An Implementation Science Approach to Professional Development in Autism

Ann W. Cox & Samuel L. Odom
OCALICON, November 14, 2012
A multi-university center to promote use of evidence-based practice for children and adolescents with autism spectrum disorders
# Center Staff

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<thead>
<tr>
<th>Frank Porter Graham Child Development Institute Univ. of NC-Chapel Hill</th>
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<th>Waisman Center Univ. of WI-Madison</th>
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Goals of the National Center

• Promote development, learning, and achievement of children with ASD and support families through use of evidence-based practices
• Increase state capacity to implement evidence-based practices
• Increase the number of highly qualified personnel serving children with ASD
Implementation Science Research

(Fixsen et al, 2005)

- Implementation research: scientific study of methods to promote use of research to reduce inappropriate care.
- Includes study of interventions to enable professionals to use research findings effectively.
- Involves two sets of procedures (intervention-level and implementation-level) and two sets of outcomes (intervention outcomes and implementation outcomes).
- Quality of replication — fidelity - critical to successful outcomes. Low quality implementation unlikely to generate good outcomes.
Fixsen, Blase, Metz, Van Dyke (in press)

“External” System Change Support

Executive Management Team

System Change

Policy Enabled Practice

Implementation Team

Practitioners
EBPs
Children & Families

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THE NATIONAL PROFESSIONAL DEVELOPMENT CENTER ON AUTISM SPECTRUM DISORDERS
Stages of Implementation Process (Fixsen et al., in press)

- Exploration
- Installation
- Initial Implementation
- Final Implementation
# NPDC’s Implementation Framework

<table>
<thead>
<tr>
<th>Fixsen Stages of Implementation</th>
<th>NPDC Model</th>
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<tr>
<td><strong>Year 1</strong></td>
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<td><strong>Exploration</strong></td>
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<td>• State application to work with NPDC</td>
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<td>• Formation of the State Leadership Team</td>
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<td>• Action plan formed</td>
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<td>• State technical assistance/coaching personal and/or resources allocated</td>
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<tr>
<td><strong>Installation</strong></td>
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<td>• Teachers take online course</td>
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<td>• Teachers and state TA providers attend intensive summer workshop delivered primarily by NPDC staff</td>
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<td>• Planning groups (teachers /TA providers) establish work plan for GAS, APERS.</td>
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<td><strong>Initial Implementation</strong></td>
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<tr>
<td>• Teachers implement NPDC model in their schools</td>
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<td>• Collect APERS data</td>
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<td>• Link student goals with EBP</td>
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<td>• Training, coaching and TA provided to support quality and EBP use (ongoing)</td>
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<td><strong>Year 2</strong></td>
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<td><strong>Final Implementation</strong></td>
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<td>• State TA providers take lead on all activities with NPDC in secondary role</td>
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<td>• Identify schools</td>
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<tr>
<td>• Summer intensive workshop</td>
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<td>• Planning groups</td>
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<td>• Support Fall Implementation in schools</td>
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<td>• Support GAS and selection of EPBs</td>
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<td><strong>Year 3</strong></td>
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<tr>
<td>• NPDC Check in with states</td>
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<td>• State repeats or adapts process followed in Year 2</td>
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<tr>
<td>• State TA providers extend their work to other schools</td>
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</tbody>
</table>
EXPLORATION: Working in Partnership With States, Districts, Teams
Exploration Components

- Received and reviewed state applications
- Invited states to participate
- Formed State Leadership Team; Autism Training Team
- State *Action Plan* developed; reviewed one year later
- Model demonstration sites selected
- State technical assistance/coaching resources allocated
Site Descriptions (2008-2012)

• 12 States: 225 students
• 76 Model and Expansion Sites
  ▪ 4 Early Intervention
  ▪ 12 Preschool
  ▪ 31 Elementary Programs
  ▪ 16 Middle
  ▪ 13 High Programs
• Breakdown by Program Type
  ▪ 43% are self-contained programs
  ▪ 57% are inclusive programs
NPDC 2- Year State Cycle

Year 1 State Capacity Building
application development, IAPG formed, strategic plan, model sites confirmed, Autism Training Team completes training

Model Sites
program quality
use of EBP
parent involvement
collaborative coaching

Year 1 Model and Expansion Site Development
Use of Evidence-Based Practices

Year 2 Sustainability
strategic plan updated; leadership shift; state ownership of process, materials, further expansion, training, and coaching

Expansion Sites
program quality
use of EBP
parent involvement
collaborative coaching
INSTALLATION: Initial Professional Development and Planning

