Measuring Fidelity: An Essential Element of Understanding Intervention

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Funded by the Institute of Education Sciences
R324A07212, R324A070008
Importance of Fidelity

• Fidelity of implementation is the determination of how well an intervention is implemented in comparison to its intended design

• Fidelity measures are needed to explain the degree of variation in treatment implementation and how it might affect or moderate outcomes
Fidelity of Implementation: Multiple Dimensions

- Extent to which an intervention (including its content and process) is implemented as designed ("adherence")
- Amount of intervention received ("dosage" or "exposure")
- What it looks like when it is implemented ("quality")
- How far participants respond to, or are engaged by, an intervention ("participant responsiveness")
- Identification of essential components* ("differentiation")

Impact: Linking Fidelity of Implementation to Outcomes

Theory of Instruction and Theory of Change: Embedded Instruction for Early Learning

Embedded Instruction
- What to teach
- When to teach
- How to teach
- How to evaluate

Intentional and Systematic Instruction on Child’s Priority Learning Targets

Increased Embedded Learning Opportunities for Child

Child Engagement and Learning

Point of Intervention
- Tool Kit (Multi-media materials)
- Workshops (high-quality/interactive)
- Coaching (on-site coaching or self-coaching)

Frequent and Accurate Use of Embedded Instruction Practices

Increased Child Learning Opportunities

Child Engagement and Learning
Learning Targets Rating Scale

Wave 4 Cohen’s $d$ Effect Sizes:
- Coach vs. Control: 1.6**
- Self vs. Control: 1.5**
- Coach vs. Self: .09
EIOS: Teacher Implementation
“Embedded” Complete Learning Trials

Wave 4 Cohen’s d Effect Sizes:
- Coach vs. Control: 1.36**
- Coach vs. Self: 1.24**
- Self vs. Control: 0.12
EIOS: Child Behaviors

Wave 4 Cohen’s d Effect Sizes:

Coach vs. Control 0.90**

Coach vs. Self 0.92**

Self vs. Control -0.02
TPOT Study: Theory of Change

- Professional Development
  - Guides & Materials
  - Workshops
  - Coaching

- Teachers’ Frequent and Accurate Use of TPOT Practices

- Contextual Variables

- Children’s Social Competence
Figure 1. Mean Teaching Pyramid Observation Tool implementation scores across waves by experimental condition. Total number of TPOT indicators = 108. Statistically significant and noteworthy differences at Wave 4 \([t(40.03)=6.80, p<.001, \text{Cohen’s } d=2.6]\)
Implementation Moderates/Mediates Social Skills
Failure to Measure Fidelity

- Incorrect conclusion about the effectiveness of interventions
- Lack of application of the planned “treatment”
- Lack of understanding of the manner in which a treatment was or was not applied, compromising replication
- Evaluation of a *described* independent variable, versus *delivered*
- Understanding of the counterfactual group and the differences between intervention and “business-as-usual”
Developing Measures

• Identify conceptual framework, theoretical model
  – Identify active ingredients
  – Operationalize constructs
  – Seek specificity
• Multi-dimensions
  – Adherence, dosage, quality, responsiveness
• Multiple measures
• Evaluate psychometric integrity of fidelity measures
Understanding Fidelity

• Factors influencing
  – External environment
  – Organization
  – Intervention
  – Interventionist

• Level needed to yield effects

• Adaptations and flexibility of Interventions

• Sustainability

• Implementation supports