New ECERS-R Virtual Subscales: How They Benefit You

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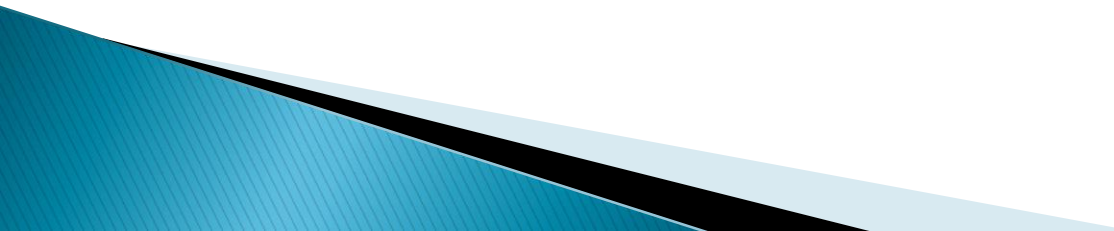**Frank Porter Graham Child Development Institute, UNC-CH**

National Smart Start Conference
Greensboro, NC
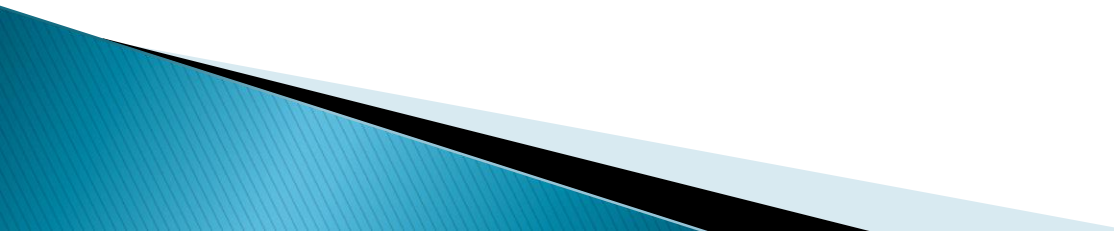May 5, 2015

Conflict of Interest Disclosure

Richard Clifford has a financial conflict of interest as a result of receiving royalty and consulting payments in connection with use of the ECERS-R. His work on this effort was conducted under IRB approval from the University of North Carolina at Chapel Hill which included a management plan for dealing with the conflict of interest noted here.
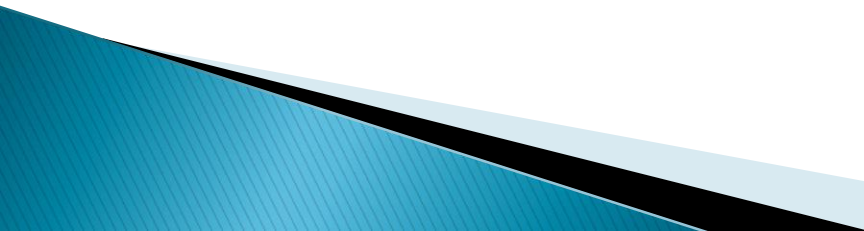
Focus of the Presentation

▸ Describe new work focused on revising the ECERS-R so that it is better able to predict child outcomes and how the revised subscales can be used to improve program quality.

▸ The focus of this work has been on:
   1. identifying new subscales,
   2. revising the scoring procedures,
   3. establishing the convergent validity of the ECERS-R, and
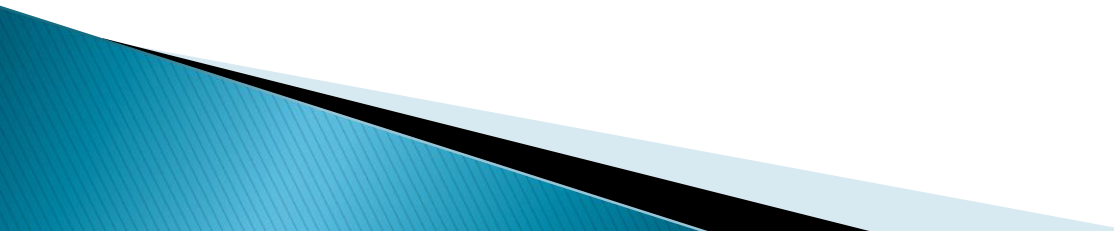   4. linking new ECERS-R subscales and total score to child outcomes.

