

16:300:563

Video Data Methodology

Fall 2016

Instructor: Dr. Gerald Goldin	geraldgoldin@dimacs.rutgers.edu
Phone Number 908-720-2434	Class room: Hardenburgh Hall (HH) B6
Office Hours: Tuesdays, 2:00-2:50, GSE Room 235, or by arrangement	Prerequisites or other limitations: School 16
Mode of Instruction: <input type="checkbox"/> Lecture <input checked="" 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

Learning Goals

This course is designed to prepare you to conduct research in education that makes use of video data. Activities will include discussions of research questions answerable through video data, analyzing video data, exploring the potential and limitations of video data, writing scholarly data analyses, and participating in research.

Course Catalogue Description

The course focuses on critical examination of studies using video data, the design of new mathematics education research that will use video data, and methodological techniques for analyzing video data.

Course Requirements

Successful completion of this course requires students to actively engage in all activities and submit all assignments. This requires that you:

1. Attend all class sessions.
2. Participate fully in all online activities, using both the course website on Sakai, and the Video Mosaic collaborative (VMC) website.
3. Attain IRB Certification to conduct Human Subjects Research. Human Subjects Certification can be obtained through completion of an on-line course.

Upload a copy of your letter acknowledging completion of the program to Sakai.

4. Review and provide a detailed discussion of two doctoral dissertations or published research articles in mathematics education, that yielded findings from the analysis of video data.

5. Conduct an individual research project using the VMC repository collection of archived videos and metadata.
6. Write a reflection paper that addresses your activities, discussions, readings, and project work during the course.

Students with disabilities

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 s/he is officially enrolled, participate in an intake interview, and provide documentation:

<https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports the request for reasonable accommodations, the campus's disability services office will provide a Letter of Accommodations. This letter should be shared with the student's instructors, and the appropriate accommodations should be discussed with them as early in each course as possible. The registration form to begin this process is available on the Office of Disability Services website at <https://ods.rutgers.edu/students/registration-form>.

Readings and Dissertations

Required and recommended articles, readings, and/or dissertations will be posted on the course website.

Resource: Goldman, R., Pea, R., Barron, B., & Derry, S. (Eds.). (2007). *Video research in the learning sciences*. Mahwah, NJ: Erlbaum

COURSE OUTLINE AND ASSIGNMENTS

Topics and readings are subject to modification, based on students' research interests and the pace of our course. Updated information will be posted on Sakai.

<p>9/07//2016 Week #1 On campus</p>	<p>Introduction and course overview. Students' research activities and interests. General perspectives on video data. Introduction to the <i>Video Mosaic Collaborative</i> (VMC).</p> <p>Assignment: Reading and online discussion in response to guiding questions.</p> <p>(1) Derry et al. (2010). Conducting video research in the learning sciences: Guidance on selection, analysis, technology, and ethics. <i>The Journal of the Learning Sciences</i>, 19, 3-53.</p> <p>(2) Palius, M. F. & Maher, C. A. (2011). Teacher education models for promoting mathematical thinking. <i>Proceedings of 35th Conference of the International Group for the Psychology of Mathematics Education</i>. Ankara, Turkey: PME.</p> <p>(3) Post commentary on the above articles to Sakai, as per class instructions.</p>
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<p>9/14/2016 Week #2 On campus</p>	<p>Exploring the use of Analytic Tool for VMC Repository. Perspectives on the formulation of research questions. Continuing discussion of students' research activities and interests.</p> <p>Assignment: Reading and online discussion per guiding questions.</p> <p>(1) Goldman, S. & McDermott, R. (2007). Staying the course with video analysis. In Goldman, R., Pea, R., Barron, B. and Derry, S. (Eds.), <i>Video Research in the Learning Sciences</i>, 101-114. Mahwah, NJ: Erlbaum.</p> <p>(2) Post commentary on the above article to Sakai, as per class instructions.</p> <p>(3) IRB certification letter to be uploaded before next week.</p>
<p>9/21/2016 Week #3 On campus</p>	<p>Formulating research questions. The role of theoretical models and research questions in interpreting video data. Preliminary discussion of issues including validity, reliability, and context-dependence of research findings.</p> <p>Assignment:</p> <p>(1) Group work with VMCAalytic and Social Networking Tool. Details to be provided.</p>
<p>9/28/2016 Week #4 TBA</p>	<p>How video is currently being used in research on teacher education and children's learning.</p> <p>Assignment: Reading and online discussion per guiding questions.</p> <p>(1) Maher, C. A. (2008). Video recordings as pedagogical tools in mathematics teacher education. In D. Tirosh and T. Wood (Eds.), <i>International Handbook of Mathematics Teacher Education: Vol. 2: Tools and Processes in Mathematics Teacher Education</i> (pp. 65-83). Rotterdam, The Netherlands: Sense Publishers.</p> <p>(2) Alston, A., Goldin, G. A., Jones, J., McCulloch, A., Rossman, C., & Schmeelk, S. (2007). The complexity of affect in an urban mathematics classroom. In Lamberg, T., & Wiest, L. R. (Eds.). Proceedings of the 29th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Stateline (Lake Tahoe), NV: University of Nevada, Reno.</p> <p>(3) Post commentary on the above articles to Sakai, as per class instructions.</p>
<p>10/05/2016 Week #5 TBA</p>	<p>Video research on cognition and affect in mathematics education.</p> <p>Assignment: Reading and online discussion per guiding questions.</p> <p>(1) Goldin, G. A. (2000). A scientific perspective on structured, task-based interviews in mathematics education research. In Kelly, A. E. & Lesh, R. A. (Eds.), <i>Handbook of Research Design in Mathematics and Science Education</i>. Mahwah, NJ: Erlbaum, 517-545.</p>

