An Implementation Science Approach to Professional Development in Autism

Ann W. Cox & Samuel L. Odom

OCALICON, November 14, 2012

THE NATIONAL PROFESSIONAL DEVELOPMENT CENTER ON AUTISM SPECTRUM DISORDERS

IDEAs that Work
U.S. Office of Special Education Programs

National Professional Development Center on Autism Spectrum Disorders

A multi-university center to promote use of evidence-based practice for children and adolescents with autism spectrum disorders

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AUTISM SPECTRUM DISORDERS

Center Staff

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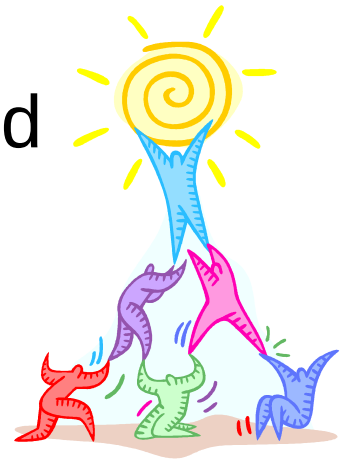
Goals of the National Center

- 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

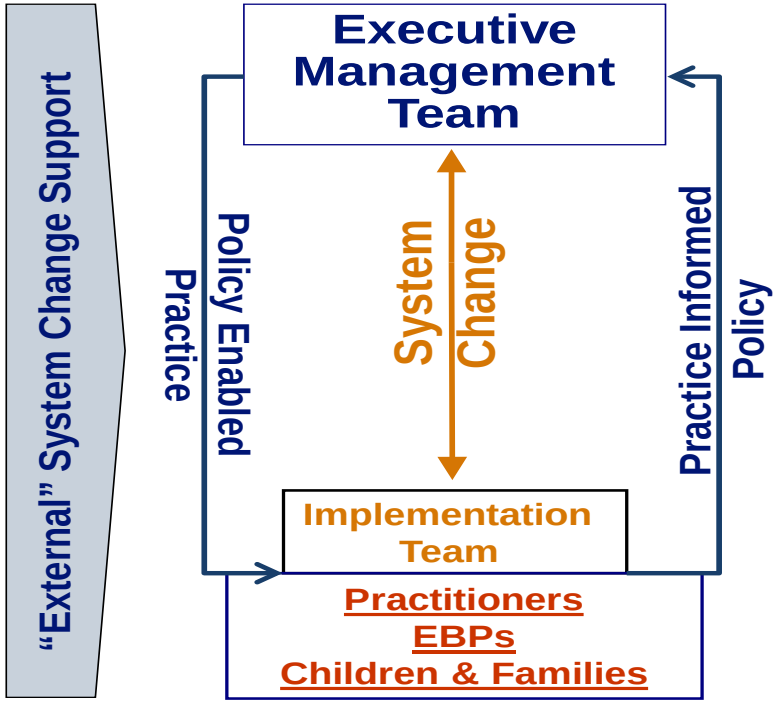


Implementation Science Research

(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)



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Stages of Implementation Process (Fixsen et al., in press)

- Exploration
- Installation
- Initial Implementation
- Final Implementation

NPDC's Implementation Framework

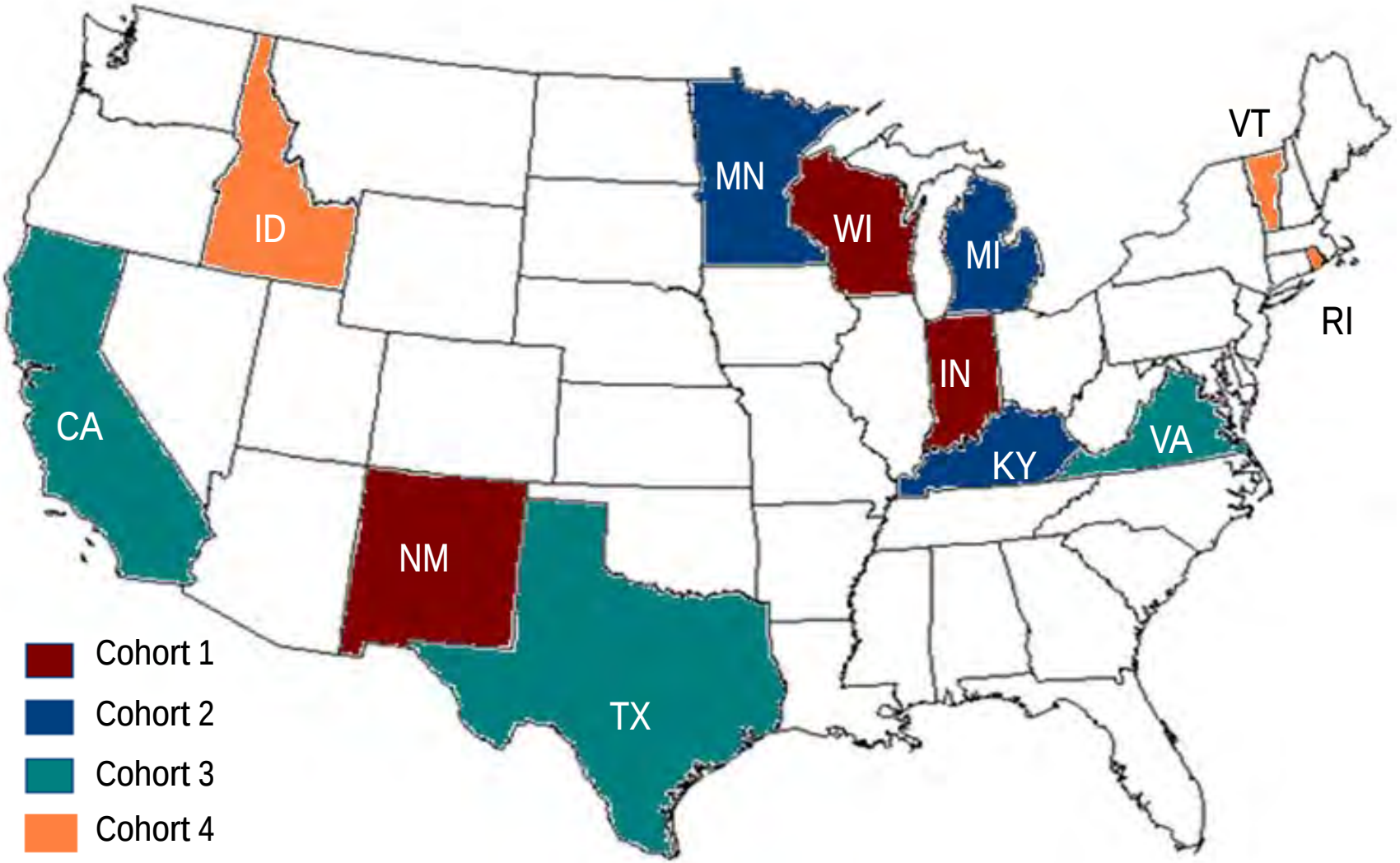
Fixsen Stages of Implementation	NPDC Model
	Year 1
Exploration	• State application to work with NPDC • Formation of the State Leadership Team • Action plan formed • State technical assistance/coaching personal and/or resources allocated
Installation	• Teachers take online course • Teachers and state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

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

State Involvement to Date



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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 **Year 2**
Model and Expansion Site Development
Use of Evidence-Based Practices

Expansion Sites
program quality
use of EBP
parent involvement
collaborative
coaching

