Methods of Inquiry
ED690  Spring 2015

Thursdays 4:20-7:00, CRMSE’s McLeod-Sowder Room (Suite 218)

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Required Materials:
Customized Course Packet of Readings (I will bring them to class)

COURSE GOALS & REQUIREMENTS

Research is often seen as an elite process that is conducted only by university researchers. Sometimes teachers dismiss research results as either too complicated to understand or irrelevant to their practice. In this course, I would like to challenge both of these beliefs. We will examine published research and explore what it has to offer you as a teacher. We will also jointly engage in the research process so that it becomes more familiar and its potential benefits more apparent. Next year, you will complete your own research project in ED795A and 795B. This semester should help you prepare for that project. However, it is my hope that your research on teaching and learning will not end with this masters program. I believe that it is important for teachers’ voices to play a role in our continually growing knowledge base about how to teach. In this course, therefore, we will explore how teachers can reasonably do research within the context of their already full schedules.

Professionalism. You are a professional in the field of education. As such, you need to take seriously your responsibility for learning and helping others learn in this class. As a professional, you should:

- attend all classes
- arrive on time and remain for the entire period
- be prepared for each class by having thoughtfully completed all readings and assignments
- keep me informed of any extenuating circumstances in your life that may hinder your ability to succeed in this course
- remain on task during class sessions
- respect others’ opinions in the class
- be curious about ideas different than your own

Because it is expected that everyone will act professionally in all class sessions, final grades will be lowered for an unprofessional attitude or behavior (including lack of or inappropriate participation). Arriving late, leaving early, or skipping classes will be interpreted as lack of participation.

Our class is a community of learners. It is important that everyone feels both encouraged to participate and a responsibility to participate.

Syllabus is Subject to Change. This syllabus and schedule are subject to change in the event of extenuating circumstances. If you are absent from class, it is your responsibility to check on announcements made while you were absent.
This course will focus on the following ideas:

<table>
<thead>
<tr>
<th>Research Problem &amp; Question</th>
<th>Conducting a Research Project</th>
<th>Critiquing a Research Project</th>
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</table>
|                             | • What do you want to investigate?  
• Why is it important?     | • What did the researcher investigate?  
• Is the question worthwhile? |
| Study Design                | • What data sources are relevant?  
• How will you design the data collection instruments so that your analysis will allow you to answer your research question(s)? | • Were the data sources appropriate?  
• Were the data collection instruments reasonable?  
• What do the instruments measure? |
| Data Collection             | • Collect the data. What permissions do you need from students, parents, and administrators? What logistical/practical considerations do you need to address? | • What methods will you use to make sense of and analyze the data?  
• How can you organize and share the data so that it makes sense, tells a story, and helps you answer your research question(s)?  
• What methods were used to analyze the data?  
• Is the type of analysis appropriate to answer the research question(s)? |
| Data Analysis               | • Based on your data analysis, what conclusions can you make?  
• How strongly do you believe your conclusions? (How strong is your evidence?)  
• Were the tools used to draw conclusions valid and reliable? | • What conclusions did the researcher(s) make?  
• Is the evidence compelling enough to justify the conclusions?  
• Is there another way to interpret the data presented?  
• Were the findings/conclusions believable? |
| Drawing Conclusions         | • How could your conclusions influence your practice?  
• Would others be interested in your conclusions? If so, how might you share the information? | • How could these conclusions influence your practice?  
• Would others be interested in these conclusions? If so, how might you share the information? |

Taking Action
Assignments:
All written assignments must be typed and double-spaced. Each assignment is due on the date indicated on the syllabus. Please see me if you have extenuating circumstances in your life that you believe merit additional time. Absences may require make-up assignments.

Grading Scale:
Grades will be based on the following grading scale:

A = 90-100%
B = 80-89%
C = 70-79%
D = 60-69%
F = Below 60%

Plagiarism and Cheating
Please be sure to read and understand the university policy on plagiarism and cheating. Academic dishonesty will result in a failing grade for the course, and will be reported to the University. This policy is stated in the Graduate Bulletin.

Students with Disabilities
If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.