- Team members complete introductory online course
- Team members attend summer workshop delivered primarily by NPDC staff
- Teams select target students
- Teams establish work plan for site that begins with assessment (APERS, Use of EBP, GAS)
Online Course: *Foundations of Autism Spectrum Disorders*

- Online and managed by NPDC
- 8 sessions with pre and post tests
- Certificate of completion and CEUs awarded
- Visually appealing with both text and narration
Summer Workshop(s)

• Initially a week-long intensive training; later divided into two shorter sessions
• Content on:
  ▪ NPDC model and its components,
  ▪ Use of selected EBPs,
  ▪ Coaching
• Development of initial team plans and timeline
INITIAL IMPLEMENTATION:
Assessment, Training, and Coaching

• School teams implement NPDC model
• Collect APERS data and implement quality improvements
• Link priority student goals with EBP
• Training, coaching, and TA provided to support quality improvement and EBP use (ongoing)
Assessment: Quality of the Program
Why is a Quality Program Important?

- The quality of programs contributes to student outcomes.
- Quality programs provide the foundation upon which EBP can be successfully implemented.
- Indicators of program quality can be captured through observation and interview.
- Program quality can be improved through training, technical assistance, and coaching.
Autism Program Environment Rating Scale (APERS)

• Assesses *quality indicators of programs* for children and youth with ASD
• Structured by domains and sub-domains
• Two versions: PS/ELE; M/HS (Infant Toddler version under development)
• Generates total score and domain profile
• Data collected by observation, interview, record review
• Results used for consultation/coaching, professional development, program evaluation
Interdisciplinary Teaming

Program Ecology
- Learning Environment
- Structure & Schedule
- Positive Learning Climate
- Curriculum & Instruction
- Communication
- Social Competence
- Personal Independence
- Functional Behavior
- Assessment & IEP
- Transition (MHS only)

Family Participation

Program Quality

Learner Outcomes

THE NATIONAL PROFESSIONAL DEVELOPMENT CENTER ON AUTISM SPECTRUM DISORDERS
Autism Program Environment Rating Scale

APERS Profile by Domain

- Classroom Environment
- Class Structure/Schedule
- Positive Classroom Climate
- Assessment
- Curriculum and Instruction
- Communication
- Staff/Peer Relationships
- Personal Ind./Competence
- Functional Behavior
- Family Involvement
- Teaming
- Overall Score

Inadequate | Adequate | Exemplary
Assessment: Teacher Use of Evidence-based Practices
What are EBP?

Focused interventions that:

• Produce specific behavioral and developmental outcomes for a child
• Have been demonstrated as effective in applied research literature
• Can be successfully implemented in educational settings

(Odom, Colett-Klingenberg, Rogers, & Hatton, 2010)
NPDC Criteria

To be considered an evidence-based practice:

- Two randomized or quasi-experimental design studies,
- Five single subject design studies by three different authors, OR
- A combination of evidence such as one group and three single-subject studies
Evidence-based Practices (2007)

- Antecedent-based interventions
- Computer-aided instruction
- Differential reinforcement
- Discrete trial training
- Extinction
- Functional behavior assessment
- Functional communication training
- Naturalistic interventions
- Parent-implemented intervention
- Peer-mediated instruction/intervention
- Picture Exchange Communication System™
- Pivotal response training
- Prompting
- Reinforcement
- Response interruption/redirection
- Self-management
- Social narratives
- Social skills training groups
- Speech generating devices
- Structured work systems
- Task analysis
- Time delay
- Video modeling
- Visual supports
Implementation Fidelity

- Implementing an intervention in same manner in which it was done in the evidence-based research

- How is this achieved?
  - Use self-learning modules on practices
  - Offer training on the practice, as needed
  - Use implementation checklists for the EBP to capture fidelity of implementation
  - Coach on the practice until fidelity is attained
Pam Quinn
Elementary ASD Teacher
Belmont Station, Loudoun, VA
Professional Development

**Training**
- Online course
- Summer Institute
- Self-Study of Modules and Briefs
- Group Study of Modules and Briefs
- On-site specific training

**Coaching**
- Recurring cyclical process of site specific support
- Online manual
- Training for TA Providers on coaching process
- Video examples
Resources on NPDC’s EBP

- EBP Briefs (http://autismmpdc.fpg.unc.edu)
  - Overview
  - Evidence Base
  - Steps for Implementing
  - Implementation Checklist
  - Sample Data Collection Forms (optional)
Resources on NPDC’s EBP

• Online Modules (Collaboration with OCALI)
  ▪ Posted on AIM Website (www.autisminternetmodules.org)
  ▪ Narrative content with video examples of practices being implemented
  ▪ Includes downloadable EBP brief components
  ▪ Pre/ Post knowledge assessment
  ▪ Case study examples
  ▪ Learning activities, Discussion questions
Selecting and Matching Student Goals with EBP
IEP Goals

• Select priority goals (teacher, team, parents/student).