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

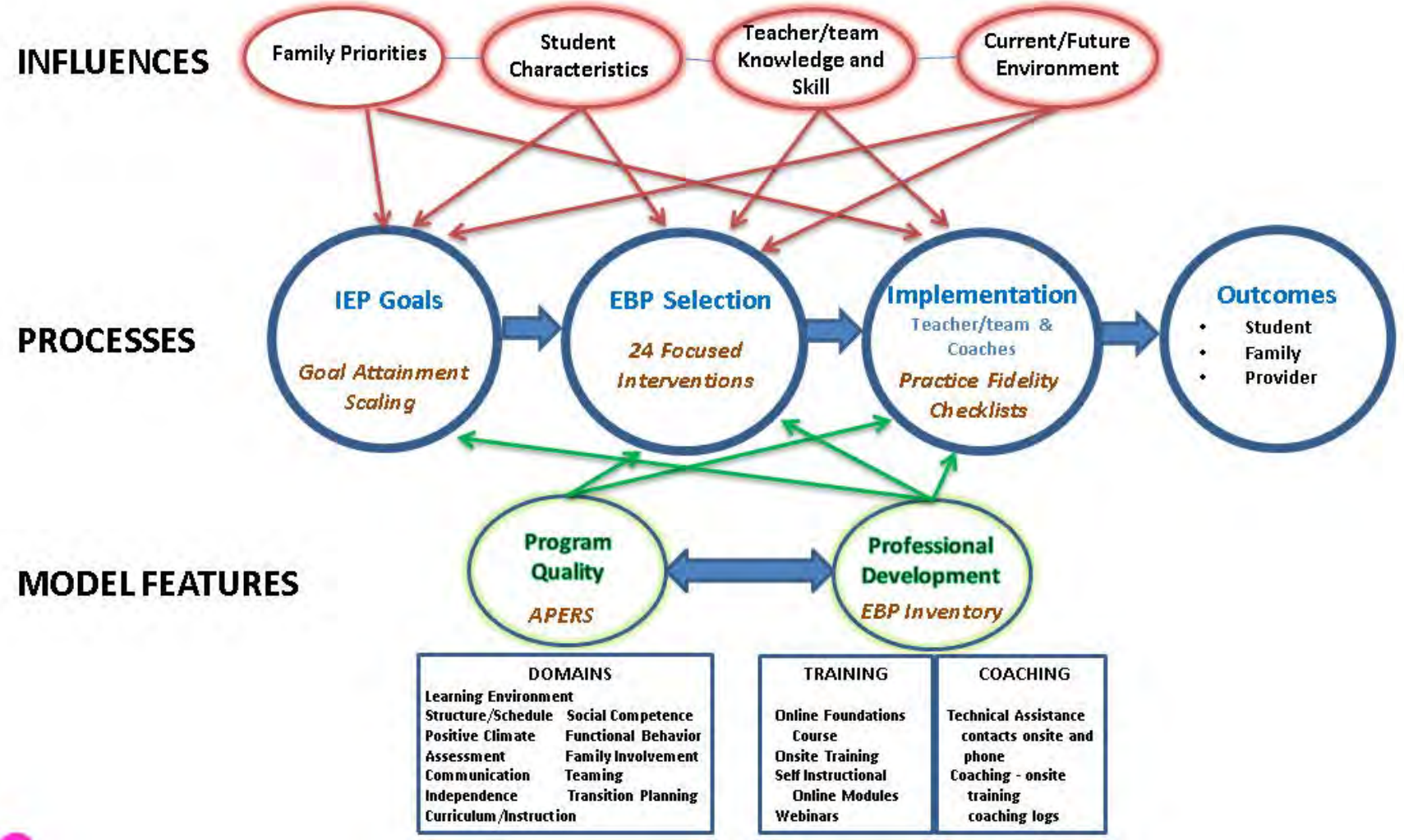
Online Course: *Foundations of Autism Spectrum Disorders*

- 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

NPDC – ASD Model Framework



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)

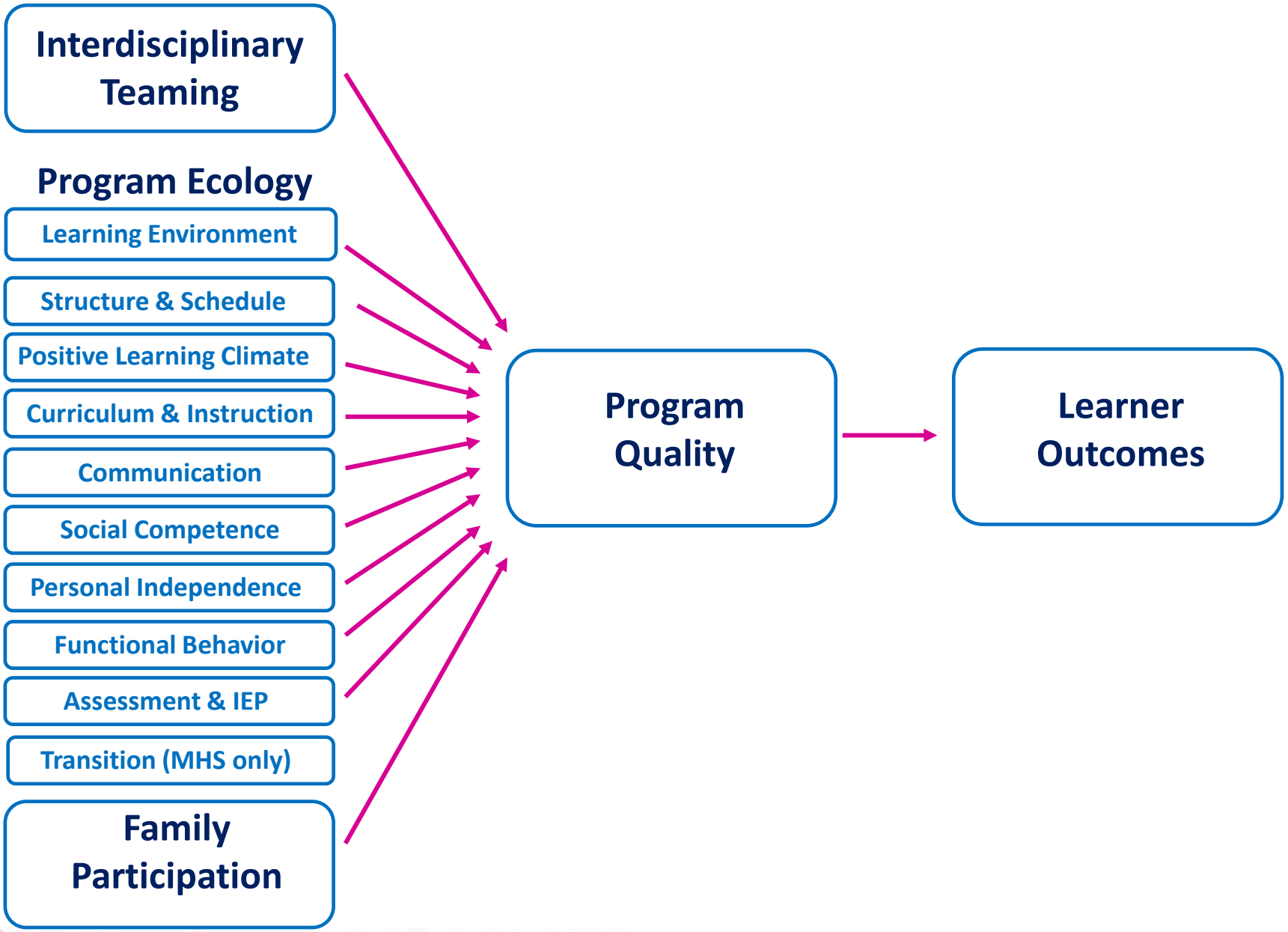
Assessment: Quality of the Program

Why is a Quality Program Important?

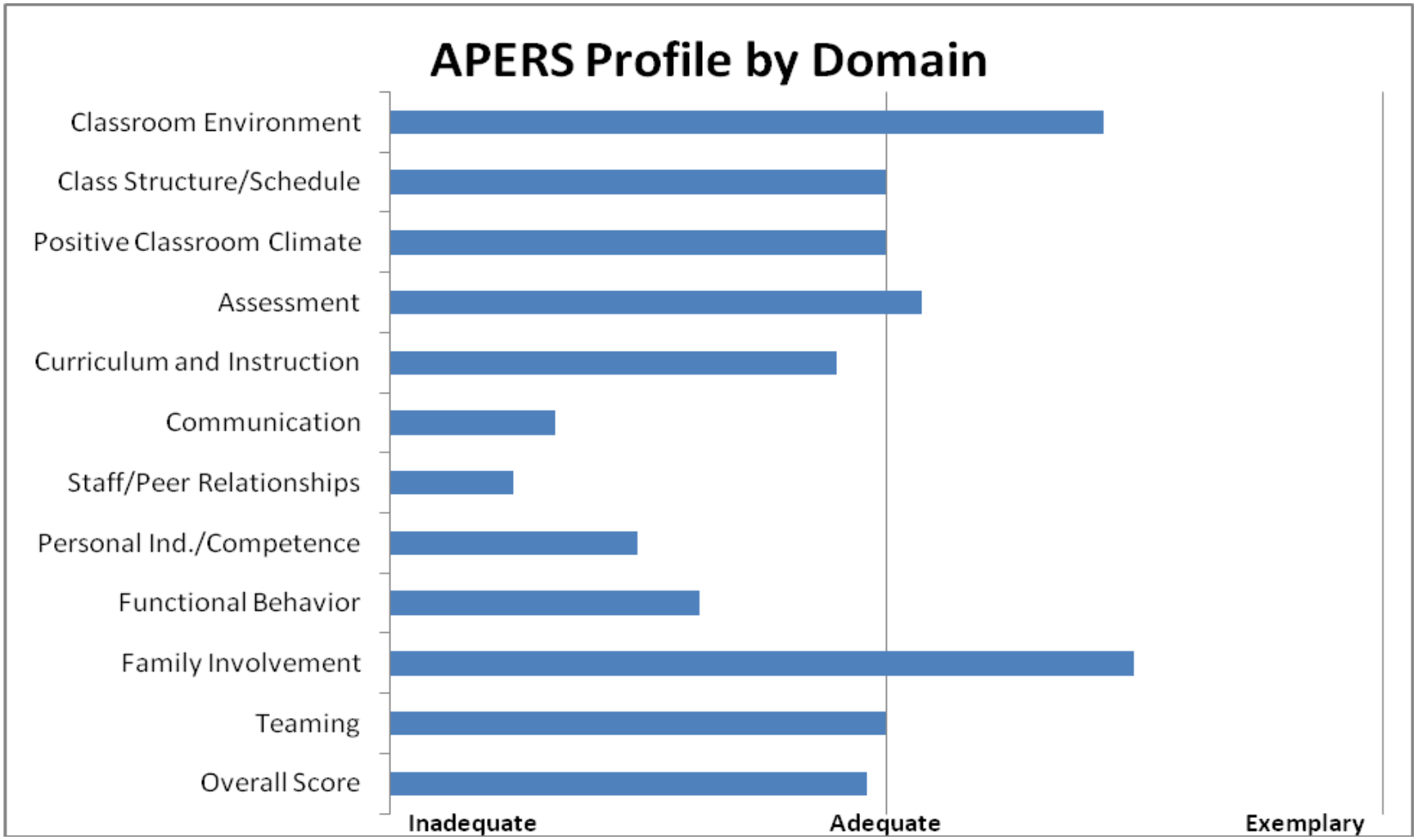
- The quality of programs contributes to student outcomes.
- Quality programs provide the foundation upon which EBP can be successfully implemented.
- Indicators of program quality can be captured through observation and interview.
- Program quality can be improved through training, technical assistance,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

