

Classroom-based Research Appetizers

Data Mining your Course Shell /
Thinking IRB

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Purposes of Systematic Educational Research

1. Separation of anecdotal evidence from hard evidence
2. Opportunity to share knowledge with other educators
3. New knowledge about teaching and learning Undergraduate Mathematics to Inform Professional Standards. *Beyond Crossroads: Implementing Mathematics Standards in the First Two Years of College.*

How do we get there?

- Build a cadre of practitioners that are interested in growing research through reflective practice and networking
- Establish common or intersecting goals
- Maintain communication throughout the year
– Google+, Face Time, Skype, Moodle. . . Jing.
- Professional “play” with bite size research projects that can grow.

Fruitful Sources for Research Topics

- Personal experiences related to math education
 - In the classroom
 - Out of the classroom (conferences, journaling, reflections)
- Discussions with colleagues
 - Educational challenges, successes, experiments
- Journal articles
 - Personally engaging topics
- Review of *Beyond Crossroad and Common Core Standards for Mathematical Practice* – *reading more about Professional standards and goals.*

Formulating Specific Research Questions

- Thorough review of research literature
 - Becoming well-versed in the topic
 - Contacting researchers already involved in topic
- Exploratory “pre-study”
 - Conducting personal interviews, etc.
 - Identifying key issues and problems
 - Involving the local Institutional Review Board (IRB)

Possible Research Agendas - 1

- Using social constructivism for social justice purposes (helping students to become quantitatively literate, democratic citizens who evaluate information and advocate for their own interests)
- Examining mathematical competencies adult returning students bring into math classes
- How to use formative assessment more fully to increase student achievement and student retention in their classes

Possible Research Agendas - 2

- Conducting quantitative and qualitative research on how the AMATYC standards are being implemented and their impact on student performance (Classroom based Research)
- Common Core Standards for Mathematical Practice
- Conducting quantitative and qualitative research evaluating project based activities and/or alternative assessment strategies.

Examples – Explore your curiosity(s)

- Grades and attendance records
- Grades and time/type of engagement within course site
- Reflections on course Activities
- Test Corrections and interviews
- Short quizzes, polls, surveys of attitudes, beliefs, understanding of key concepts
- Impact of service learning on mastery of course content
- Differences between project-based knowledge representation and test-based knowledge representation.
- Use of “Cafeteria Style” preparation work and demonstrated knowledge on formative and summative evaluations.
- “Muddiest Points” analysis
- Use of item analysis in online tests, quizzes, Google forms.

Points of Evidence

- **Artifacts and Observation:** Grades, journal entries, analysis of evidence of mathematical thinking and engagement within assignments and tests, within-semester and post-semester interviews, comparisons between and among demographic and pre-enrollment characteristics, surveys of attitudes and beliefs.
- **Data Mining our Course Shells.**

Research requires IRB review prior to initiation, irrespective of funding if:

- involving human subjects (Human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains 1) data through intervention or interaction with the individual, or 2) identifiable private information. - from [45 CFR 46.102](#))
- using records gathered on human subjects

IRB Review Criteria

- Risks to the subjects is:
 - Minimized and reasonable in relation to anticipated benefits.
- Selection of subjects is equitable.
- Informed consent is:
 - Obtained from each prospective participant or his or her legally authorized representative, and properly documented.
- Adequate preparation is taken to protect the privacy and confidentiality of subjects.
- Adequate provisions are made for the ongoing monitoring of the subjects' welfare.

Basic Tenants of IRB

- Informed Consent – willingness and understanding of purpose, procedures, benefits and risks.
- Basic principles
 - Autonomy – gives participants the respect, time, and opportunity necessary to make his or her own decisions
 - Beneficence – maximize possible benefits and minimize possible harms for everyone
 - Justice – distributes the risks and benefits fairly and without bias

IRB (Institutional Review Board) Considerations

- [Federal Law](#) – Code of Federal Regulation
Title 45 Public Welfare
- Local Institutional Policies – Institutional
Review Boards (where the research is
being conducted and where the
researcher(s) are employed or studying).

Examples of projects/studies that do not need IRB review

- Searches of existing literature
- Quality assurance activities or evaluation projects designed for self-improvement or program evaluation, not meant to contribute to "generalizable" knowledge
- Interviews of individuals where questions focus on things not people (e.g.. questions about policies)

Type of Review - Expedited

- Expedited review – presents no more than minimal risk to human subjects.
 - **(1) Collection of data from voice, video, digital, or image recordings made for research purposes.**
 - **(2) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.**
- The expedited review procedure may not be used where identification of the subjects and/or their responses would reasonably place them at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, insurability, reputation, or be stigmatizing, unless reasonable and appropriate protections will be implemented so that risks related to invasion of privacy and breach of confidentiality are no greater than minimal.

Type of Review - Exempt

- Exempt review-
 - **Exempt Category #1**
Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as: research on regular and special education instructional strategies, or research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. Note: *This category may be applied to research involving children.*
 - **Exempt Category #2**
Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and Any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Type of Review – Full Committee Review

- Full committee review - This type of review is carried out for studies greater than minimal risk to subjects.

Two types of studies

- Retrospective Study – IRB for data mining you and or your colleagues materials, course sites, records
- Prospective Study – Planned ahead of time based on Research question(s) with the intention of data mining you and your colleagues materials, course sites, records.

Join Us!

- What are your classroom-based questions?
- How can we support your engagement in Research?
- <http://rmetyc.blogspot.com/>