



Conceptualizing Fidelity in Tiered Models: A Multidimensional Framework

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Why are We Concerned with Fidelity Assessment?

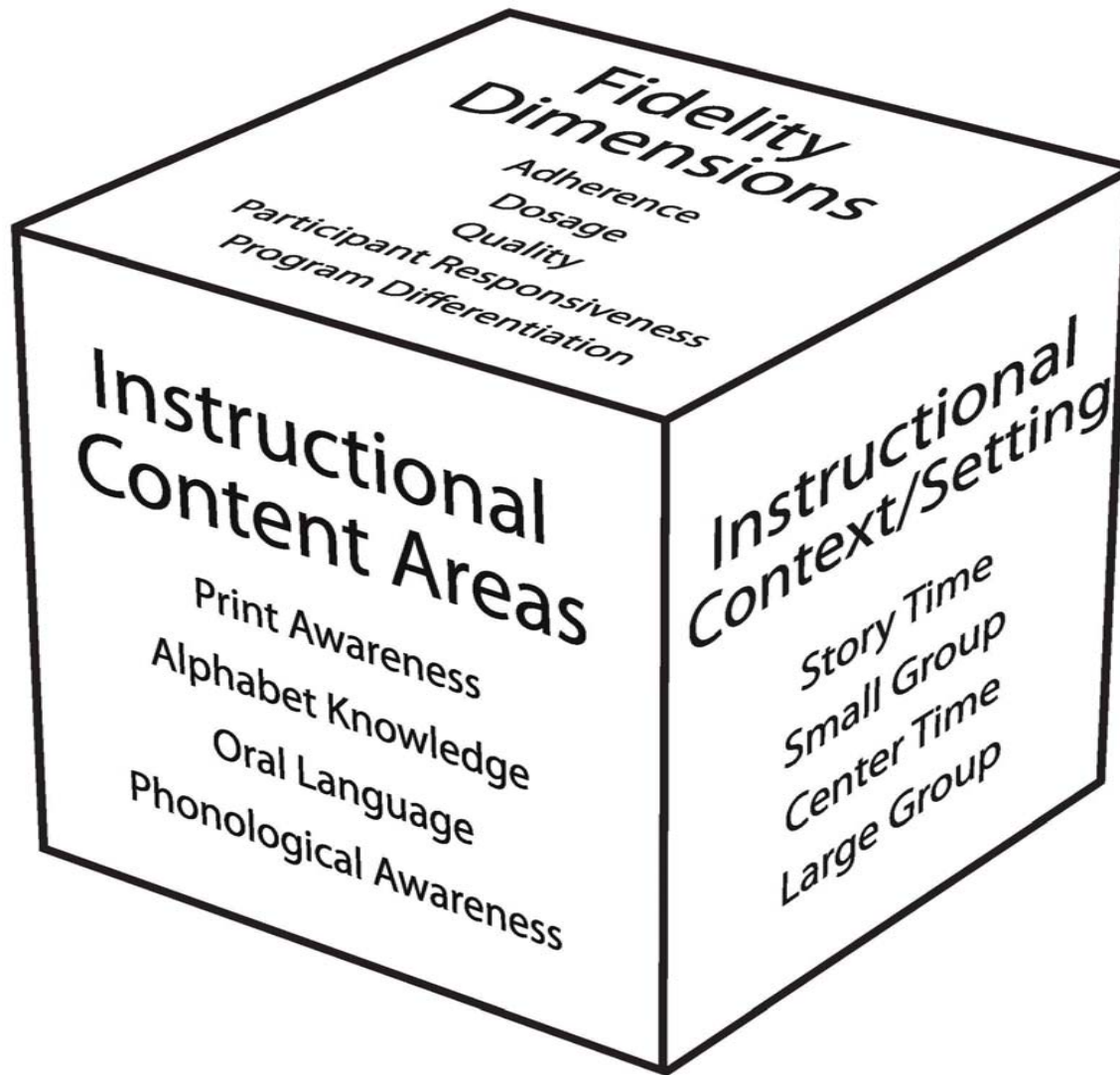
- Our ability to conclude that an intervention is effective (i.e., outcome is a function of the IV) requires knowledge about implementation
- There is a positive relationship between implementation fidelity and the reliability/quality of our conclusions
- Failure to document fidelity results in evaluation of interventions as described or desired, rather than delivered
 - Potential for “Type III error”

Guiding Assumptions for Preschool-3T Fidelity

- Fidelity is a multi-dimensional construct that concerns both *what* is delivered, *how* it is implemented, whether it is *received* by its intended recipients, and its *appropriateness* based on student needs.
- Fidelity assessment considers both delivery by the treatment agent (i.e., what, how, when, where) and uptake/response (match) by its intended recipients (i.e., students at each tier).
- In three-tiered models, it also concerns the fidelity with which student data are collected and used, decisions are made, and interventions/strategies are developed based on the data.