Autism Program Environment Rating Scale



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 a one group and three single-subject studies

Evidence-based Practices (2007)

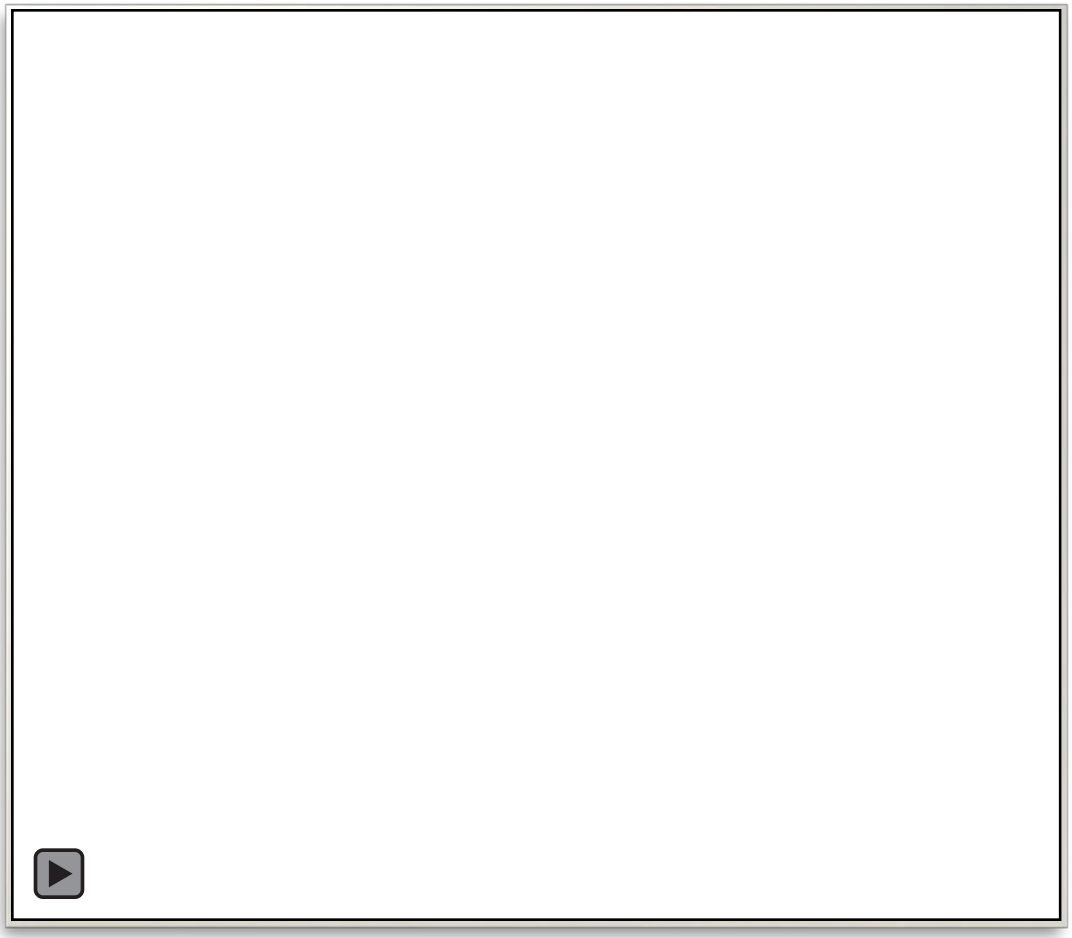
- Antecedent-based interventions
- Computer-aided instruction
- Differential reinforcement
- Discrete trial training
- Extinction
- Functional behavior assessment
- Functional communication training
- Naturalistic interventions
- Parent-implemented intervention
- Peer-mediated instruction/intervention
- 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://autismpdc.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

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IEP Goals

- Select priority goals (teacher, team, parents/student).
- Determine baseline and collect data to describe.
- Are they measureable, 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. . . . .

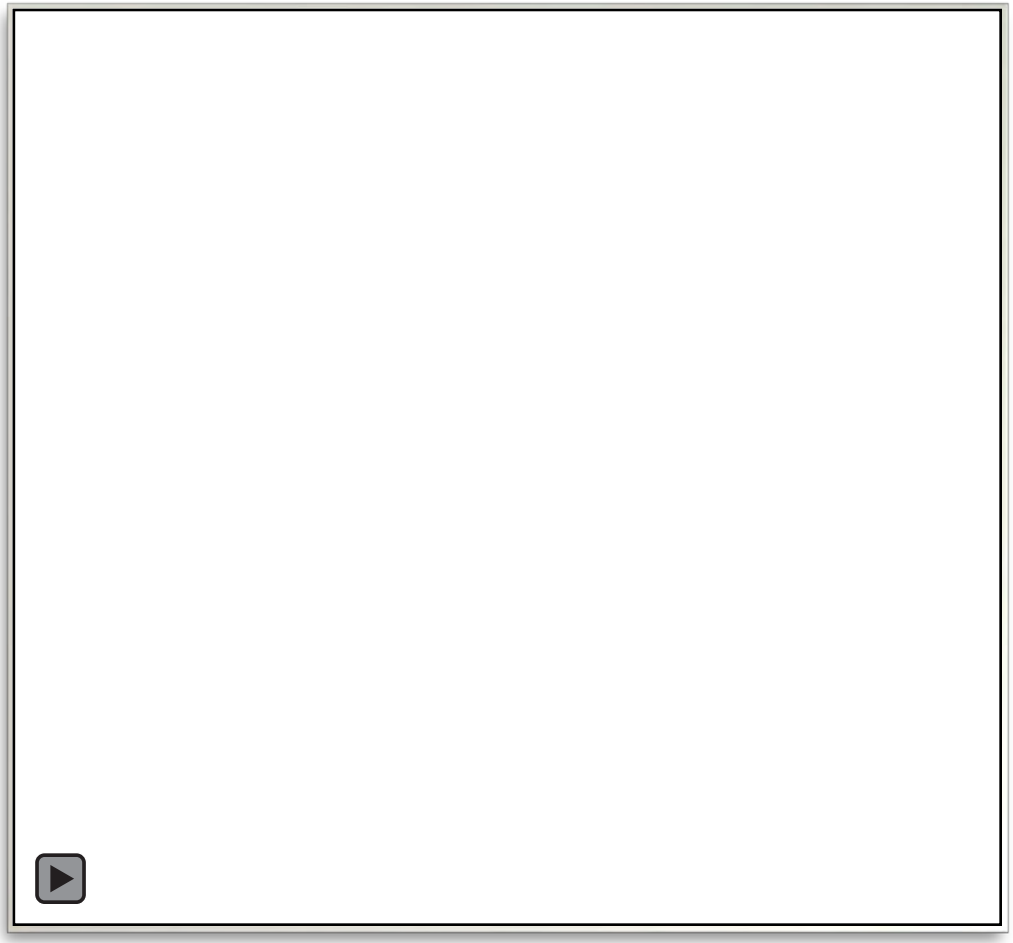
- Student present level of functioning
- Student characteristics: temperament, learning style, etc.
- Student history: What has worked for the student in the past; what has not
- Characteristics of the current and future environment
- Knowledge and skill of teacher/team members
- Family and student priorities

EBP by Domain and Age

	Academics & Cognition			Behavior			Communication			Play			Social			Transition		
Evidence-Based Practices	EC	EL	MH	EC	EL	MH	EC	EL	MH	EC	EL	MH	EC	EL	MH	EC	EL	MH
1. Antecedent-based Interventions	■	■	■	■	■	■												
2. Computer Assisted Instruction	■	■	■															
3. Differential Reinforcement				■	■	■	■	■	■				■	■	■			
4. Discrete Trial Training	■	■		■	■		■	■		■	■		■	■				
5. Extinction				■	■	■												
6. Functional Behavioral Assessment				■	■	■	■	■	■									
7. Functional Communication Training				■	■		■	■										
8. Naturalistic Interventions							■	■	■				■	■	■			
9. Parent Implemented Interventions				■	■		■	■		■	■		■	■				
10. Peer Mediated Instruction/Intervention							■	■	■				■	■	■			
11. Picture Exchange Com. System				■	■	■	■	■	■				■	■	■			
12. Pivotal Response Training	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
13. Prompting	■	■	■	■	■	■	■	■	■									
14. Reinforcement	■	■	■	■	■	■	■	■	■									
15. Response Interruption & Redirection	■	■	■	■	■	■												
16. Self-Management	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
17. Social Narratives	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
18. Social Skills Groups							■	■	■				■	■	■			
19. Speech Generating Devices (VOCA)							■	■	■									
20. Structured Work Systems	■	■	■							■	■	■				■	■	■
21. Task analysis	■	■	■	■	■	■	■	■	■				■	■	■			
22. Time delay		■						■			■			■				
23. Video Modeling	■	■	■				■	■	■	■	■	■	■	■	■			
24. Visual Supports	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Beth Carl

Preschool Special Education Teacher
Belmont Station, Loudoun, VA



What is Coaching?

