

Rutgers, The State University of New Jersey

16:300:661:01 Seminar in Mathematics Education Research

Spring 2016

Mondays 4:30-7:00

Graduate School of Education, Room 30

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Phone Number 848-932-0802	10 Seminary Place, Room 231
Office Hours: Monday PM; by appointment	Prerequisites or other limitations: none
Mode of Instruction: <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input checked="" type="checkbox"/> Hybrid <input type="checkbox"/> Online <input type="checkbox"/> Other	Permission required: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes Non-matriculated students may get permission number from Marjory Palius at: marjory.palius@gse.rutgers.edu

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentations: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Course Catalogue Description

Students formulate one or more research questions; discuss theoretical perspectives; design a pilot study; collect data; and identify and implement a suitable framework for analysis.

Prerequisite: Practicum or permission of instructor.

Course Goals

This course is designed to prepare you to conduct research in mathematics education through a variety of activities that include examining ethical and methodological issues in conducting research, learning from experienced researchers, critically reviewing research literature, and preparing for individual doctoral research. For students nearing the end of course work in their Ed.D. or Ph.D. program, it is expected that they make progress on their dissertation research proposal. For students who have defended a research proposal, it is expected that they will engage in carrying out their research, updating the literature, and making progress as each study suggests.

All students are encouraged to assimilate into the research community and participate in professional research meetings (e.g., ICME, PME, PME-NA, AERA and NCTM Research Pre-session, GSE brown bag presentations, etc.). Students are encouraged to engage in the preparation of posters, short orals and research reports and symposia.

In order to introduce you to a variety of research studies that are completed or in progress, several speakers will be invited to give presentations. The dates for invited speakers are tentative and will depend on winter weather and other possible conflicts. For each speaker, you need to prepare a one page abstract of important ideas and your reaction.

You, too, are expected to present some aspect of your ongoing work this semester. This will be in the form of a 15-20 minute PowerPoint presentation. The setting of specific goals of project work will be negotiated early in the course (**first meeting or shortly thereafter**) **based on individual interests and objectives for starting or advancing your research work.**

COURSE REQUIREMENTS

Successful completion of the course requires that actively engage in all activities and submit all assignments. This process requires that you:

1. Attend on-campus class sessions and guest lectures. Submit one page abstract/reaction to guest lectures. Be an active participant in class discussions.
2. Engage in regular online threaded discussions through the Pearson eCollege/eCompanion course web site. You must participate in these activities as an individual posting your ideas to group work and by responding to the ideas posted by others in your group. Your voice must be heard (i.e., visible) as a contributor to discussions and other group work. It is insufficient to merely read what others say; you must contribute your own thoughts and reactions by posting to the site with questions, interpretations, responses, etc.
3. Attain and/or update IRB Certification to conduct Human Subjects Research. If you are not currently certified you must do so by **February 21, 2016**. Send email to Instructor (Maher and Sigley) with your date of certification and/or copy of the letter documenting certification. Human Subjects Certification can be obtained through completion of an online (Sakai) course. Anticipated time of completion is three hours, and information about to proceed can be found at the following website: <http://orsp.rutgers.edu/humans/HSCPLetter.php>
4. Complete all individual and group project assignments: These include but are not limited to:
 1. Updated literature review for research topic of interest
 2. Written review of a doctoral dissertation (approval of instructor)
 3. Attendance at dissertation/proposal defense/brown bag
 4. Show knowledge of conducting library search for publications
5. Prepare one page abstract/reaction to all assigned readings
6. Complete individual course project; contribute to small group project

Note that the details of specific assignments will be posted to the eCollege/eCompanion course web site, although assignments also may be discussed in some detail during face-to-face meetings. The following table is a projected course outline with some assignments noted, but the exact schedule of assignments may be adjusted as we proceed with the course. However, we will follow the schedule with regard to dates when we meet on campus. In the event of severe, inclement weather, we may switch our in-class meeting to asynchronous online.

Learning Goals

1. Students will gain knowledge in developing and carrying out research
2. Students will collaborate and assist each other in making progress toward a research study
3. Students will be introduced to ongoing and completed research studies

4. Students will learn about research through assigned readings and research tools
5. Students will learn to write reviews of published articles and dissertations
6. Students will develop and present a PowerPoint presentation of their work

Required texts

All readings will be provided electronically or will be obtained through library search

Grading policy

Attendance - Students are required to attend all class sessions and participate regularly during in class and online sessions. If special circumstances (religious observance, school open house, illness) require absence, students are responsible to inform the instructor beforehand and to make up all work. It is suggested that each student identify a partner who can share information and assignments when one is unable to attend class.