Assessing Fidelity within Preschool 3T Programs

- Fidelity dimensions
- Structural elements:
 - Instructional context/setting (where?)
 - Instructional content (what?)
- Process elements:
 - Problem solving and decision making



Multidimensional Framework for Fidelity Assessment in Pre-3T: Language and Literacy Focus

Dimensions of Fidelity

(Cordray & Pion, 2006; Dane & Schneider, 1998)

- Dosage – overall amount of intervention delivered and received by participant (“strength of intervention”)
- Adherence – the implementation of intervention strategies as designed by developers
- Quality -- qualitative aspects or effectiveness with which strategies are delivered (the “competence of treatment agents”)
- Participant Response -- the extent to which the participant is engaged in and receptive to the intervention
- Program Differentiation -- the extent to which the intervention is different from "business as usual" or an alternative intervention

Structural Elements

- *Context (Instructional Setting)* -- the discrete structural settings within preschool programs designed for the majority of academic instruction and learning to occur, including *instructional strategies* that are utilized:
 - Story Time
 - Center Time
 - Large Group
 - Small Group

Structural Elements

- *Skill Domain (Instructional Content)* -- Skill areas predictive of early literacy development:
 - Print Awareness
 - Alphabet Knowledge
 - Oral Language
 - Phonological Awareness

Process Elements

- The problem solving/decision making process is a separate aspect of, and potential source of variance in, the tiered intervention sequence.
- Targeted and individualized tiers need to be concerned with fidelity of decision making and problem solving processes as unique facets of the intervention.
- To conclude that a tiered model is efficacious at bringing about change in a child, evidence of fidelity of both *content* (what strategies are delivered) and *process* (how decisions about individualization are made) is necessary.

Challenge...

- Each aspect of fidelity addresses a fundamentally important, albeit different, issue.
- Each instructional context poses different instructional demands and targeted opportunities for learning.
- Each skill domain is important to early literacy development.
- *How do we capture each dimension, context, skill domain, and process element in a way that is practical and sound?*

Putting it Together

Fidelity Dimension	Within Context/Setting	Skill/Domain
Adherence	Overall percentage of instructional strategies met within each setting	Percent of relevant instructional strategies met targeting skill within setting
Quality	Overall quality ratings of each instructional strategy within each setting	Quality ratings of relevant strategies targeting skill within setting
Student Responsiveness	Proportion of students engaged and participating in tasks/activities within settings aimed at targeting skill domains	
Dosage	Individual student present x strategy	Individual student present x quality of relevant strategies met within setting

Putting it Together

- Within settings:
 - Assess adherence to evidence-based instructional strategies

Adherence	Instructional Strategy (Story Time)
Y N	ST 1. Introduces the book through reading of title, author, or illustrator.
Y N	ST 2. Discusses or demonstrates of concepts about print (one or more) (e.g., text contains letters, words, sentences; reading progresses left to right, top to bottom, finger tracing along text; etc).
Y N	ST 3. Uses facial expressions and voice to capture children's attention as appropriate to the text by using different tones for characters or modulating voice to emphasize words/facts (e.g., for a non-fiction book emphasizing words, and with a fiction book, changes voices for characters).
Y N	ST 4. Calls attention to novel vocabulary words that children may not know by repeating, providing a definition or a brief explanation; vocabulary words are discussed when preparing to read and/or reading books aloud (charts and displays are not required).

Putting it Together in Pre3T

Fidelity Dimension	Within Context/Setting	Skill/Domain
Adherence	Overall percentage of instructional strategies met within each setting	Percent of relevant instructional strategies met targeting skill within setting
Quality	Overall quality ratings of each instructional strategy within each setting	Quality ratings of relevant strategies targeting skill within setting
Student Responsiveness	Proportion of students engaged and participating in tasks/activities within settings aimed at targeting skill domains	
Dosage	Individual student present x adherence of instructional strategy	Individual student present x quality of relevant strategies met within setting

- **Within settings:**

- *Rate instructional strategy delivery on quality*

Strategy (Story Time)	Adherence	Quality		
	0	1.	2.	3.
ST 1. Introduces the book through reading of title, author, or illustrator.	0. FAILS to meet adherence criteria	1. Introduces the book by ONLY mentioning 2 of 3 of the title, author, and illustrator.	2. Introduces the book through reading of title, author, and illustrator.	3. Introduces the book through reading of title, author, and illustrator and checks for understanding of the terms.
ST 2. Discusses or demonstrates of concepts about print (one or more) (e.g., text contains letters, words, sentences; reading progresses left to right, top to bottom, finger tracing along text; etc).	0. FAILS to meet adherence criteria	1. Sporadically discusses or demonstrates of concepts about print (e.g., traces finger along one or two pages of text but not most of the pages).	2. Consistently discusses or demonstrates concepts about print (e.g., consistently uses finger tracing along text).	3. Discusses AND demonstrates of concepts about print (one or more) (e.g., uses, finger tracing along text and tells or asks children why she is moving tracing long text).
ST 3. Uses facial expressions and voice to capture children's attention as appropriate to the text by using different tones for characters or modulating voice to emphasize words/facts (e.g., for a non-fiction book emphasizing words, and with a fiction book, changes voices for characters).	0. FAILS to meet adherence criteria	1. Fails to appropriately use facial expressions. E.g., Uses facial expressions that are inappropriate for preschool children or that don't match the tone of the book.	3. For the most part, uses facial expressions and voice to capture children's attention as appropriate to the text by using different tones for characters or modulating voice to emphasize words/facts	4. Strongly exhibits consistent facial expressions and voice to capture children's attention as appropriate to the text by using different tones for characters or modulating voice to emphasize words/facts
ST 4. Calls attention to novel vocabulary words that children may not know by repeating, providing a definition or a brief explanation; vocabulary words are discussed when preparing to read and/or reading books aloud (charts and displays are not required).	0. FAILS to meet adherence criteria	1. Fails to call attention to novel vocabulary words that children may not know by repeating, providing a definition or a brief explanation OR fails to discuss vocabulary words when preparing to read.	1. Misses numerous appropriate opportunities but does call attention to novel vocabulary words AND discusses vocabulary words when preparing to read and/or reading books aloud.	3. Consistently calls attention to novel vocabulary words providing a definition or a brief explanation AND discusses vocabulary words when preparing to read and/or reading books aloud.