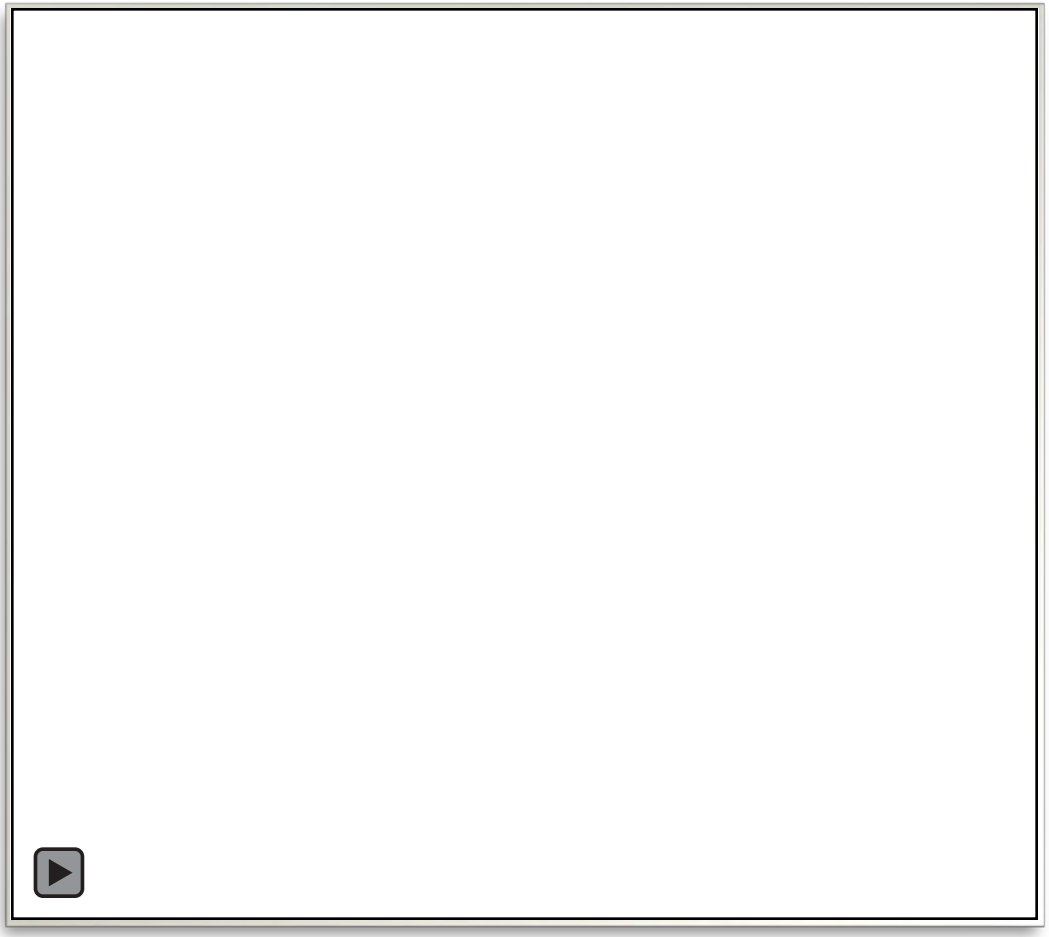
- Form of embedded professional development used to:
  - Refine existing skills and/or acquire new teaching skills in EBP
- Vehicle to develop:
  - An ongoing, confidential relationship that recognizes individual expertise and professional growth
  - Supports practitioner's ability to apply knowledge to skills in the classroom

What is Coaching? (continued)

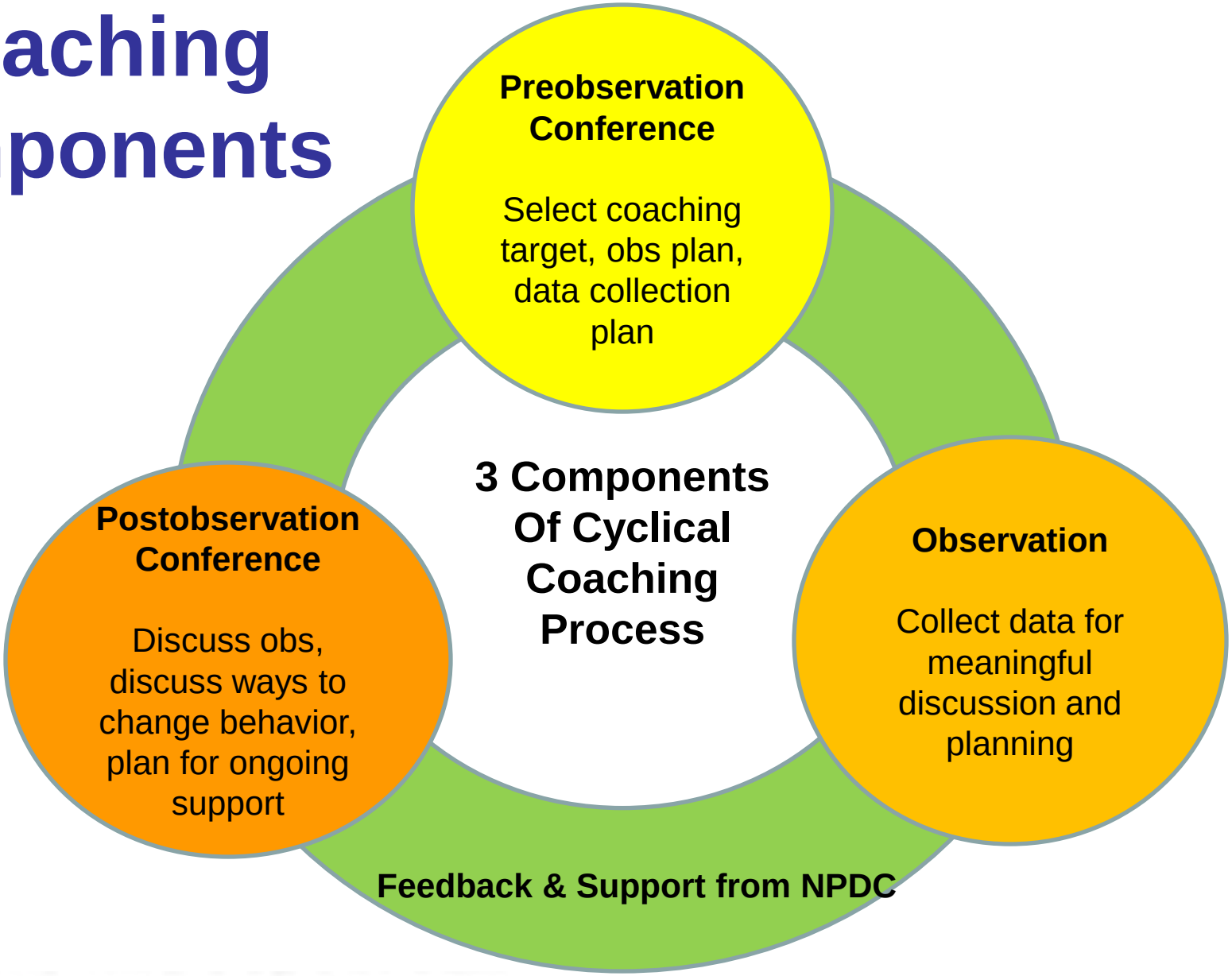
- Focuses on content that encourages the use of data to inform practice
- Uses adult learning principles and respects the learner's professionalism and ability to make decisions

Beth Carl

Preschool Special Education Teacher
Belmont Station, Loudoun, VA



Coaching Components



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.

