Abstract Title Page
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Title: A Procedure for Assessing Fidelity of Implementation in Experiments Testing Educational Interventions

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Abstract Body
Limit 5 pages single spaced.

Background/context:
Description of prior research, its intellectual context and its policy context.

An educational intervention's effectiveness is judged by whether it produces positive outcomes for students, with the randomized controlled trial (RCT) as a valuable tool for determining intervention effects. However, the intervention-as-implemented in an experiment frequently differs from the intervention-as-designed, making it unclear whether unfavorable results are due to an ineffective intervention model or the failure to implement the model fully. It is therefore vital to assess fidelity of implementation and, where possible, to incorporate fidelity data in the analysis of outcomes.

Purpose / objective / research question / focus of study:
Description of what the research focused on and why.

Our objectives are to 1) elaborate a five-step procedure for fidelity assessment, 2) describe the advantages of assessing fidelity with this approach when conducting experiments testing educational interventions, and 3) use examples based on published studies to illustrate how this procedure can be applied.

Setting:
Description of where the research took place.

N/A

Population / Participants / Subjects:
Description of participants in the study: who (or what) how many, key features (or characteristics).

We examine five examples of experiments that tested educational interventions in a range of subject areas (e.g., mathematics, reading, science, behavior) and grade levels (e.g., preschool, elementary, high school).

Intervention / Program / Practice:
Description of the intervention, program or practice, including details of administration and duration.

Fidelity is the extent to which an intervention is implemented as intended. Fidelity assessment describes the cause-and-effect sequences inside the experimental "black box" that collectively make up the implementation of the intervention. By assessing fidelity, we determine the extent to which this sequence occurred as originally envisioned, thus assessing construct validity and providing a basis for generalization. While not always possible, the ideal fidelity assessment includes five steps (Cordray, 2007): 1) describe the intervention change and logic models; 2) create indices to measure the fidelity of the implemented intervention to constructs identified in the models; 3) determine the reliability and validity of indices; 4) combine indices in the analysis; and 5) link fidelity measures to outcomes.

Research Design:
Description of research design (e.g., qualitative case study, quasi-experimental design, secondary analysis, analytic essay, randomized field trial).

As a foundation for our paper, we discuss the limitations of the intent-to-treat experimental model for explaining effects, and the advantages of using fidelity measures to look inside the black box. We describe the five-step assessment process and the rationale for each step. We then demonstrate the procedure's application using several published studies that followed one or more of these steps, illustrating how this approach can be applied practically and the benefits it yields.

Data Collection and Analysis:
Description of the methods for collecting and analyzing data.

Studies examined are drawn from a pool of 526 articles across subjects and grade-levels, identified through a review based on O'Donnell's (2008) methodology. The search employed 14 databases, including ERIC, PsycINFO, JSTOR, Dissertation Abstracts, and Google Scholar. We narrow the scope of articles to peer-reviewed studies involving experiments.

Findings / Results:
Description of main findings with specific details.

We find that, while most analyses of fidelity in educational studies include one or more steps in the five-step fidelity assessment process, the typical study does not include all steps and/or executes steps incompletely. As a result, the usefulness of fidelity data for interpreting experimental results is diminished. We demonstrate that a more complete assessment of fidelity in such cases would lead to a more meaningful analysis that interprets experimental results in light of actual implementation.

Conclusions:
Description of conclusions and recommendations based on findings and overall study.

We conclude that the fidelity assessment procedure can be followed for a range of intervention types and subjects. Furthermore, this approach leads to more *complete* fidelity assessment and thus to better understanding of construct validity and generalizability. By advancing these arguments and providing examples, we encourage broader understanding of the importance of fidelity assessment, more complete assessment, and improved methods for assessment.

Appendices
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Appendix A. References
References are to be in APA version 6 format.

Cordray, D.S. (2007) Assessing Intervention Fidelity in Randomized Field Experiments. Funded Goal 5 proposal to Institute of Education Sciences.

O'Donnell, C. L. (2008). Defining, Conceptualizing, and Measuring Fidelity of Implementation and Its Relationship to Outcomes in K-12 Curriculum Intervention Research. *Review of Educational Research*, *78(1),* 33-84.

Appendix B. Tables and Figures

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