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• Skill Domain

-- Weight adherence and quality ratings by setting

Weighted Language and Literacy Skills Across the Day

Story Time: *20% Print Awareness, 80% oral language (additional points when Alphabetic Knowledge and Phonological Awareness are part of the lesson plan and appropriate for the book to be read).*

Print Awareness

- ST 1. Introduces the book through reading of title, author, or illustrator.

Oral Language

- ST 4. Calls attention to novel vocabulary words that children may not know by repeating, providing a definition or a brief explanation; vocabulary words are discussed when preparing to read and/or reading books aloud (charts and displays are not required).
- ST 5. Calls attention to pictures and asks children to name objects in pictures or describe what they see.
- ST 6. Asks open ended questions (e.g., “what if”, “where have you seen”, “how would”) to encourage discussion of facts in the book (nonfiction), details, plot and/or characters (fiction), or topic and/or rhyming (poetry).
- ST 7. Uses “think-alouds” or summarizing, or prior knowledge. (e.g., What do you think is happening here? How is Nora feeling? Look at Nora’s face. I think she looks sad.) to support literal and/or inferential comprehension.

Alphabet Knowledge (Note: AK is not expected to occur during story reading unless the lesson plan states that the teacher plans to use the book as a tool learning or reinforcing AK; e.g., ABC book. Score as NA if not applicable.)

Phonological Awareness (Note: PA is not expected to occur during story reading unless the book lends its self to rhyming or alliteration. Score as NA if not applicable.)

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Student Responsiveness – Rate within Setting and Weight by Domain

1	2	3	4
Not at All	Not Very	Somewhat	Completely
1: <u>Students not at all responsive/engaged.</u> Students are completely unengaged/No evidence of student engagement. Fewer than 25% of students are engaged during the majority of the observational period.			
2: <u>Students not very responsive/engaged.</u> There is little evidence of engagement. Between 25 and 50% of the students engaged during the majority of the observational period.			
3: <u>Students somewhat responsive/engaged.</u> There is moderate evidence of engagement. Between 50 and 75% of the students are engaged during the majority of the observational period.			
4: <u>Students are completely responsive/engaged.</u> There is much evidence of engagement. Between 75 and 100% of the students are engaged during the observational period.			

Behavioral indicators of engagement during Story Time include any of the following:

Listening to story, conversation, or instruction

Alert body language

Raising hand

Vocalizing in manner consistent with group during choral responding

Responding to discussion questions

Use the names of the characters/relate to another story that was read

Asking questions

Using own experiences to talk about the story


Pointing out objects/actions in the picture

Pointing out letters/sight words



Process Elements of Pre-3T

- Use of data to move students into more intensive and individualized levels of intervention requires complex decision-making
- Development of individualized plans is based on a problem-solving consultation model, involving specification of the problem, frequent assessment, development of an evidence-based intervention that can be delivered effectively, and ongoing evaluation
- Problem-solving components include frequent assessment of target skills/behaviors; equivalence between progress monitoring tools and targeted assessments are untested



Challenge: Psychometric Qualities of Fidelity Measures

- Reliability (interrater, internal consistency, stability)
- Validity (convergent, predictive)
- Sensitivity of fidelity criteria (utility in predicting outcomes)
- Sensitivity of scale (ability to capture ‘true’ implementation; ability to differentiate high from low/ “good” from “bad”)
- Representativeness of occasion



Challenge: Analytic Issues

- How do we best understand and use fidelity information in studies on intervention efficacy?
 - Indexing fidelity and creating composites/scores
 - Mediation/Moderation
 - “Grain size”
 - Cost effectiveness
- Implementation fidelity as an independent variable



Lessons Learned

- Streamlining is critical in assuring the tool is practical and useful
- Needs in research and practice are unique; for example:
 - Evidence of implementation via paper-pencil records and self-reports are reliable and yield results similar to direct measures (Sheridan et al., 2009) but on a narrow range of dimensions
 - Video records provide rich and flexible data collection across fidelity dimensions, but are expensive to collect and interpret (Knoche et al., in press)