Findings and Methodological Lessons from an Evaluation of a Project to Integrate the Arts into Elementary School Reading and Mathematics Instruction

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Purpose of the Paper

- To report a self-meta-evaluation of a quasi-experimental study of a small federally funded project
- How strong can we expect the conclusions of small quasi-experimental evaluations of federally funded programs to be?

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Primary Meta-Evaluation Foci

- *"Project-maturity" issues:* Are most small federally funded projects ready experimental designs?
- *Instrumentation issues:* Collecting data on young students
- *Design issues:* Contextual differences among groups; sampling units and appropriate analyses; generalizability of results
- *Implications for social policy:* Funding small federal programs

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The Evaluated Project

- The evaluation was of the ARTS FIRST Windward Research Project
- Funded by the Arts in Education Model Development and Dissemination (AEMDD) Grant Program.
- Evaluated by doctoral-level generalist evaluators

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AEMDD Purpose

- *From the RFP for AEMDD:* To support "the enhancement, expansion, documentation, evaluation, and dissemination of innovative, cohesive models that are based on research and have demonstrated that they effectively:
  - (1)Integrate standards-based arts education into the core elementary and middle school curricula;
  - (2) strengthen standards-based arts instruction in these grades; and
  - (3) improve students' academic performance, including their skills in creating, performing, and responding to the arts."

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Preferred AEMDD Evaluation Designs

- "Evaluation methods using an experimental design are best for determining project effectiveness. . . . If random assignment is not feasible, the project may use a quasi-experimental design with carefully matched comparison conditions. This alternative design attempts to approximate a randomly assigned control group by matching participants--e.g., students, teachers, classrooms, or schools--with non-participants having similar pre-program characteristics. . . ."

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(Preferred Designs, cont'd.):

- "In cases where random assignment is not possible and participation in the intervention is determined by a specified cutting point on a quantified continuum of scores, regression discontinuity designs may be employed. . . ."
- "Proposed evaluation strategies that use neither experimental designs with random assignment nor quasi-experimental designs using a matched comparison group nor regression discontinuity designs will not be considered responsive to the priority when sufficient numbers of participants are available to support these designs."

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Required Evaluation Rigor

- Evaluation requirements seem to reflect Institute for Education Science specifications for efficacy and effectiveness studies (focus on whether programs work, not how)
- No provision for using formative evaluation methods for development studies (IES "Goal 2 studies")
  - Our experience suggests most AEMDD projects were development efforts.

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"Development" or "Enhancement"?

- Note the discrepancy between the program title and description.
  - Title: Arts in Education Model Development and Dissemination (AEMDD) Grant Program
  - Description: ". . . to support "the enhancement, expansion, documentation, evaluation, and dissemination"
  - "Development" is not the same as "enhancement."

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Project Purpose

- The ARTS FIRST Windward Research Project *purpose:* To examine the extent to which elementary teachers' use of arts strategies in basic skills instruction improved students'
  - achievement in basic skills.
  - attitudes toward school.
  - interest in the arts.

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Project Model

- Strategies taught in four art forms:
  - Drama
  - Dance
  - Music
  - Visual arts
- Six full-day teacher professional development sessions throughout the year
- In-class mentoring by professional artists with teaching experience.

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Program Scope and Duration

- Three-year program in three Title I schools, with an evaluation each year
- Served Grades 3-5, beginning with Grade 3 and adding a grade each year.
  - An expensive program:
    - The schools did not have art teachers; artist mentors had to be found and funded.
    - The project could not afford to serve Grade 3 in Year 3.
- Our meta-evaluation primarily examines the third year of the study, when Grades 4 and 5 were served.

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Evaluation Design

- A quasi-experimental study (non-equivalent control group) with three pairs of schools (project and control) matched on
  - reading achievement
  - SES
  - school size
  - ethnicity
- Matched schools randomly assigned within pairs in Year 1

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Mixed-Method Evaluation

- *Quantitative data (*Good reliability and validity results, as reported previously):
  - **Students' achievement**
  - **Students' attitudes toward school**
  - **Students' interest in the arts**
  - Teachers' attitudes toward the arts
  - Weekly teacher implementation logs
  - Professional development quality (project group only)
  - Ratings of teachers' quality in using arts strategies
- *Qualitative data* (project group only):
  - student focus groups
  - teacher focus groups
  - professional development quality (open-ended responses)

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Project-Maturity Issues

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Ready for Prime Time?

- Contrary to what we had been led to believe about the project at the inception of the study, the AFWRP project evolved considerably over the three years.
  - The arts strategies that were taught were narrowed.
  - The PD methods were revised.
- Not unusual for programs of this nature.

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Instrumentation Issues Complicating the Interpretation of Results

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Restriction of Range

- Student attitude and interest-in-the-arts instruments showed ceiling effects in Years 1 and 2.
  - Calculating and analyzing IRT scores for best-discriminating items helped distinguish among groups.

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How Much About Young Children Can Be Measured Quantitatively?