Course project

An independent course project will be negotiated with each student as background, experience and interest suggest. Examples of projects include, but are not limited to: literature reviews, research proposals, data collection, data coding, and data analyses.

Class participation– 10%

Online participation– 10%

Small group course project – 15%

Individual course project -25%

Abstract/Reactions to readings and invited speakers – 40%

Academic Integrity Policy

Any violation of academic honesty is a serious offense and is therefore subject to an appropriate penalty. Refer to <http://academicintegrity.rutgers.edu/integrity.shtml> for a full explanation of policies.

Course Requirements

You are expected to be an active participant in the class through small group work in the classroom and through web-based discussions, projects, lectures and writing. Successful completion of the course requires that you engage in all activities and submit all assignments. You are required to:

1. Attend **all** on-campus sessions and submit all assignments **ON TIME**.
2. Actively participate in online discussions as you engage with assignments (readings) and respond to guiding questions as posted on the eCompanion course web site. You are required to make at least one original posting and respond to at least two group member postings per week.
3. Be knowledgeable and contribute to the discussion of all the assigned readings
4. Complete and present *Individual Project*
5. Complete a *reflection paper* and *exit questionnaire* about your work in this course to include online and in class discussions of the literature and project work. This will be the final assignment and due no later than May 2. You should reflect on your knowledge of the work for the semester
6. Complete **ALL** assignments.

Class sessions are held on campus in our regular classroom (GSE 030) except when indicated as **ONLINE** (2/15, 2/22, 3/7) in the following outline of activities. Every week includes online discussions in addition to activities conducted in a face-to-face setting.

WEEK SESSION	IN CLASS ACTIVITIES	ASSIGNMENTS Drop Box Posts, Readings and Other Requirements
Week 1 January 25	Class Activities: 1. What is a research agenda? How does one establish a research agenda? What are considerations in conducting research? 2. What is IRB? Why are issues of integrity important? Discuss research with human subjects and their rights. Getting IRB certified. 3. What are your research experiences, if any? 4. Review of syllabus and individual projects	Drop Box: Respond to the questions in the Document Folder and then submit to Drop Box. Be sure to title with your name. Reading for Week 2: Review doctoral dissertation of Maria Steffero (posted on course site)
Week 2 February 1	Class Activities Part 1: Discussion of purpose, theoretical perspective, framework, design, content, format, findings of Steffero Dissertation Part 2: Guest Speaker to be announced	Online: Engage in discussion of Steffero dissertation; questions posted on line Drop Box: Submit 2-page review of Steffero dissertation Reading for Week 3: Maher, C. A. & Weber, K. (2010).
Week 3 February 8	Class Activities Part 1: Discussion of purpose, theoretical perspective, framework, design, analysis, findings, limitations, and implications for further study of Maher/Weber paper. Part 2: Guest Speaker to be announced	Reading for Week 4: Tsamir, P. (2008). Online: Engage in discussion; questions posted on line
Week 4 February 15 ONLINE	Attain and/or update IRB Certification to conduct Human Subjects Research	Assignments for Week 5: 1. Submit evidence of certification 2. Review doctoral dissertation of Kathy Shay (posted on course site) 3. Drop Box: Submit 2-page review of main ideas of Shay dissertation
Week 5 February 22 ONLINE	Alexander Library: Learn to conduct literature searches and use the RefWorks bibliographic tool	Assignment for Week 6: Online: Engage in discussion of Shay dissertation; questions posted