Religious Observances
University Policy on Absence for Religious Observances includes the following statements: “By the end of the second week of classes, students should notify the instructors of affected courses of planned absences for religious observances. Instructors shall reasonably accommodate students who notify them in advance of planned absences for religious observances.” Please notify me in a timely manner and a reasonable accommodation will be reached.
## Class Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>In Class Topics (Tentative)</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thurs, Jan 22</td>
<td>What is research? Why conduct research? On Becoming a Critical Consumer of Research</td>
<td></td>
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<tr>
<td>Thurs, Jan 29</td>
<td>Survey Design</td>
<td></td>
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<tr>
<td>Thurs, Feb 5</td>
<td>Survey Design (Nina Potter visit)</td>
<td></td>
</tr>
<tr>
<td>Thurs, Feb 12</td>
<td>1. Designing a Research Study, Part I: Research Critique &amp; Integration (modified literature review) (tentative)</td>
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<tr>
<td>Thurs, Feb 19</td>
<td>No Class Meeting, Work Session</td>
<td></td>
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<tr>
<td>Thurs, Feb 26</td>
<td>2. Survey analysis</td>
<td></td>
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<tr>
<td>Thurs, Mar 5</td>
<td></td>
<td></td>
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<tr>
<td>Thurs, Mar 12</td>
<td></td>
<td></td>
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<tr>
<td>Thurs, Mar 19</td>
<td>3. Classroom video (tentative)</td>
<td></td>
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<tr>
<td>Thurs, Mar 26</td>
<td></td>
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<tr>
<td>Thurs, Apr 2</td>
<td>No Class Meeting, Spring Break</td>
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<td>Thurs, Apr 9</td>
<td>4. Student work (tentative)</td>
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<td>Thurs, Apr 16</td>
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<td>Thurs, Apr 23</td>
<td>5. Interview Coding and Analysis (tentative)</td>
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<td>Thurs, Apr 30</td>
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<tr>
<td>Thurs, May 7</td>
<td>No Class Meeting, Work Session</td>
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<tr>
<td>Thurs, May 14</td>
<td>Finals, No Class Meeting, Research Design Due</td>
<td>6. Designing a Research Study, Part II</td>
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## WRITTEN ASSIGNMENTS

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>Due Date</th>
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</thead>
<tbody>
<tr>
<td>Reading responses</td>
<td>10</td>
<td>Weekly</td>
</tr>
<tr>
<td>1. Designing a Research Study, Part I: Research Critique &amp; Integration (modified literature review)</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>2. Survey Design and Analysis</td>
<td>15</td>
<td>February 26</td>
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<tr>
<td>3. Classroom Video Analysis</td>
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<td></td>
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<td>4. Analysis of Students’ Written Work</td>
<td>15</td>
<td></td>
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<tr>
<td>5. Interview Analysis</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>6. Designing a Research Study, Part II</td>
<td>15</td>
<td></td>
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</tbody>
</table>
COURSE ASSIGNMENTS

Thursday, January 22
What is research? Why conduct research? Why this course?
What will our ED 795A/B research projects entail?

Read, in class:


Technology Education, 9*(2), 115-129.

Thursday, January 29

Review the two articles you read in class on January 22, looking in particular for the research 
methods the researchers used. Consider, but do NOT turn in, answers to the following: What 
research questions were the authors seeking to answer? What were the data sources and how did 
they analyze the data? Were the findings believable (valid and reliable)? What conclusions did the 
authors reach? How were the two research studies similar and different?

Due, Read and Reflect:

Fischer, J. C. (2001). Action research rationale and planning: Developing a framework for 
teacher inquiry. In G. Burnaford, J. Fischer, & D. Hobson (Eds.), *Teachers doing research: 

- Briefly summarize the chapter (bullet points are fine)
- Name 3-4 reasons a teacher may want to conduct research
- After reading the article, brainstorm 2-3 topics that *might* be of interest to you to investigate 
  (either during or after this program). I won’t “hold” you to these topics!

Weekly Readings

You will be assigned readings every week. Some readings will be articles about *how to* conduct 
research, whereas other articles will be examples of research that utilizes particular methods. 
I will provide some questions to consider when reading. Unless otherwise stated, you will turn in a 
brief summary of every article to help you remember the main points.
Assignment #1: Designing a Research Study, Part I: Research Critique and Integration

This assignment has 3 parts.

1) Find 3 research articles related to a topic of interest to you. Use the article databases that are available through the library. Before you begin to find articles, brainstorm 2-3 research questions related to this topic.

2) Read the articles, and for each article, write a brief (1-2 page) review that includes the research questions, conclusions, methods used, believability (validity and reliability) and significance of each.
   i. **Research Questions:** What did the researchers investigate? What did the researchers expect to find based on the literature?
   ii. **Conclusions:** What did the researchers learn?
   iii. **Supporting Evidence:** What evidence did the researchers have to support their conclusions? That is, what data did they collect and how did they analyze it?
   iv. **Believability of Conclusions:** To what degree is the evidence compelling enough to justify their conclusions?
   v. **Critique of the research:** What were some limitations of the study? What additional data might researchers collect or what analyses might they use to bolster their findings?