- Quantitative measures are essential for experiments and quasi-experiments
- Are attitude or student-interest instruments appropriate for measuring children's developmental level?
  - Little found in the literature on measuring elementary school children's attitudes.
- *Bias due to primacy?*
  - Students might have responded to instruments based on recent experiences

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Design Issues Complicating the Interpretation of Results

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Student Quantitative Data Analyses and Results

- Examined project-control differences at the end of Grade 5 (students who had participated all three years), using a fixed-effects statistical model with Grade 3 pretest and propensity scores as covariates.
  - Achievement (results favored project group; post-hoc analysis showed significant difference only between highest-scoring project school and lowest-scoring control school)
  - Attitudes toward school (results favored project)
  - Interest in the arts (dance: results favored project; music: results favored control; others no difference)
  - (Results presented previously [AEA, AERA])

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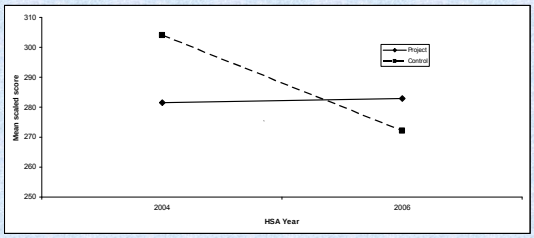
Longitudinal Reading Results



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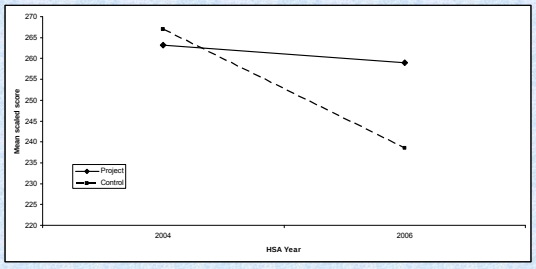
Longitudinal Math Results



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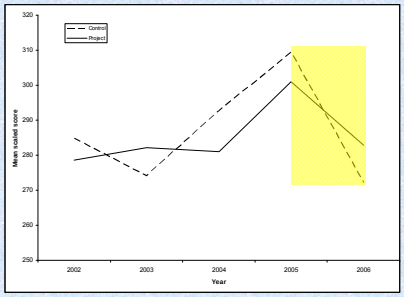
Cross-Sectional Validation (Reading)



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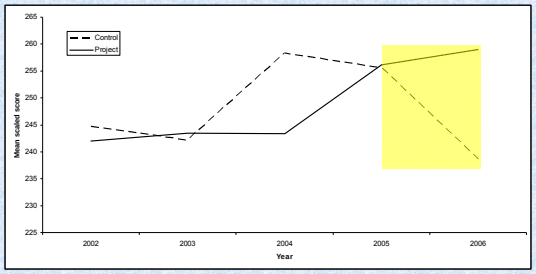
Cross-Sectional Validation (Math)



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Validity Threats Due to Project History

- *Schools' NCLB Standing*
  - Two control schools were "in good standing, unconditional."
  - Two schools, one project and one control, were in "school improvement Year 2."
  - One project school was in "corrective action."
  - One project school was in "planning for restructuring."
- Reading programs used at the schools (e.g., Success for All used at highest-scoring school)

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Aspects of the Study That Complicated the Choice of Analysis

- Chose schools as it were a group-randomized (i.e., cluster-sample) study.
  - Six schools was an insufficient size for a valid group-randomized study because of low statistical power.
  - Not surprisingly, the analysis using a random-effects statistical model showed no significant differences among groups.

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Fixed Effects Model

- We used a fixed-effects statistical model (i.e., schools not considered random effects)
  - This model advocated by IES in the past for Goal 2 (development) grants.
  - The model seems appropriate for us because of the low power of the random-effects model.

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Problems With Fixed Effects Model

- Cannot generalize results to other sites.
- Some argue strongly against fixed-effects model when groups are the unit of assignment because of the strong possibility of inflating the Type I error rate
  - Murray (1998, p. 108) says that using the fixed effects model is a "seductive trap."

Murray, D. M. (1998). *Design and analysis of group-randomized trials.* New York: Oxford University.

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Issues About the Use of Propensity Scores

- Propensity scores are recommended as covariates to help equate non-equivalent groups.
  - However, it is often stated that ANCOVA should only be used with randomly assigned sampling units (although the literature is contradictory about this).
- We used propensity scores at the level of the individual in our analysis. Should they have been at the level of the school (the sampling unit)?

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Social Policy Issues

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Can AEMDD Do What It Seeks to Accomplish?

- Have enough projects shown prior success (a criterion for eligibility for AEMDD)?
  - Should AEMDD and similar programs emphasize *development*, as the title says, or *enhancement*, as the program description says?
- Evolving projects form moving targets that are inappropriate for experimental study.

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Funding Levels

- Most AEMDD evaluations were allocated considerably smaller portion of funds than us ($330,000 for 3 years-- about 40-45% of total funding)
- Is funding sufficient for conducting good group-randomized studies?

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- Low funding a substantial reason for the small number of groups included small studies.
  - "The small number of randomized experiments in education may reflect a simply calculation of how difficult they are to mount." Cook (2001)

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- Despite low funding, perhaps is good social policy (and politically essential) to support the arts.
- Perhaps it is also good policy to insist evaluators focus more on whether programs work than why they work.

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Summary

- Many proposals are submitted for funding to develop new projects, not to enhance existing ones.
- These projects are not ready for quasi-experiments.
- Contextual issues may result in validity threats.
- For elementary school programs, quantitative data possibilities are limited.
- The findings of fixed-effects and other quasi-experimental analyses lack strong warrants.
- Funding for small projects may be too little to arrive at the kinds of conclusions that policymakers seek.

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