant to your project and you will include those references in the bibliography. You should annotate 2 to 3 readings from the program. You will also be expected to find some articles on your own — you will need to find the balance of the 8 articles to annotate. (For example, you may find that 2 articles that you read during the Masters Program are relevant to your research. You then need to find 6 articles (8 – 2) on your own that you will annotate). The outside articles you find should be different than the outside articles of your group members.

Citation of References
Each entry in the bibliography should contain a complete citation. These should be in APA style which is followed by most research journals. We provide three sample entries, one for a journal article, one for a book, and one for a book chapter in an edited book (in which each chapter has a different author).

Journal article

Book

Chapter in an edited book
Annotations of References

Each annotation should include a summary portion and a connections portion.

Summary: You will write a succinct summary for each of the readings that you cite. You will review the main ideas of the reading. This summary should be in your own words and should not be a copy of the abstract for the paper. This part of the entry should be no more than 750 words.

Connections to your study: You will write 1 – 2 paragraphs describing how this reading relates to your project. It should include specific information from the reading that influenced your thinking about your project. For example, you might propose to:

- follow a methodology described,
- use particular mathematics problems that were presented,
- build on a definition that was articulated,
- replicate or extend a research study, or
- answer an author’s claim that more research is needed on a particular topic (that is, use this author’s claim to justify the significance of your study).

Choosing References

Whenever writers begin literature searches of this type, they have to sift through multiple readings to determine what is relevant to their work. It is important that you be patient during this process. We encourage you to skim articles before committing to reading them thoroughly and eliminate articles that are not appropriate. For example, if you are studying young children’s understanding of fractions, an article about high school students' solution strategies for fraction problems is probably not relevant to your work and should not be included in the bibliography.

We encourage you to use a variety of peer-reviewed references that could include but is not limited to: research studies, chapters from NCTM yearbooks, articles in Teaching Children Mathematics and Mathematics Teaching in the Middle School, and methodology readings. The majority of your references should be research-based articles or book chapters.

Sample Entry for Annotated Bibliography

Research Question: How do our questions facilitate or hinder math discussions in our classrooms?


Summary:

The authors use data collected from 18 first-grade classrooms in the Chicago Metropolitan area where teachers were using the Everyday Mathematics curriculum to develop a framework that captured the features of skillful mathematics instruction with the
curriculum. They call their framework, Advancing Children’s Thinking (ACT). From their data set, they identified one skillful teacher who exemplified all of the features of skillful instruction. They use data from her class to explain the features of the ACT framework which fall into three broad components: Eliciting, Supporting and Extending student thinking. Within each of the broad components, 2 – 3 sub-categories were identified and for each sub-category 1 – 5 attributes were identified. The authors also discuss how the components intersect. For example, they describe how eliciting children’s thinking sometimes intersects with supporting children’s thinking.

The authors note that the Support component was the most common teaching strategy observed in the classrooms that they studied. They go on to share some evidence that many of the 18 teachers that they studied rarely exhibited Eliciting and when they did, they did not elicit many strategies. The authors conclude that Supporting solutions is more in line with traditional teaching than Eliciting children’s thinking. They point out that Extending was also observed infrequently. They suggest that the framework can be used by researchers, teacher educators and curriculum designers.

**Connection to our study:**

We plan to use the framework that is developed in this article. We will use it to analyze our own mathematics teaching. We are particularly interested in whether we are as successful in Extending student thinking as Ms. Smith (the skillful teacher in the article). We will focus on the “Goes beyond initial solution methods” aspect of Extending student thinking which includes:

• “Pushes individual students to try alternative solution methods for one problem situation
• Promotes use of more efficient solution methods for all students
• Uses students’ responses, questions and problems as core lesson” (p. 155)

We expect that we will be coding video tapes of our teaching and will use these attributes as codes for our data analysis.

We wonder about promoting efficient solution strategies and whether we will be comfortable with this instructional strategy. In the article, Fraivillig and her colleagues indicate that Ms. Smith asked her students, “Yes, but is there a shorter way?” They then write, “Ms. Smith’s ability to promote meaningful use of more efficient solution methods required sensitivity to each child’s current and potential understanding so that students were not pushed beyond what they could do even with appropriate scaffolding” (p. 162). We fear that asking children for more efficient methods may send the message that math is about quick computation. We recognize the importance of pressing children to continually move forward in their development of strategies but suspect that this is complicated work. We wonder if we will see evidence of this instructional strategy in our own classrooms. Fraivillig and her colleagues did not provide counts of how often the teacher utilized Extending strategies in her teaching so we are not sure how prominent they were. We are interested to find out how prominent they are in our own teaching.