	<p>(2) Post commentary on the above article to Sakai, as per class instructions.</p> <p>(3) Doctoral dissertation readings, to be specified.</p>
<p>10/12/2016 Week #6 On campus</p>	<p>Analysis of video data. Transcriptions, rubrics, coding schemes, and interpretations of findings.</p> <p>Assignment:</p> <p>(1) Further doctoral dissertation readings, to be specified.</p>
<p>10/19/2016 Week #7 On campus</p>	<p>Exploring video research in the learning sciences.</p> <p>Assignment: Reading and online discussion per guiding questions</p> <p>(1) Goldman, R. (2007). Video representations and the perspective framework: Epistemology, ethnography, evaluation, and ethics. In Goldman, R., Pea, R., Barron, B. and Derry, S. (Eds.), <i>Video Research in the Learning Sciences</i>, 3-38, Lawrence Erlbaum Associates: Mahwah.</p> <p>(2) Post commentary on the above article to Sakai, as per class instructions.</p>
<p>10/26/2016 Week #8 Online activity No meeting</p>	<p>Problems and issues regarding methodologies for video data analysis. Further discussion of video research on affect and cognition.</p> <p>Assignment: Readings and online discussion per guiding questions</p> <p>(1) Powell, A. B., Francisco, J. M., & Maher, C. A. (2003). An analytical model for studying the development of Learners' mathematical ideas and reasoning using videotape data. <i>The Journal of Mathematical Behavior</i>, 22(4), 405-435</p> <p>(2) Epstein, Y., Schorr, R. Y., Goldin, G. A., Warner, L. B., Arias, C., Sanchez, L., Dunn, M., & Cain, T. R. (2007), Studying the affective/social dimension of an inner-city mathematics classroom. <i>Procs. of the 29th Annual Conference of PME-NA</i>, Lake Tahoe, Nevada, USA, October 25-28, 2007.</p> <p>(3) Post commentary on the above articles to Sakai, as per class instructions.</p>
<p>11/02/2016 Week #9 On campus</p>	<p>Advantages and limitations of collecting and analyzing video data. Issues of data collection and interrater reliability. Implications for the study of affect in mathematics education.</p> <p>Assignment: Reading and online discussion per guiding questions</p> <p>(1) DeBellis, V. A. & Goldin, G. A. (2006), Affect and meta-affect in mathematical problem solving: A representational perspective. <i>Educ. Studies in Mathematics</i>, 63, 131-147.</p> <p>(2) Post commentary on the above article to Sakai, as per class instructions.</p>

11/09/2016 Week #10 TBA	Individual VMC research project preparation Assignment: (1) Analysis of full video (2) Develop research question(s); draft preliminary coding rubric; select critical events. (3) Outlines for detailed article and dissertation reviews.
11/16/2016 Week #11 On campus	Discussion of VMC research projects. Discussion of doctoral dissertations and published studies. (1) Post abstracts of VMC research projects (2) Post outlines of individual article and dissertation reviews. (3) Continue individual work on VMC research projects and article/dissertation reviews. (4) Begin reflection paper.
11/23/2016	<i>Thanksgiving holiday schedule: no meeting this week</i>
11/30/2016 Week #12 On campus	Presentations of reviews of doctoral dissertations and published studies.
12/07/2016 Week #13 On campus	Presentations of individual VMC research projects.
12/14/2016 Week #14 Online activity No meeting	Online responses to questions, feedback, and group discussion. All required course assignments will be due for posting to Sakai by Thursday December 15: (1) Report on individual VMC research project, (2) Two reviews of published articles and dissertations (including at least one dissertation), (3) Reflection paper.

Policy on Academic Integrity

Students are responsible for knowledge of Rutgers University's academic integrity at policy, found at <http://academicintegrity.rutgers.edu>, and will be held strictly accountable for compliance with it.