3) Write a 2-3 page synthesis of the articles. The synthesis should incorporate ideas from each article together rather than providing a summary of one article, then a summary of the 2nd article, and another summary of the 3rd article. You should look across the three articles for themes, similarities, and differences in findings, and any take-away messages you gleaned. In your synthesis, be sure to cite the articles appropriately, using APA style. Include a reference list at the end of your synthesis. You may be wondering how (2) and (3) are different. Note that in #2, the primary goal is to describe and critique the research methods used in the article. In #3, the primary goal is to consider the content in the articles, and how the findings are similar or different, or how one researcher’s work might build from another’s research, and to identify common themes across the articles.
Assignment #2: Survey Design and Analysis

Due:  February 26, Survey must be designed, administered, and analyzed

Your goal is to design, administer, and analyze a short survey to assess and analyzed your students’ (or fellow teachers’) attitudes/beliefs about mathematics/science.

Determine your research question:
In class, two or three groups will jointly determine a research question about attitudes or beliefs about mathematics and science. Perhaps one group will want to know if your students generally like math/science class. Perhaps you want to know whether students believe math/science should be done collaboratively or independently. Perhaps you want to see if there is a difference between the boys’ and the girls’ beliefs about the importance of mathematics and science outside of school. Perhaps you want to know whether your highest achieving students are your most confident students in math/science. Or or or…

Design a short survey.
Create a survey to investigate your research question. The survey should have 5-10 questions on it. The survey should include at least one open-ended question and at least one question requiring the students to identify their feelings on a Likert scale. Be sure that the length and format of the survey is appropriate for your age level. You are welcome (and I would prefer) that you use Survey Monkey or Qualtrics or some other related survey collection software.

In each group, gather survey data from a total of at least 50 students (or, if you survey teachers, at least 30 teachers).

Analyze your data. Be sure to consider confirming and disconfirming evidence.

Describe the following:
1. What is your research question?
2. Definitions of the codes you used
3. Summary coding sheet(s) that reflect the coding of all participants, not the individual survey of each participant. These summary coding sheets may take the form of tables, graphs, lists of key quotes, etc.
4. Bulleted list of observations about the data (you will have several bulleted lists – one list for each question, or perhaps one list for a subgroup (2-3) of questions
5. These bulleted lists should reflect what you noticed from your summary coding sheet(s). You should have at least 3 bulleted observations per item (or subgroup of items) but some lists may be lengthy (e.g. 15 bulleted observations). You do not need to organize this list in any particular way for this first pass at the analysis.
6. 1-3 paragraphs highlighting major conclusions and key evidence to support those conclusions. (You should also briefly describe how you analyzed the data to identify this evidence.
7. How could these conclusions influence your practice?
8. If you were to give this survey to your class next year, would you make any changes? Why or why not? If you would make changes, what changes would you make?
9. What else could you do to investigate this topic further?
Please include a copy of the student survey.
Assignment #3: Classroom Video Analysis

Your goal for this assignment is to analyze videos of classroom teaching by examining a videotape of two lessons, each about 15 minutes long. For the two videos, you will conduct two analyses.

Analyze two classroom sessions in two different ways.
Math: One from the TIMSS study and one from Humphries (fraction division)
Science: One from the TIMSS Study and one from a class lesson that will be uploaded to Blackboard.

Analysis #1

Here are your research questions:

- Which kinds of questioning patterns (IRF, Funneling, or Focusing) are most prevalent in each teacher’s classroom? and
- What is the influence of those questioning patterns on students’ responses?

Analyze your data. Answer the following:

1. Definitions of the codes you used (IRF, Funneling, Focusing)
2. Code sheet(s) that reflect the coding of each video clip. These coding sheets may take the form of tables, lists of key quotes, etc.
3. Bulleted list of observations about the data
4. 1-3 paragraphs highlighting major conclusions and key evidence to support those conclusions. (You should also briefly describe how you analyzed the data to identify this evidence).

Analysis #2

Determine your research question:
You need to decide what you want to investigate in the video. It should be something that has the potential to occur more than once. See below for several examples.

Example 1: You may want to examine whether boys and girls participate equally in your discussions.

Example 2: You may want to examine how often a particular student or group of students is confused vs. understands.

Example 3: You may want to consider to what extent the teachers support students’ enactment of one of the Standards of Mathematical Practice OR the NGSS practices?

Example 4: You may want to examine to what extent the teachers use the productive talk moves?

Example 5: You may want to examine to what extent students are enacting the strands of mathematical proficiency?
Analyze your data. For each analysis, you need to create some way to code your video.

Example 1. The coding may be as simple as counting the number of boys and girls who respond to your questions. However, in this case you would also need to decide what counts as a single response – for example, if you ask a question and s/he responds but then you ask a follow-up question and the same student responds – is that one or two responses?

Example 2. The coding may consist simply of two codes (confused or understands) but you would have to determine what signifies each. Perhaps you would also need a category of “unclear.” If you are examining the understanding of a group of students, you would need some criteria for determining what signifies understanding for the group.

** There are no right or wrong answers here. You simply need to think hard about the coding decisions you are making. Remember that you want your evidence to be compelling to a critic.