• Determine baseline and collect data to describe.

• Are they measurable, observable, functional?

• Then scale for academic year using Goal Attainment Scaling
Student Goal Achievement: Goal Attainment Scaling (GAS)

- Goal Attainment Scaling (GAS) is designed to document progress on IEP goals, objectives, and benchmarks.
- Has a long history in fields of mental health, education, geriatric care
- Provides a summative rating to evaluate outcomes
Assessing Student Progress

- Goal Attainment Scaling: a five point range of performances for students:
  - Much less than expected
  - Somewhat less than expected
  - Expected level of outcome
  - Somewhat more than expected
  - Much more than expected
| **Much less than expected**  
  *(Present Level of Performance)* | When he enters classroom EJ does not greet his peers or professionals |
|-----------------|-------------------------------------------------|
| **Somewhat less than expected**  
  *(Benchmark)* | When entering the classroom in the morning and with a verbal prompt and picture cue, EJ will greet at least one peer by saying “hi” or waving for 4/5 mornings for a week |
| **Expected level of outcome**  
  *(Annual Goal)* | When entering the classroom in the morning and with a visual prompt, EJ will greet at least one peer by saying “hi” or waving for 4/5 mornings for 2 consecutive weeks. |
| **Somewhat more than expected**  
  *(Exceeds annual goal)* | When entering the classroom in the morning without a prompt, EJ will greet at least one peer by saying “hi” or waving for 4/5 mornings for 2 consecutive weeks. |
| **Much more than expected**  
  *(Far exceeds annual goal)* | When entering school in the morning and without a prompt, EJ will greet at least one peer and one non-classroom professional by saying “hi” or waving for 4/5 mornings for 2 consecutive weeks. |
Once goals are selected and scaled, consider EBPs.

- Student present level of functioning
- Student characteristics: temperament, learning style, etc.
- Student history: What has worked for the student in the past; what has not
- Characteristics of the current and future environment
- Knowledge and skill of teacher/team members
- Family and student priorities
# EBP by Domain and Age

<table>
<thead>
<tr>
<th>Evidence-Based Practices</th>
<th>Academics &amp; Cognition</th>
<th>Behavior</th>
<th>Communication</th>
<th>Play</th>
<th>Social</th>
<th>Transition</th>
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<td>2. Computer Assisted Instruction</td>
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<td>3. Differential Reinforcement</td>
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<td>4. Discrete Trial Training</td>
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<td>5. Extinction</td>
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<td>6. Functional Behavioral Assessment</td>
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<td>7. Functional Communication Training</td>
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<td>8. Naturalistic Interventions</td>
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<td>9. Parent Implemented Interventions</td>
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<td>10. Peer Mediated Instruction/Intervention</td>
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<td>11. Picture Exchange Com. System</td>
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<td>12. Pivotal Response Training</td>
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<td>13. Prompting</td>
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<td>14. Reinforcement</td>
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<td>15. Response Interruption &amp; Redirection</td>
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<td>16. Self-Management</td>
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<td>17. Social Narratives</td>
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<td>18. Social Skills Groups</td>
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<td>19. Speech Generating Devices (VOCA)</td>
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<td>20. Structured Work Systems</td>
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<td>21. Task analysis</td>
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<td>22. Time delay</td>
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<td>23. Video Modeling</td>
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<td>24. Visual Supports</td>
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Beth Carl
Preschool Special Education Teacher
Belmont Station, Loudoun, VA
What is Coaching?

• Form of embedded professional development used to:
  ▪ Refine existing skills and/or acquire new teaching skills in EBP

• Vehicle to develop:
  ▪ An ongoing, confidential relationship that recognizes individual expertise and professional growth
  ▪ Supports practitioner’s ability to apply knowledge to skills in the classroom
What is Coaching? (continued)

• Focuses on content that encourages the use of data to inform practice
• Uses adult learning principles and respects the learner’s professionalism and ability to make decisions
Beth Carl
Preschool Special Education Teacher
Belmont Station, Loudoun, VA
Coaching Components

Preobservation Conference
Select coaching target, obs plan, data collection plan

Observation
Collect data for meaningful discussion and planning

Postobservation Conference
Discuss obs, discuss ways to change behavior, plan for ongoing support

Feedback & Support from NPDC

3 Components Of Cyclical Coaching Process
Coaching – Promising Practice

Coaching leads to . . .