Week 6 February 29	<p>Class Activities</p> <p>Part 1: Discussion and selection of dissertations</p> <p>Part 2: What is the study about? What theoretical perspective does the researcher take? What is the data source? What framework is used to analyze the data? What is the method of analysis? What are some findings? What are limitations and implications?</p>	<p>Assignment for Week 7:</p> <p>Review doctoral dissertations from list provided and choose a dissertation to read, study and present to class</p>
Week 7 March 7 ONLINE	<p>Review doctoral dissertations from list provided and choose a dissertation to read, study and present to class</p>	<p>Assignment for Week 8:</p> <p>Drop Box: Submit 2-page review of main ideas of selected dissertation</p>
	SPRING BREAK: MARCH 14	
Week 8: March 21	<p>Class Activities</p> <p>Class discussion/presentations of selected dissertations</p>	<p>Readings for Week 9:</p> <ol style="list-style-type: none"> 1. Cobb, P., & Yackel, E. (1996) 2. Yackel, E. & Hanna, G. (2003) <p>Online: Engage in discussion of questions posted</p>
Week 9 March 28	<p>Class Activities</p> <p>Part 1: Reports of Group Project</p> <p>Part 2: Discussion of readings</p>	<p>Readings for Week 10:</p> <p>Selected chapters from: Davis, R. B., Maher, C. A. & Noddings, N. (Eds.) (1990)</p> <p>Online: Engage in discussion of questions posed</p>
Week 10: April 4	<p>Class Activities</p> <p>Invited Speaker: Professor Gerald Goldin</p> <p><i>Exploring Affect in Research</i></p>	<p>Readings for Week 11:</p> <p>To be determined</p> <p>Online:</p> <p>To be determined</p>
Week 11: April 11	<p>Class Activities</p> <p>Part 1: Discussion of readings</p> <p>Part 2: Reports of Group Projects</p>	<p>Readings for Week 12:</p> <ol style="list-style-type: none"> 1. Francisco, J. M., & Maher, C. A. (2005) 2. Maher, C. A. (1999) <p>Online: Engage in discussion of questions posed</p>

Week 12: April 18	Class Activities Part 1: Discussion of readings Part 2: Discussion of individual projects	Readings for Week 13: 1. Maher, C.A. & Martino, A.M.(1996) 2. Yackel, E. & Hanna, G. (2003) Online: Engage in discussion of questions posed Preparation of PowerPoint
Week 13: April 25	Class Activities: Part 1: Discussion of readings Part 2: Discussion of course projects	Readings for Week 14: 1. Freudenthal. H. (1968) 2. Davis, R. B. (1992) Online: Engage in discussion of questions posed
Week 14: May 2	Class Activity: PowerPoint Presentations	Final Reflection and Next Steps
Week 15: May 9	Class Activity: Complete PowerPoint Presentations	

READINGS AND REFERENCES

- Cobb, P., & Yackel, E. (1996). Constructivist, emergent, and sociocultural perspectives in the context of developmental research. *Educational psychologist*, 31(3-4), 175-190.
- Davis, R. B.(1992). Understanding ‘Understanding’. *The Journal of Mathematical Behavior*, 11(3), 225-241.
- Davis, R. B., Maher, C. A. & Noddings, N. (Eds.) (1990). Constructivist views on the teaching and learning of mathematics: *Journal for Research in Mathematics Education*, Monograph No. 4. Reston, VA: National Council of Teachers of Mathematics.
- Freudenthal, H. (1968). Why to teach mathematics so as to be useful. *Educational Studies in Mathematics* 1, 3-8.
- Francisco, J. M., & Maher, C. A. (2005). Conditions for promoting reasoning in problem solving: Insights from a longitudinal study. *The Journal of Mathematical Behavior*, 24(3), 361-372.

- Maher, C. A. (1999). Mathematical thinking and learning: a perspective on the work of Robert B. Davis. *Mathematical Thinking and Learning*, 1 (1), 85-91.
- Maher, C. A. & Martino, A. M. (1996). The development of the idea of mathematical proof: A 5-year case study. In F. Lester (Ed.), *Journal for Research in Mathematics Education*, 27 (2), 194-214.
- Maher, C. A. & Weber, K. (2010). Representation Systems and Constructing Conceptual Understanding. Special Issue of the *Mediterranean Journal for Research in Mathematics Education* 9(1), 91-106.
- Pirie, S. E. B. & Kieren, T.E. (1992). Watching Sandy's understanding grow. *The Journal of Mathematical Behavior*, 11(3), 243-257.
- Tsamir, P. (2008). Using theories as tools in mathematics teacher education. In D. Tirosh and T. Wood (Eds.), *International Handbook of Mathematics Teacher Education: Vol. 2: Tools and Processes in Mathematics Teacher Education* (pp. 211-234). Rotterdam, The Netherlands: Sense Publishers.
- Yackel, E. & Hanna, G. (2003). Reasoning and proof. In J. Kilpatrick, G. W. Martin, and D. Schifter, (Eds.), *A Research Companion to Principles and Standards for School Mathematics* (pp. 227-236). Reston, VA: National Council of Teachers of Mathematics.