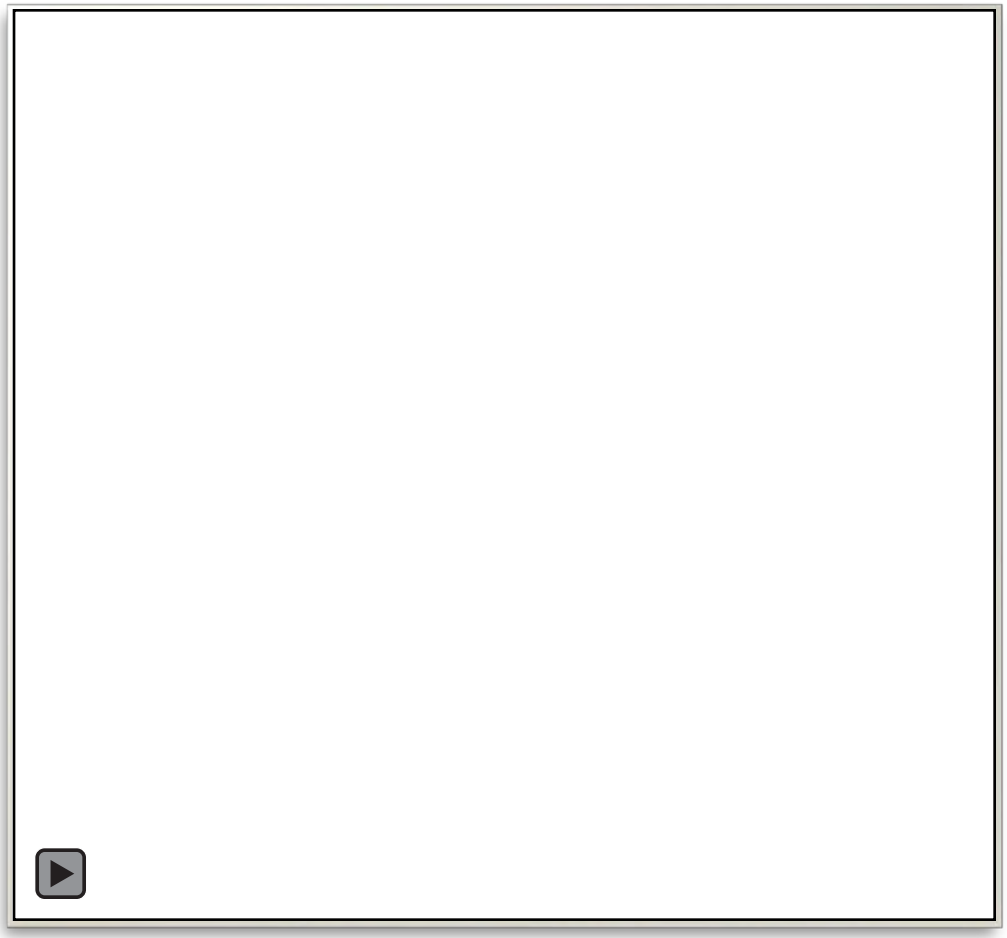
(National Center for Education Evaluation and Regional Assistance, 2007: The Annenberg Institute for School Reform, 2004;)

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*

Maria Baybayan

Preschool Special Education Teacher
Belmont Station, Loudoun, VA



Charlotte Crane

Autism Consulting Teacher and Technical Assistance Provider
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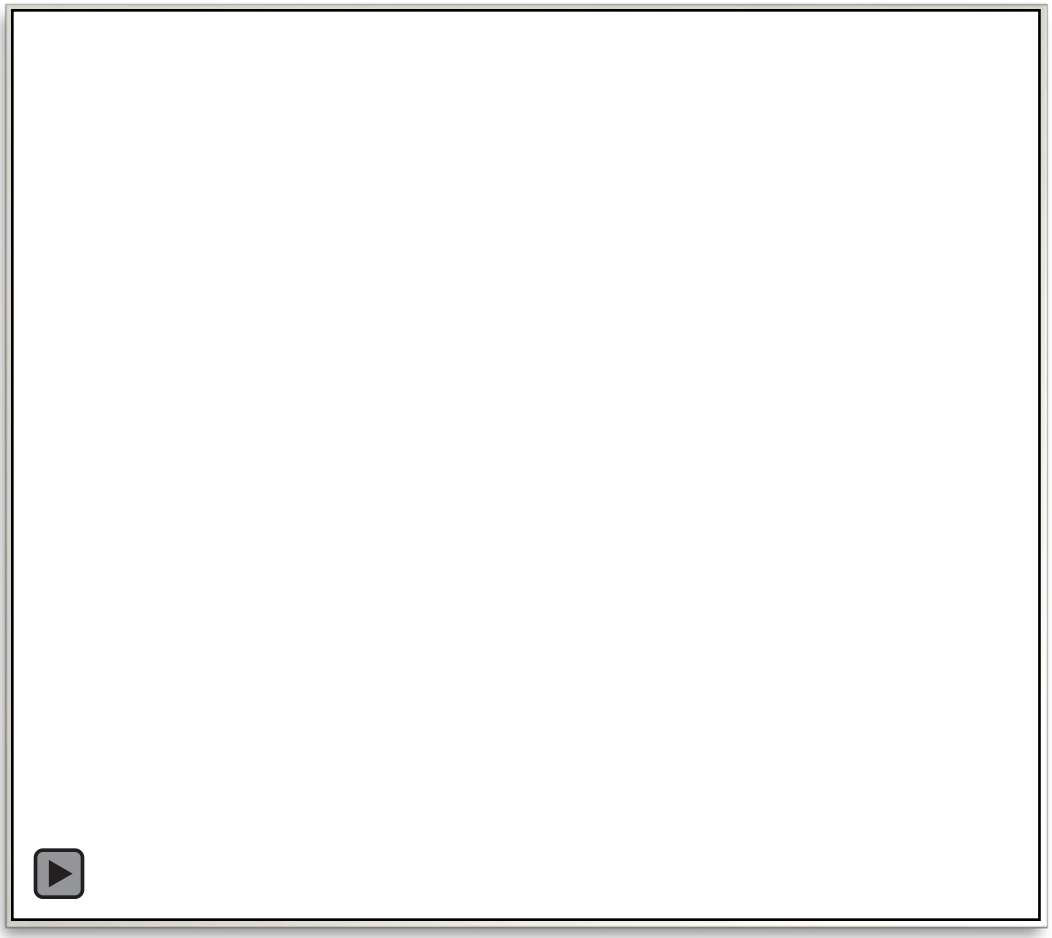

FINAL IMPLEMENTATION (Year 2): State Takes Lead, NPDC Supports

- 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

Karen Berlin

TA Consultant

George Mason University

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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?

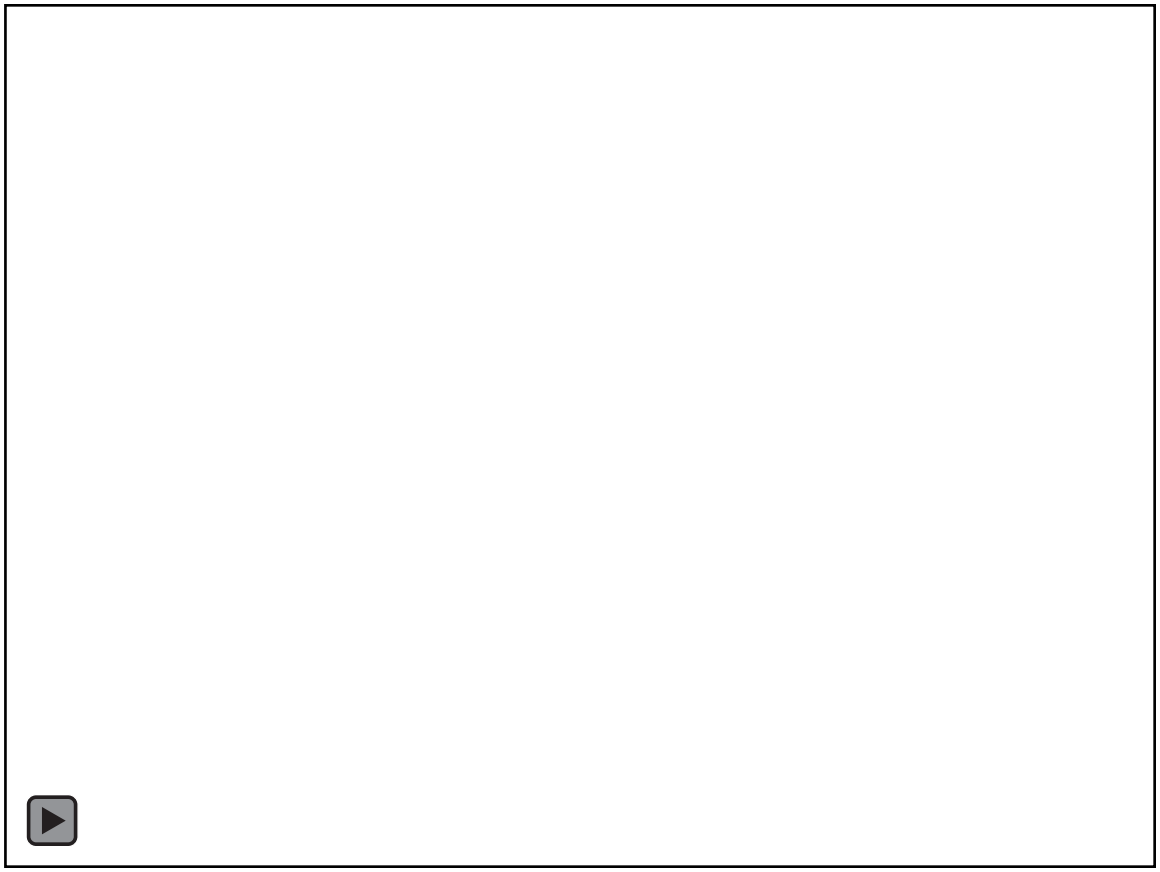
State team consists of:

- *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

States	NPDC sites	State sites thru June 2012	Total sites	New Sites 2012-2013
Cohort 1				
IN	**10**	**19**	**29**	**25**
NM	**5**	**3**	**8**	
WI	**7**	**10-modified model**	**17**	**19**
Cohort 2				
KY	**11**	**26**	**37**	**12**
MI	**7**	**7**	**14**	
MN	**7**	**111 – full and modified model**	**118**	**40**
Cohort 3				
CA	**6**	**7**	**13**	**6**
TX	**6**	**25**	**31**	**29**
VA	**8**	**6**	**14**	**2**
Cohort 4				
ID	**3**	**0**	**3**	**6**
RI	**3**	**0**	**3**	**2**
VT	**3**	**13**	**1620**	**9**
TOTAL	**76**	**227**	**303**	**150**

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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?