A selection of Recent Doctoral Dissertations Using Video Data (with acknowledgment to Professor Carolyn A. Maher):

From Rutgers University

- Aboelnaga, Eman (2011). *A case study: The development of Stephanie's algebraic reasoning*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Ahluwalia, Anoop (2011). *Tracing the building of Robert's connections in mathematical problem solving: A sixteen-year case study*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Arias Pablopoulos, C. C. (2015). *Investigating the Use of the Clinical Interview Method in an Elementary Mathematics Methods Course*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Baldev, P. (2009). *A study of urban, seventh-grade students' ideas about linear functions*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Brett, P. C. (2013). *An analysis of affective student/teacher mathematical interactions in two urban middle school classrooms*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Francisco, J. M. (2004). *Students' reflection on mathematical learning: Results from a longitudinal study*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Glass, B. H. (2001). *Mathematical problem solving and justification with community college students*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Kiczek, R. D. (2000). *Tracing the development of probabilistic thinking: Profiles from a longitudinal study*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Halien, William B. (2011). *Tracing students' understanding of instantaneous changes*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Mueller, Mary (2007). *A study of the development of reasoning in sixth grade students*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Marchese, C. (2009). *Representation and Generalization in Algebra Learning of 8th grade students*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Pantozzi, R. (2009). *Students Making Sense of the Fundamental Theorem of Calculus*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.

- Powell, A. B. (2003). *"So let's prove it!" Emergent and elaborated mathematical ideas and reasoning in the discourse and inscriptions of learners engaged in a combinatorial task*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Rossmann, C. F. (2013). *An Investigation of Two Engagement Structures in Middle School Mathematics Classrooms*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Schmeelk, Suzanna (2010). *An Investigation of Fourth-Grade Student's Growing Understanding of Rational Numbers*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Shay, K. (2009). *Tracing middle school students' understanding of probability*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Spang, K. (2009). *Teaching Algebra Ideas to Elementary School Children: Robert B. Davis' Introduction to Early Algebra*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Sran, Manjit K. (2010). *Tracing Milin's Development of Inductive Reasoning: A Case Study*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Steencken, E. P. (2001). *Tracing the growth of understanding of fraction ideas: A fourth grade case study*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Steffero, Maria (2010). *Tracing beliefs and behaviors of a participant in a longitudinal study for the development of mathematical ideas and reasoning: A case study*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Tozzi, Barbara (2011). *A Study on Middle School Students' Use of Computer Generated Representations As They Solve a Probability*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Uptegrove, E. B. (2005). *To symbols from meaning: Students' long-term investigations in counting*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Walter, J. G. (2004). *Tracing mathematical inquiry: High school students mathematizing a shell*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Warner, L. B. (2004). *Behaviors that indicate mathematical flexible thought*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.
- Yankelewitz, D. (2009). *The development of mathematical reasoning in elementary school students' exploration of fraction ideas*. Unpublished doctoral dissertation, Rutgers, The State University of New Jersey, New Brunswick.

From other universities

- Choppin, J. M. (2004). *How teachers' discourse practices affect student engagement in the context of mathematics reform*. Unpublished doctoral dissertation, The University of Wisconsin, Madison.
- Doyle, J. A. (2003). *Student voice: The influence of complex instruction on fifth grade students' mathematical problem solving performance*. Unpublished doctoral dissertation, Boston College, Boston.
- Goos, M. (1999). *Metacognition in context: A study of metacognitive activity in a classroom community of mathematical inquiry*. Unpublished doctoral thesis, University of Queensland.
- Herbst, P. G. (1998). *What works as proof in the mathematics class*. Unpublished doctoral dissertation, University of Georgia.
- Horn, I. S. (2002). *Learning on the job: Mathematics teachers' professional development in the contexts of high school reform*. Unpublished doctoral dissertation, University of California, Berkeley.
- John, A. S. (2001). *Generalizing in interaction: Students making and using mathematical generalizations in design projects*. Unpublished doctoral dissertation, University of California-Berkeley, Berkeley.
- Larsen, S. P. (2004). *Supporting the guided reinvention of the concepts of group and isomorphism: A developmental research project*. Unpublished doctoral dissertation, Arizona State University.
- Magidson, S. (2002). *Teaching, research, and instructional design: Bridging communities in mathematics education*. Unpublished doctoral dissertation, University of California, Berkeley.
- Martin, L. C. (1999). *The nature of the folding back phenomenon within the Pirie-Kieren theory for the growth of mathematical understanding and the associated implications for teachers and learners of mathematics*. Unpublished doctoral dissertation, University of Oxford, Oxford, England.
- Raman, M. J. (2002). *Proof and justification in collegiate calculus*. Unpublished doctoral dissertation, University of California, Berkeley.
- Seymour, J. R. (2004). *Tracing the evolution of pedagogical content knowledge as interanimated discourses*. Unpublished doctoral dissertation, The University of Wisconsin-Madison, Madison.
- Sherin, M. G. (1996). *The nature and dynamics of teachers' content knowledge*. Unpublished doctoral dissertation, University of California, Berkeley.
- Smith, S. P. (1999). *Children, learning theory, and mathematics: An analysis of the role of language and representations in children's mathematical reasoning*. Unpublished doctoral dissertation, Michigan State University, East Lansing.