• Improvement in instructional capacity, increasing teachers’ ability to apply what has been learned to their work with students.

• Improvement in the instructional culture of the school.

(National Center for Education Evaluation and Regional Assistance, 2007: The Annenberg Institute for School Reform, 2004;
How did this work in real classrooms with real teachers and coaches?

- Program team consists of:
  - Regional Coach
  - District Coach
  - Teachers, team members, administrator, parents and students
  - NPDC staff
Charlotte Crane
Autism Consulting Teacher and Technical Assistance Provider
Loudon County, Loudoun, VA
FINAL IMPLEMENTATION (Year 2): State Takes Lead, NPDC Supports

- State TA/Coaches/Leaders take the lead on all activities with NPDC in secondary role
- Summer intensive workshop: Initial teams train expansion teams
- Planning group (state and site-based) set agenda for 2nd year
- NPDC supports initial implementation in expansion sites
- NPDC supports APERS, GAS, selection of EBP
Lessons Learned: What it Takes

- Committed personnel
- Operationalized professional development model
- Administrative buy-in and support (state and district)
- A means of assessment – program, practitioner, student
- Tools to support learning
- Training
- Coaching – consistent, knowledgeable, supportive, clear in terms of fidelity of implementation and program quality
- Teamwork
- Progress monitoring
Year 3: What happens at the state level and after the NPDC has completed the two-year cycle?

State team consists of:

State liaison
Other leadership team members
State coaches, teaching staff, etc.
NPDC staff
Cathy Pratt
Director, Indiana Resource Center for Autism

Full Clip
## 2008-2012 State Expansion / Sustainability

<table>
<thead>
<tr>
<th>States</th>
<th>NPDC sites</th>
<th>State sites thru June 2012</th>
<th>Total sites</th>
<th>New Sites 2012-2013</th>
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<td><strong>Cohort 1</strong></td>
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<td><strong>TOTAL</strong></td>
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<td><strong>303</strong></td>
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Key Outcomes Associated with NPDC Model (2007-2012)

- Change in Program Quality
- Increased Use of Evidence-based Practices
- Students Meeting and Exceeding IEP Goals
- Expansion and Sustainability
What Lies Ahead?

• Completion of new review of the literature (1990-2011) and report.
• Create additional learning modules for EI providers and for additional practices.
• Expand work with emphasis in early intervention and secondary school settings.
• Develop and pilot the APERS – IT (Infant Toddler version)
• Analyze data related to APERS.
• Complete qualitative study of impact.
• Determine applicability of model in other countries.
Questions?
Key Outcomes and Measures

- Program Quality - APERS
  - Fall and Spring
- Use of Evidence-based Practices – EBP Inventory
  - Fall and Spring
- Achievement of IEP Goals - Goal Attainment Scale
  - Fall and Spring - Assesses growth across year
- Sustainability - State reports, Impact study
  - State use of model during and after NPDC involvement
Program Quality
Mean APERS Scores (N=72)

\[ d = 1.22 \]
Use of Evidence-based Practices (2008-2012) Pre/Post EBP Use by Practitioners

Before Participation
Increase After Participation

n=59
Number of Students Targeted with EBPs (n = 59)
Implementation Fidelity 2008-2012
Percentage of Steps for Implementation Followed with Fidelity for all Cases with 2 or More Data Points
Implementation Fidelity 2008-2012
Average Percentage of Steps for Implementation Followed with Fidelity for All Cases with 2 or more Data Points
2008-2012 Average Percentage of Steps for Implementation Followed with Fidelity for All Cases with 2 or more Data Points
Groups Split into Slow Acquisition (Data Point 4 < 60% Fidelity) and Fast Acquisition (Data Point 4 > 60% Fidelity)

- **Slow Acquisition (Data Point 4 < 60% Fidelity):**
  - Fidelity 1: n = 222
  - Fidelity 2: n = 109
  - Fidelity 3: n = 51
  - Fidelity 4: n = 19
  - Fidelity 5: n = 109
  - Fidelity 6: n = 51
  - Fidelity 7: n = 19
  - Fidelity 8: n = 10

- **Fast Acquisition (Data Point 4 > 60% Fidelity):**
  - Fidelity 1: n = 30
  - Fidelity 2: n = 30
  - Fidelity 3: n = 30
  - Fidelity 4: n = 30
  - Fidelity 5: n = 30
  - Fidelity 6: n = 30
  - Fidelity 7: n = 30
  - Fidelity 8: n = 10
Goal Achievement 2008-2012

Frequency of GAS Outcome Ratings (n = 567)