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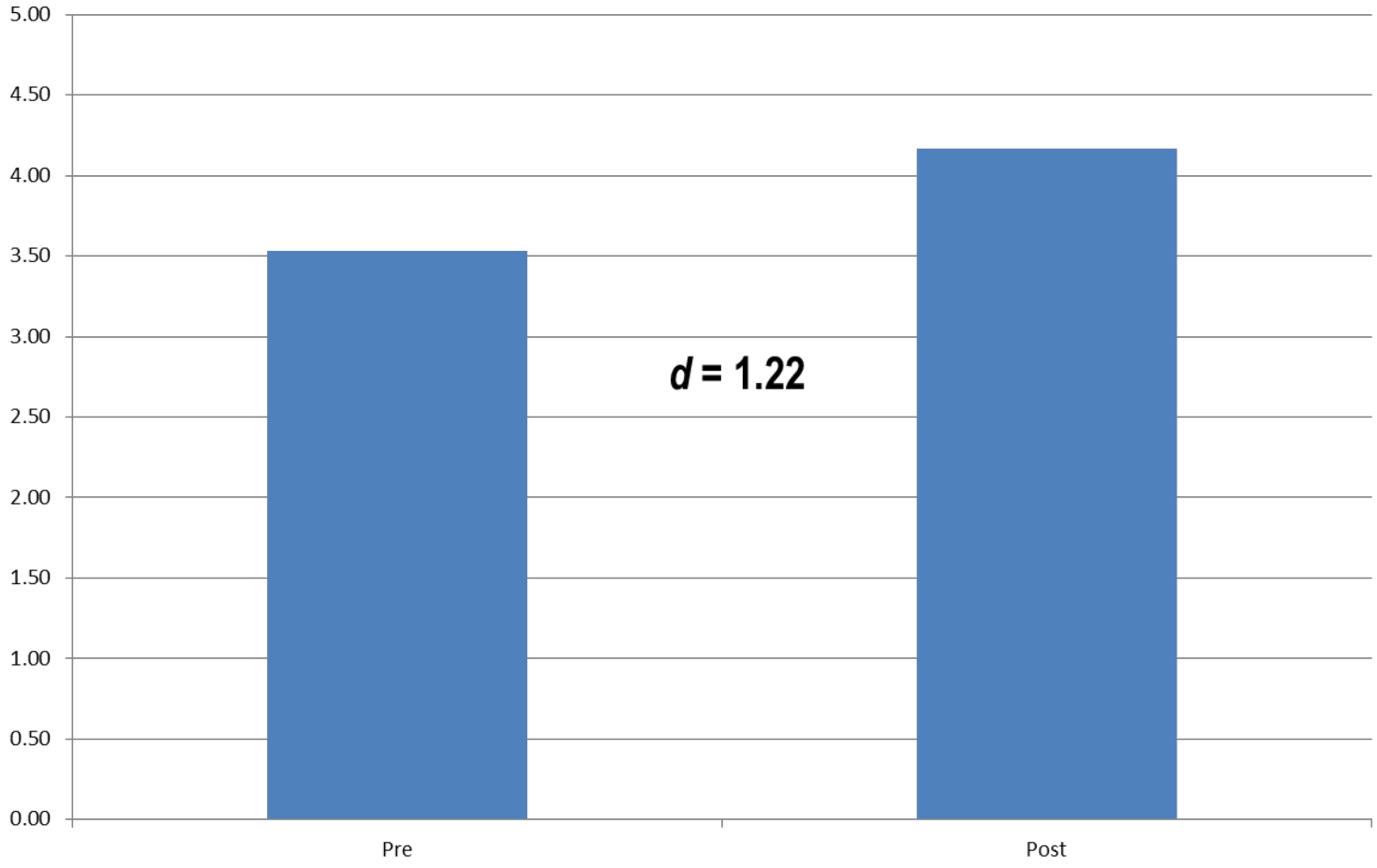
Key Outcomes and Measures

- 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)



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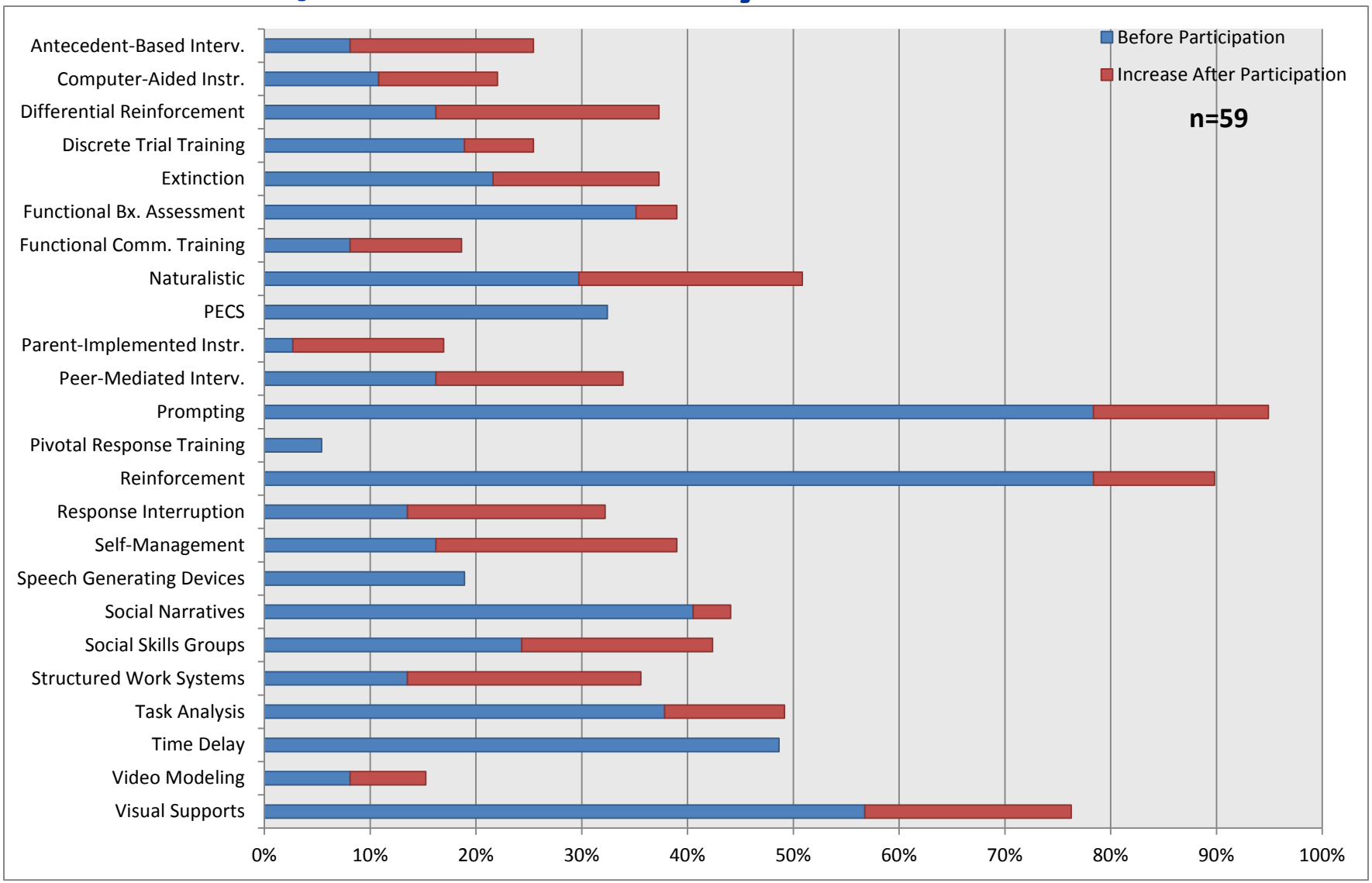
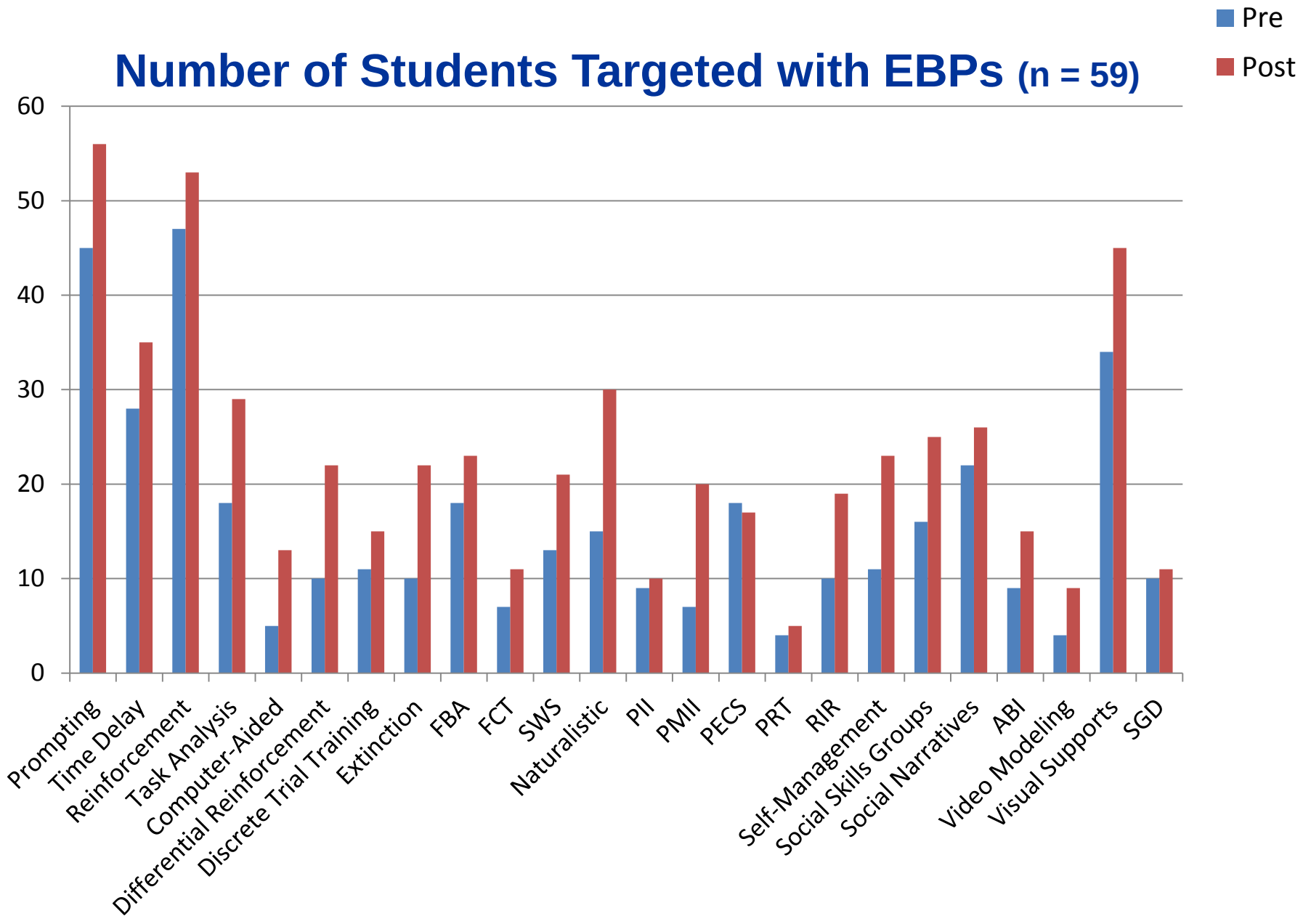
Use of Evidence-based Practices (2008-2012)

