

## Evidence-Based Instruction in EBD: How To Determine and Deliver Best Practice

G. M. Sasso  
University of Iowa

Midwest Symposium for Leadership in  
Behavior Disorders  
February 2005

---

---

---

---

---

---

---

---

## NCLB Standards of Research

- Use of effective educational practices based on scientifically-based research (SBR-Quantitative experimental designs)
- Establish a cause-and-effect relationship between variables
- Group comparison
  - Holding salient variables constant
  - Systematic variation of one or more factors
  - Control
    - Environment
    - Random assignment of groups
    - Intervention

---

---

---

---

---

---

---

---

## NCLB Types of Research

- "Gold Standard" (scientifically based)
  - Experimental
  - Randomized Clinical Trials (RCT)
- "Silver Standard" (quasi-experimental)
  - Failure to control for one of three elements of experimental designs
    - Environment
    - Intervention
    - Assignment to experimental or control groups
- "Bronze Standard" (supplemental research)
  - Correlational research
  - Single-subject design research (external validity)
  - Qualitative research

---

---

---

---

---

---

---

---

## The Scientific Process

---

- Science is measurement and control (Stanovich, 2004)
  
- Science is not a single procedure, nor is it defined by a particular experimental model (Herschbach, 1996)
  
- Systematic empiricism

---

---

---

---

---

---

---

---

## Systematic Empiricism

---

- Falsifiability
  - A procedure, hypothesis, theory, or set of observations must be submitted to a test
    - If there is no way to fail, not a test
- Replication
  - More than one study, more than one researcher
  - Rules out error and bias (e.g., Cold Fusion)
- Reliability
  - Measure yields consistent results
- Validity
  - Measure accurately predicts what it is designed to predict
- Predict, not prove.
  - Not truth, but at least can eliminate error.

---

---

---

---

---

---

---

---

## Values of Science

---

- Organized Skepticism
  - Not conspiracies in lieu of investigation
- Universalism
  - Science does not respect any culture/ color/gender, but it also does not disrespect any culture/color/gender
- Disinterestedness
  - Science does not serve a particular political purpose
  - Roots of special education in medicine, psychology, and the human rights movement
- Community
  - Scientific results are freely shared
  - Empirical honesty

---

---

---

---

---

---

---

---

## Fooling Ourselves and Others

- Politically Motivated Research
- Advocacy Research
- Fooled by Scholars
  - Theoretical
  - Philosophical
  - Ideological
- Confirmation Bias
- Human Rights Bias
- Sales and Service v.s. Research and Development

---

---

---

---

---

---

---

---

## Bias and Error Politically Motivated

- Bush and WMD
  - Fox News viewers at 67%
- NCLB State Standards
  - Local norms
  - RTI
- SAT and Bias

---

---

---

---

---

---

---

---

## Bias and Error Advocacy Research

- Whole Language Constructivist Approaches
  - "In order to justify its love affair with whole language in the face of little or no evidence for its positive results, the field of reading education began to disavow scientific methodology and objective measurement... Instead of acknowledging that objective assessments were proving them wrong, many reading-education researchers rejected objectivity itself... Attitude, not achievement, became the outcome of concern... The goal of teaching became love of reading, not the ability to read." (Moats, 2000)

---

---

---

---

---

---

---

---

**Bias and Error**  
**The University as Beacon of Truth**

---

- Anti-Realist Doctrine
- “Deeply Theoretical”
- Peer Review

---

---

---

---

---

---

---

---

**Confirmation Bias**

---

- Interpreting evidence in ways that conform to existing beliefs, expectations, and available hypothesis (Nickerson, 1998; Sherman, 2002)
  - “*Women Shortchanged in NIH Medical Research Budget*”
- Only 10% of budget directed toward research related to women’s health problems
- Yet another example of male bias at NIH and in larger society

---

---

---

---

---

---

---

---

**Confirmation Bias**

---

- Interpreting evidence in ways that conform to existing beliefs, expectations, and available hypothesis (Nickerson, 1998; Sherman, 2002)
  - “*Women Shortchanged in NIH Medical Research Budget*”
- Only 10% of budget directed toward research related to women’s health problems
- Yet another example of male bias at NIH and in larger society
- **85% of NIH budget directed to medical research on humans, regardless of gender**
- **10% devoted to women’s health**
- **5% devoted to men’s health problems**

---

---

---

---

---

---

---

---

## Bias and Error Human Rights Arguments

- Self-esteem movement
  - Young women
  - Gang members
- Cultural variables
  - "That which is collective and customary is non-rational, and the overcoming of unreason and collective custom are one and the self-same process...Error is to be found in culture; and culture is a kind of systematic, communally-induced error" (Gellner, 1992).
- Inclusion
  - Outcome variable or treatment variable?