1. What is your research question for Analysis #2?
2. Definitions of the codes you used
3. Code sheet(s) that reflect the coding of each video clip. These coding sheets may take the form of tables, lists of key quotes, etc.
4. Bulleted list of observations about the data
5. 1-3 paragraphs highlighting major conclusions and key evidence to support those conclusions. (You should also briefly describe how you analyzed the data to identify this evidence).
6. What conclusions can you draw from analysis 1 and from analysis 2?
7. Compare and contrast the analysis procedure for each analysis. Was one harder? more time consuming? more effective?

These paragraphs should identify the big story told by this set of data. For each big idea you highlight, be sure to point to 1-2 pieces of evidence that led you to that conclusion. You may (and probably will) reuse some of the observations from your bulleted list as evidence. However, these paragraphs should be more than a reordering of your bulleted list. You need to take a step back and identify the most important ideas emerging from the data. (In contrast, in the bulleted list, you should identify as many ideas as possible.)
Assignment #4: Analysis of Students’ Written Work

Your goal is to examine closely a set of student work that I give to you (one set for mathematics and one set for science).

Here is your research question:
How do children think about ________?

Analyze your data. Your goal is to identify patterns in the student work. For example, what percent of students answered each item correctly/incorrectly? What are the most typical correct/incorrect strategies? What are the anomalous strategies? What are the most/least sophisticated strategies? Determine how you will organize and code your data.

For the set of student work, you should turn in:

a. Definitions of the final codes you used
b. Completed summary coding sheet(s)

c. Summary coding sheet(s) should reflect the coding of all participants, not the individual work (e.g., written tests, interview performance, etc.) of each participant. These summary coding sheets may take the form of tables, graphs, lists of key quotes, etc.
d. Bulleted list of observations about the data
e. This list should reflect what you have noticed from your summary coding sheet(s). You should have at least 3 bulleted observations but some lists may be lengthy (e.g. 15 bulleted observations). You do not need to organize this list in any particular way for this first pass at the analysis.
f. 1-3 paragraphs highlighting major conclusions and key evidence to support those conclusions
g. What else could you do to investigate this issue further?

These paragraphs should identify the big story told by this set of data. For each big idea you highlight, be sure to point to 1-2 pieces of evidence that led you to that conclusion. You may (and probably will) reuse some of the observations from your bulleted list as evidence. However, these paragraphs should be more than a reordering of your bulleted list. You need to take a step back and identify the most important ideas emerging from the data. (In contrast, in the bulleted list, you should identify as many ideas as possible.)
Assignment #5: Interview Analysis

During this masters program, you will conduct many interviews. This assignment is designed to help you carefully consider the decisions involved with interviewing.

You will be given a set of interviews to code (one set for math and one set for science). You will be given the items posed, and we will discuss what the research question for each set was.

Analyze your data. Be sure to consider confirming and disconfirming evidence.

For the set of interviews, you should turn in:

a. Definitions of the final codes you used
b. Completed summary coding sheet(s)
c. Summary coding sheet(s) should reflect the coding of all participants, not the individual transcriptions of the interviews of each participant. These summary coding sheets may take the form of tables, graphs, lists of key quotes, etc.
d. Bulleted list of observations about the data
e. This list should reflect what you have noticed from your summary coding sheet(s). You should have at least 3 bulleted observations but some lists may be lengthy (e.g. 15 bulleted observations). You do not need to organize this list in any particular way for this first pass at the analysis.
f. 1-3 paragraphs highlighting major conclusions and key evidence to support those conclusions
g. What else could you do to investigate this issue further?

These paragraphs should identify the big story told by this set of data. For each big idea you highlight, be sure to point to 1-2 pieces of evidence that led you to that conclusion. You may (and probably will) reuse some of the observations from your bulleted list as evidence. However, these paragraphs should be more than a reordering of your bulleted list. You need to take a step back and identify the most important ideas emerging from the data. (In contrast, in the bulleted list, you should identify as many ideas as possible.)
Assignment #6: Designing a Research Study

Due: May 14

Throughout the semester, we will explore various parts of different research studies. This assignment gives you a chance to design your own research study. There are not any perfect studies so there is not any “right” answer. Rather, I am looking for evidence that you understand the research process and are thinking like a researcher.

In Assignment #4: Designing a Research Study, Part I: Research Critique and Integration, you identified a research topic of interest to you and then read and review 3 articles related to your topic.

On the basis of what you learned in the articles, identify 1-2 research questions.

Design a study to investigate your selected research question. You will need to identify:

- your predicted conclusions
- who your participants would be
- your data collection procedures – you need at least three data sources for triangulation
- your data analysis procedures and why those analyses are appropriate
- your proposed study's reliability and validity.

Your paper should be 2-4 pages.