Pre/Post EBP Use by Practitioners

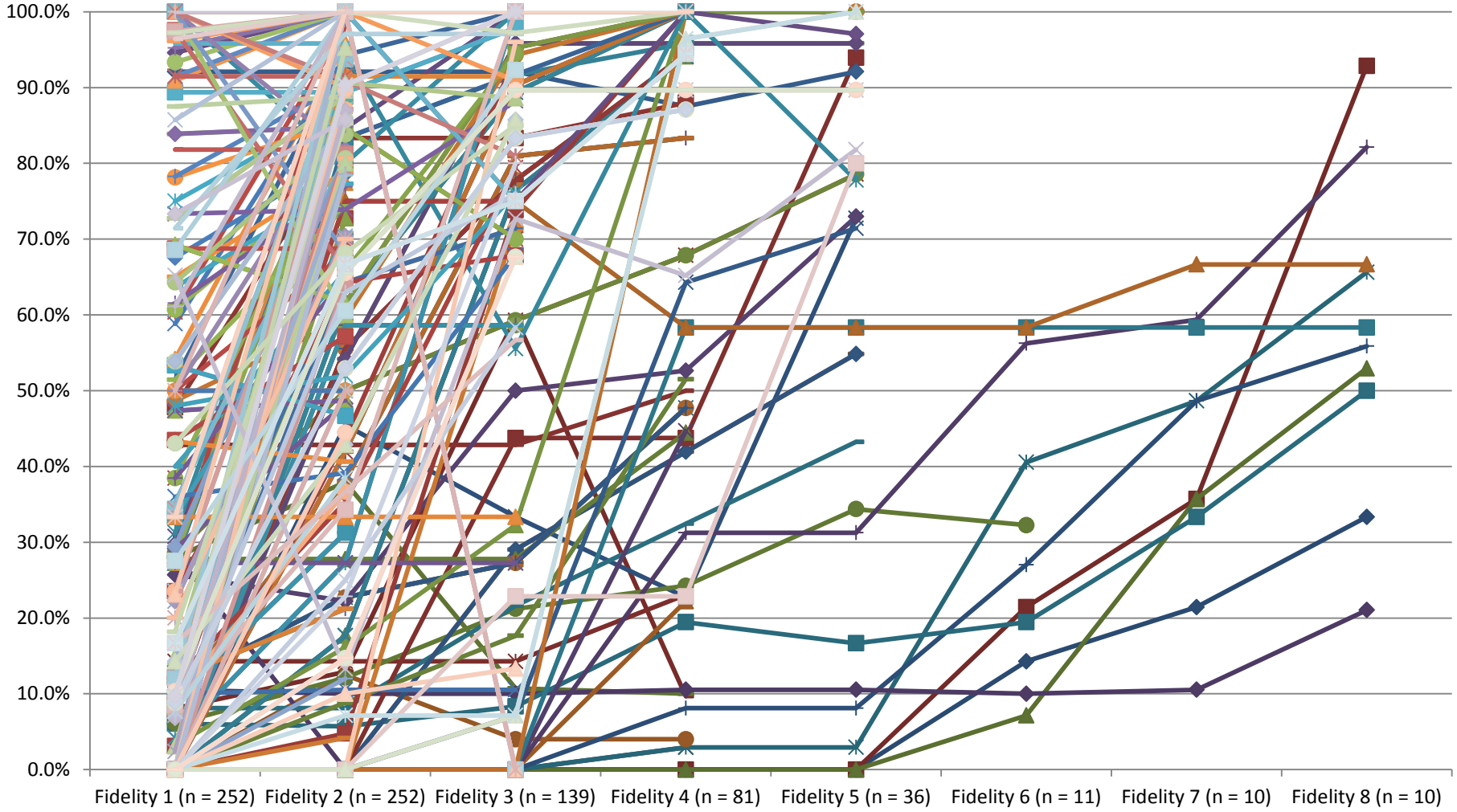


Number of Students Targeted with EBPs (n = 59)



Implementation Fidelity 2008-2012

Percentage of Steps for Implementation Followed with Fidelity for all Cases with 2 or More Data Points



