



Buffalo State College Mathematics Department
Spring 2007 MED 595 — Course Number 2152 —
Research Methods and Techniques in Mathematics Education
Thursdays 6:00 pm – 8:40 pm Room: Bacon 220

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Office Hours: Mondays 3:00 – 4:00
Thursdays 4:00 - 5:00
or by appointment.

COURSE OVERVIEW:

This course is designed to help reflective practitioners of learning interact with many types of knowledge to assist in making decisions in the world of practice. This course will familiarize the reflective practitioner with current research practices in Mathematics Education. This will include research techniques, evaluation of research techniques, and experimental design. The course will enable the student to read and evaluate current research reports and determine the appropriate application of the results to his/her teaching.

RELATION TO TEACHER EDUCATION PROGRAM CONCEPTUAL MODEL:

The preparation of reflective facilitators of learning at Buffalo State College is anchored in a foundation of knowledge of the **learner** (i.e., students in the schools), knowledge of mathematical **content** to be taught, and knowledge of **pedagogy**. The three components of the conceptual model form the foundation of MED 595. Reflective Practitioners need to interact with many types of knowledge when they are making decisions in the world of practice. They must use their:

Knowledge of the **learner**, including knowledge of student characteristics and cognitions, as well as knowledge of motivational and developmental aspects of how students learn.

Knowledge of **content** – their understanding of the facts or concepts within the domain of mathematics – as well as their grasp of the structure of the subject matter. They must have knowledge of the substantive structures – the ways in which the fundamental principals of mathematics are organized. In addition, they must have knowledge of the syntactic structure of a discipline – the canons of evidence and proof that guide inquiry in the field both to teach it and to practice it as a guide to effective critical thinking.

Knowledge of **pedagogy** – knowledge of pedagogical principles that are subject matter or topic specific and pedagogical principals and techniques that are not bound by subject matter or topic.

COURSE OBJECTIVES:

At the conclusion of this course, the student will be:

1. knowledgeable of the resources available to research a topic in mathematics education;
2. able to read, analyze and interpret research in mathematics education;
3. familiar with major research paradigms in mathematics education;
4. familiar with major research questions in the teaching and learning of mathematics as well as knowledgeable of the current status of research implications for each of these questions;
5. familiar with varying research methodologies that are available for conducting research in mathematics education;
6. able to identify appropriate research questions for a specific topic of interest in mathematics education research;
7. able to conduct and write a literature review addressing his/her questions; and
8. able to design a research study appropriate for studying his/her questions.

REQUIRED TEXTS

Creswell, J.W., (2005). Educational research – planning, conducting, and evaluating quantitative and qualitative research (2nd ed.). Upper Saddle River, NJ: Pearson Education, Inc.

On a regular basis, you will be expected to use the campus library outside class time. For this reason, you will need a current SUNY card.

You will need a current email account that can accept documents. If you are using an account other than your BSC account be sure to let the instructor know.

All assignments should follow the American Psychological Association Publication Manual format. If you are not familiar with this format, it is advised that you purchase one of the following.

American Psychological Association. (2001). Publication manual of the American Psychological Association (5th ed.). Washington, D.C.: The author.

Amato, C.J., (2002). The world's easiest guide to using the APA: A user friendly manual for formatting research papers according to the American Psychological Association. [Available at Amazon.com]

Some RECOMMENDED TEXTS

Bogdan, R.C., & Biklen, S.N. (1992). Qualitative research for education (2nd ed.). Needham Heights, MA: Allyn and Bacon.

Carr, W. & Kemmis S. (1986). Becoming critical - education, knowledge and action research. Philadelphia, PA: Falmer Press.

Gall, M.D., Borg, J.P., & Borg, W. R. (2003). Educational research: an introduction (7th ed.). Boston, MA: Allyn and Bacon.

Gitlin, A., Bringhurst, K., Burns, M., Cooley, V., Myers, B., Price, K., Russell, R. & Ties, P.

- (1992). Teachers' voices for school change: an introduction to educative research. NY: Teachers College Press.
- Krathwohl, D.R. (1985). Social and behavioral science research: A new framework for conceptualizing, implementing, and evaluating research studies. San Francisco: CA: Jossey-Bass Publishers.
- Lecompte, M.D., & Preissle, J. (1993). Ethnography and qualitative design in educational research (2nd ed.). San Diego, CA: Academic Press.
- Miles, M.B. & Huberman, A.M. (1994). An expanded sourcebook: qualitative data analysis (2nd ed.). Thousand Oaks, CA: Sage Publications.
- National Council of Teachers of Mathematics. (2000). Principles and standards for school mathematics. Reston, VA: The author.
- Sowder, J. and Schappelle, B. (2002). Lessons Learned from Research. Reston, VA: National Council of Teachers of Mathematics.