---

---

---

---

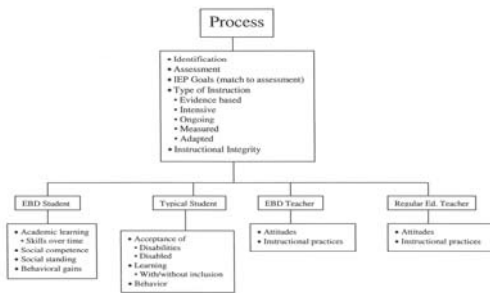
---

---

---

---

## Inclusion Research Variables




---

---

---

---

---

---

---

---

## Sales and Service versus Research and Development

- Facilitated Communication
- Recovered Memory Therapy
- Face validity
  - Book publishers
  - "Road shows"

---

---

---

---

---

---

---

---

## Ten Misguided Notions About Teaching and Learning (Heward, 2003)

1. Structured curricula impede true learning.
2. Teaching discrete skills trivializes education and ignores the whole child.
3. Drill and practice limits students' deep understanding and dulls their creativity.
4. Teachers do not need to (and/or cannot, should not) measure student performance.
5. Students must be internally motivated to really learn.
6. Building students' self-esteem is a teacher's primary goal.
7. Teaching students with disabilities requires unending patience.
8. Every child learns differently.
9. Eclecticism is good.
10. A good teacher is a creative teacher.

---

---

---

---

---

---

---

---

---

---

## "Worst Practices"

- Do not teach toward any predetermined corpus of knowledge or curriculum objectives (and by all means, do not directly or intensely focus on specific skills). With support and encouragement, children will naturally discover and learn what they need to know.
- Let students construct their own meanings.
- Replace drill and practice with interesting activities in authentic context.
- Do not objectively measure student performance.
- Be patient.
- Slow the pace of instruction to accommodate low achievers.
- Make the children feel good about themselves, even if that means letting them repeat errors.
- Because every child learns differently, be sure to include instructional methods and materials from many different learning theories, models and approaches.
- Be creative.

---

---

---

---

---

---

---

---

---

---

## Evidence-Based Practice

- Does it work? (Internal validity)
- Who does it work for?
- Under what conditions does it work? (External validity)

---

---

---

---

---

---

---

---

---

---

## Functional Assessment

- Behavioral Function (Discriminated operant)
  - Establishing operation
  - Discriminated stimulus
  - Response
  - Class of events that reinforce/maintain the response
- Experimental Analysis
  - Structured analysis
  - Brief functional analysis
  - Extended functional analysis
  - Control, mostly clinical
- Functional Assessment
  - Interviews
  - Rating scales
  - Scatterplots
  - Descriptive observations (e.g., A-B-C)

---

---

---

---

---

---

---

---

## Ask for Data and Evaluate Their Believability

- Has this program been tested in the classroom?
- What is the evidence showing that this program works?
- What measures of student performance were used to evaluate this program?
- Has any research on this program been published in peer-reviewed journals?
- Is there any evidence to suggest that the program will be successful if modified to meet the skill levels and ages of my students?
- Identify bias
- Ask for primary sources of evidence
  - When someone states:
    - "Research shows"
  - Respond:
    - "Show me the data"

---

---

---

---

---

---

---

---

## Evidence Base in EBD (Basic Premises)

- Intensive, ongoing interventions
- Structured interventions
- Precise interventions
- Intervention matched to assessment data
- Continuous monitoring and adaptation
- Procedural reliability
- Early, longitudinal interventions

---

---

---

---

---

---

---

---

## Evidence Base in EBD (Specific Procedures)

- Direct Instruction
  - Drill and practice
  - Phonemic awareness
- Active Responding/Academic Engagement
  - Cues, responses, feedback
- Self-Management Interventions
- Social skills instruction
  - Targeted behaviors
  - Direct instruction
  - Response opportunities, feedback, natural contingencies
- Generalization technology (Stokes and Baer, 1977)
- Replacing problem behavior with positive alternatives
  - Functional equivalence
  - Match to function
  - Contingency reversal
  - Multi-component interventions
- Tutoring interventions
- Scaffolding
- Psychopharmacological interventions
- Applied Behavior Analysis

---

---

---

---

---

---

---

---

## Applied Behavior Analysis

- Reinforcement
  - Social
  - Preferences (Assessment)
  - Contingent
  - Immediate
  - Specific
  - Descriptive
  - Increase in Rate
- Punishment
  - Immediate, Specific, Descriptive
  - Matched to function
  - Replacement responses
  - Decrease in rate
- Altering Antecedents
  - Structural assessment
  - Precision requests
  - Behavioral momentum
- Group-oriented contingencies
- Many other specific procedures/techniques
  - Shaping, chaining, task analysis, time delay, stimulus and response generalization procedures, stimulus control, token economy, DRO

---

---

---

---

---

---

---

---

## Barriers to Implementation of Evidence-Based Practices

- Research is devalued or ignored
- Articulate and passionate advocates for alternative explanations
- Skills not taught in teacher training programs
- Teaching environment (support) not conducive to treatment fidelity
- Salaries, support
- Evidence-based interventions are difficult, time-consuming, rigorous
- The lure of the "eclectic"
- Our penchant for the "new" and "exciting" (breakthroughs and cures)

---

---

---

---

---

---

---

---

## The Future of EBD

- Continue to develop substantive criteria for evidence base and delineate practices that meet those criteria
- Train well and accurately at the university level
- Insist on evidence base, insist on integrity
- Focus on alterable variables
- View special education as a scientifically-based profession – Expert educators
- Produce positive, measurable and superior outcomes

---

---

---

---

---

---

---

---