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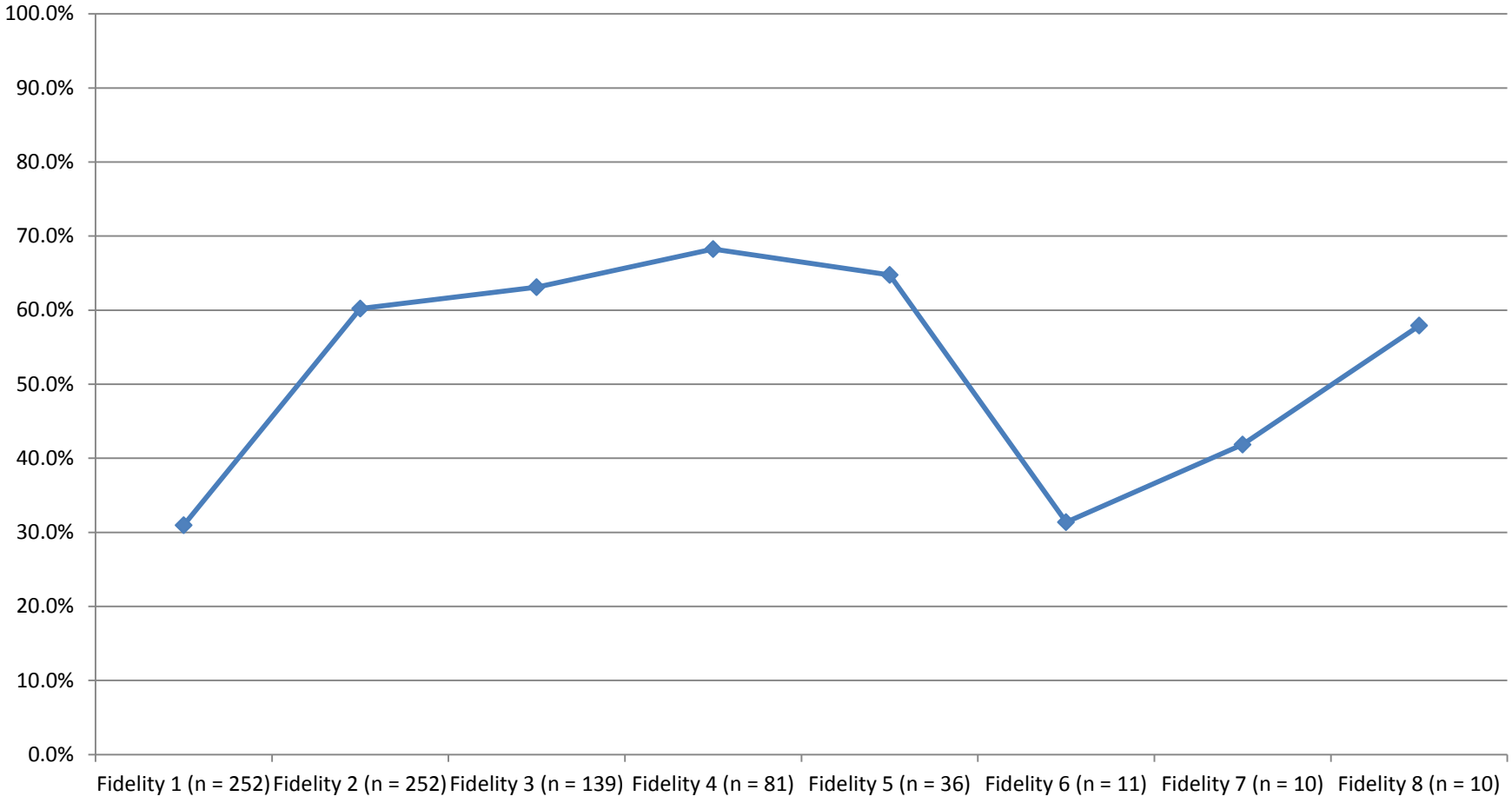
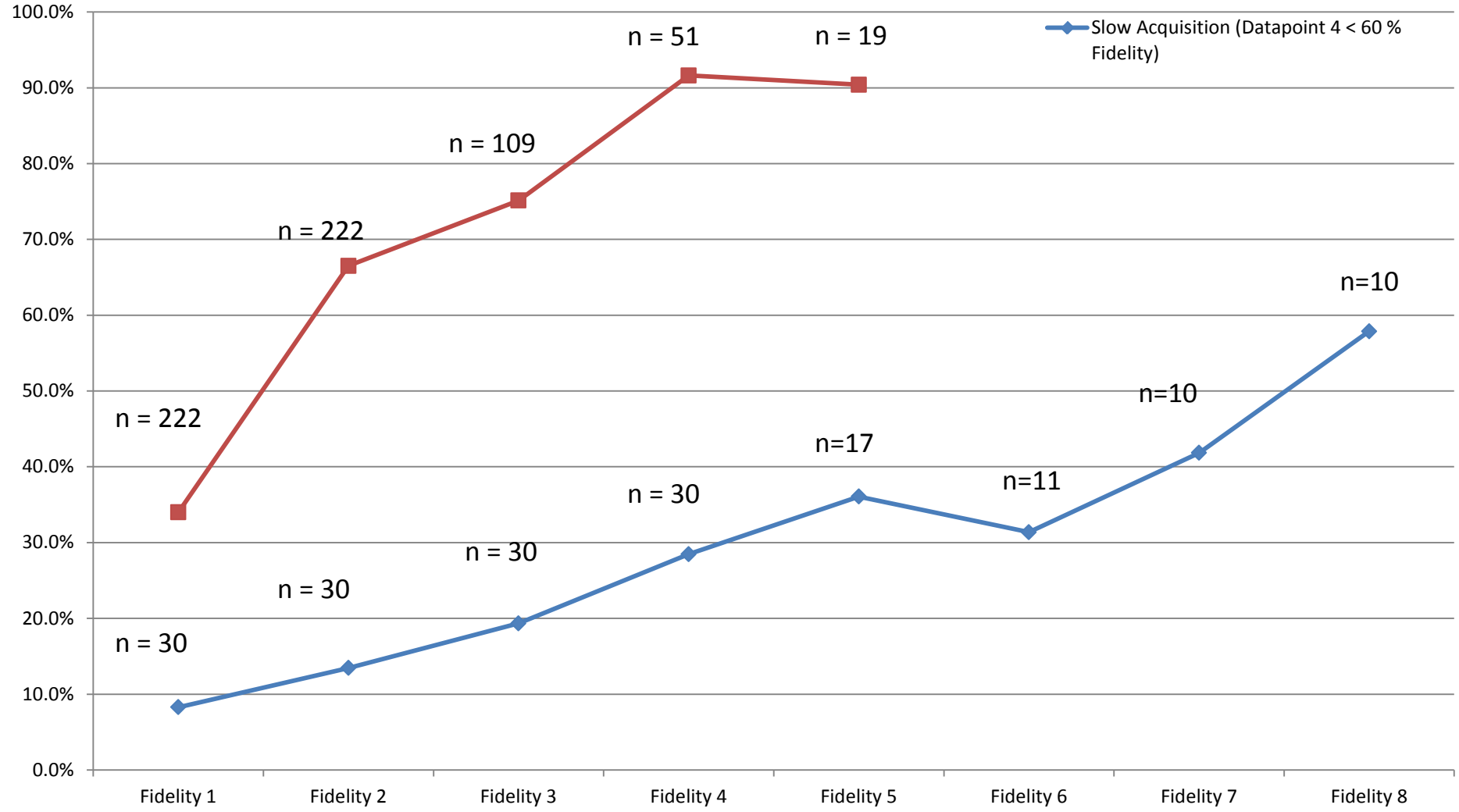
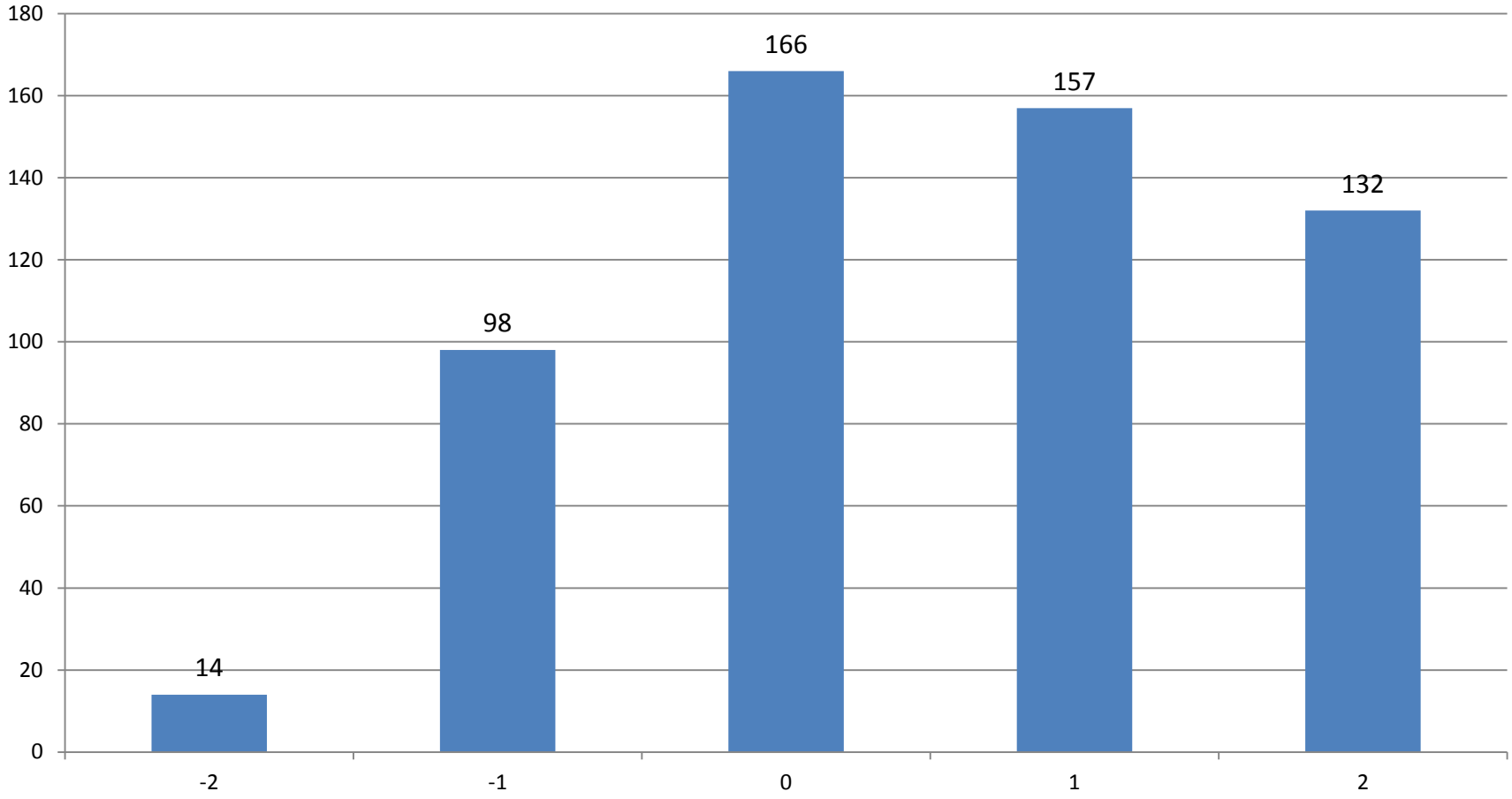


2008-2012 Average Percentage of Steps for Implementation Followed with Fidelity for All Cases with 2 or more Data Points Groups Split into Slow Acquisition (Data Point 4 < 60% Fidelity) and Fast Acquisition (Data Point 4 > 60% Fidelity



Goal Achievement 2008-2012

Frequency of GAS Outcome Ratings (n = 567)



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