COURSE REQUIREMENTS and EVALUATION:

General Classroom Activities and Attendance:

You are expected to attend all scheduled classes and participate actively in discussions. Your attendance is not only an indication of how seriously you take this course, but a measure of your professional commitment as well. You are expected to be a collaborative participant in all class work. Your participation in our class activities and discussions is important not only for your own learning, but also for the learning of others. You are expected to participate thoughtfully, responsibly and constructively in discussion on a regular basis. Our discussions serve as a forum in which you can sharpen your thinking, test your ideas, exchange insights and perceptions with the instructor and each other and contribute toward others' ideas.

If you are forced to miss a class, it is your responsibility to notify me as soon as possible and get assistance on the work missed before the next class. Absence from more than two classes is considered excessive and will likely result in a lower grade. Repeated tardiness can also result in a lower grade.

Use of Cell Phones and Pagers:

While in our classroom, please turn off all cell phones and pagers. They are a disruption to the entire class. If you are facing an emergency situation that necessitates that you keep your phone or beeper on, please notify me before class begins and be as discrete as you can while in class. Otherwise, please turn it off or choose vibrate as your ringer.

Assignments

Readings

You will be required to read selected sections from texts as well as articles distributed in class. You will be required to type responses to various questions within the readings. You may have quizzes addressing the readings or mathematical content covered in the readings.

Journal Article Critiques

You will be responsible for critiquing research articles throughout the semester. A research study article will be given to you to critique. Your critique **MUST** be typed,

double-spaced using APA style. This is NOT a summary of the article but a careful consideration of the work presented.

Weekly Assignments and Quizzes

There will be some sort of assignment given each week; some may be to work with a group or partner outside class. Even if you are absent on the day the assignment is handed out or the due date, you are not excused from handing in the required homework on time. All written work, other than mathematical problems, should be done on a word processor. If you do not have a computer for your use at home, there are computers in the mathematics department and in the campus computer labs that you may use. Mathematical calculations and formulas, transparencies, and drawings are the only hand-drawn materials acceptable. (You should begin to learn how to do these on a computer as well.)

Literature Review

As a part of your Research Plan, you will be expected to complete a Review of the Literature relevant to your study's topic. Further elaboration of this project will be given. You will be required to give a brief presentation about your literature review to the class.

Research Plan

You will be required to write a Research Plan. After writing this plan you will share the plan with a few of your classmates, as well as your instructor. During the class succeeding the submission of your Research Plan, you will present your fellow group members with typed comments on their plans. You will then be expected to revise your plan using the comments from both your classmates and your instructor.

Research Plan Presentation

You will be required to give a presentation of your final research plan to the entire class. This should be a formal presentation of your proposed study. You should include a discussion of the rationale and significance of your study.

GRADING: Your grade for the semester will be determined according to the following chart.

Reaction Papers and assignments	45%
Quizzes	5%
Research Plan and Critique of group members' Research Plans	25%
Presentations	10 %
Classroom Participation	15%
Total	100%

In order to maintain consistency in grading, points will be deducted from assignments that are submitted after the due date and time. 10% of the total point value will be deducted for each weekday an assignment is late.

It is NOT possible to repeat an assignment to raise a grade unless otherwise stated on a specific assignment.

Academic Integrity: Plagiarize: *to steal and pass off (the ideas or words of another) as one's own; use (a created production) without crediting the source.* Webster's Ninth New Collegiate Dictionary.

ANY work handed in by you, with your name on it, is assumed to be YOUR WORK and YOUR WORK alone. If you work with another person or a group of people, or find a solution in another text, which you wish to submit, PLEASE give credit where credit is due. Any materials that are not documented are defined as plagiarism and will result in a zero grade.

Behavior: (recommended BSC policy) “All students are expected to comport themselves in a manner that does not convey to others in the college community any disrespect, intolerance, or rude behavior based on age, race, religion, color, national origin, gender, sexual orientation, disability, or marital, veteran, or socioeconomic status. All members of the college community are expected to contribute to the college environment to move the college community in the direction of respect for all.” And

“The instructor may have removed from the classroom anyone who, in the instructor's opinion, is disrupting the educational process, and pursue formal changes against the student under the college judicial system, pursuant to Buffalo State College's Procedure Regarding Disruptive Individuals.”

Accommodations for Students with Disabilities: If you have a disability or suspect that you have a disability that requires any type of accommodation to fulfill the requirements of this course, please contact the Office of Special Services for Students with Disabilities at 878-4500.

IMPORTANT DATES:

February 8 - LIBRARY ORIENTATION We will meet in Butler Library 314.

March 22 – No Class session.

March 30 – Last day to Withdraw

April 5 – Spring Break – No Class

April 19, 26, May 3 (Perhaps continuing until May 10) – proposal presentations

May 10 – Last meeting