Participant Objectives

▸ As a result of this presentation, participants will be able to:

1. describe the newly developed ECERS-R subscales, how they are set up, and how they are linked to DAP;
2. explain how a revised ECERS could be used to guide practice taking into account the importance of child outcomes; and
3. derive scores for each of the new proposed subscales using the new scoring procedures.

Current ECERS-R

- The goal of the ECERS-R is to provide a reliable and valid measure of global quality in early learning environments.
- When the ECERS was originally developed, it was based on the DAP position statement.
- ECERS-R reflects a balance of child-initiated and teacher-directed activities within a safe, nurturing environment.
- The scale contains 43 items within 7 subscales. This presentation will focus only on the first 6 subscales and 36 items.

Current ECERS-R Subscales

- Space and Furnishings
- Personal Care Routines
- Language-Reasoning
- Activities
- Interaction
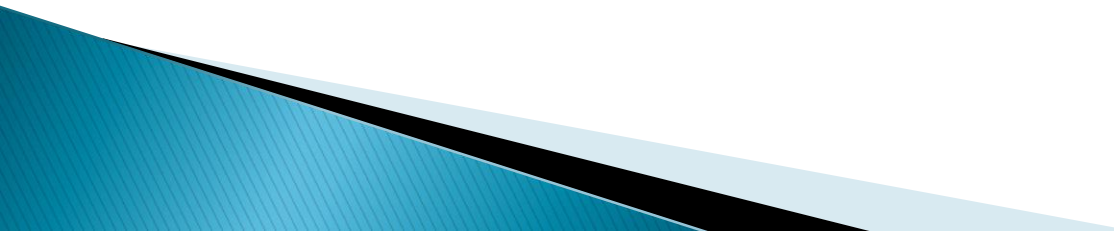- Program Structure
- Parents and Staff

Sample Item From ECERS-R

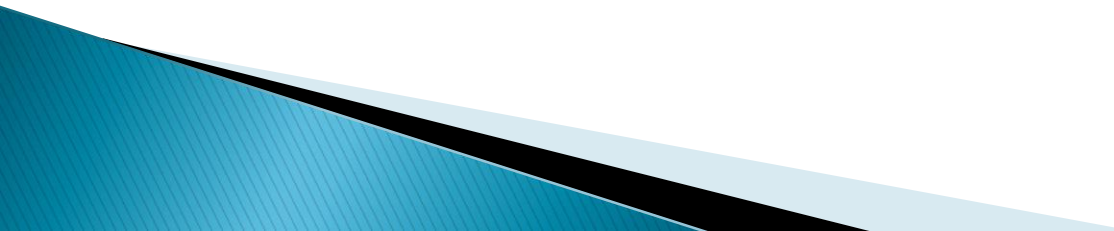| 10. Meals/Snacks			
1.1 Meal snack schedule is inappropriate.	3.1 Schedule appropriate for children.	5.1 Most staff sit with children during meals/snacks.	7.1 Children help during meals/snacks.
1.2 Food served is of unacceptable nutritional value.	3.2 Well-balanced meals/snacks.	5.2 Pleasant social atmosphere.	7.2 Child-sized serving utensils used by children.
1.3 Sanitary conditions are not usually maintained.	3.3 Sanitary conditions are usually maintained.	5.3 Children are encouraged to eat independently.	7.3 Meals and snacks are times for conversation.
1.4 Negative social atmosphere.	3.4 Non-punitive atmosphere during meals/snacks.	5.4 Dietary restrictions of families followed.	
1.5 No accommodations for food allergies.	3.5 Allergies posted.		
	3.6 Children with disabilities included at table with peers.		

Current ECERS-R Scoring Procedures

- Individual items are scored on a Likert-type scale from "1" to "7."
- "1" represents low quality; "3" minimally acceptable quality; "5" good , and "7" high quality.
- Each item is anchored by a set of indicators.
- Midpoint scores of "2," "4," and "6" also are possible.
- Subscale scores and total score are derived by calculating the simple mean.

Why Revise the ECERS-R?

- Increased number of children enrolled in public pre-kindergarten programs
- Emergence of Quality Rating and Improvement Systems (QRIS)
- Increased emphasis on valid and reliable measures in early childhood that accurately predict child outcomes
- New techniques available to analyze the way the scale works

Increased Attention on Improving Validity and Reliability of Existing Measures

- Researchers in the field argue that environmental assessments, including the ECERS-R, do not demonstrate adequate predictive validity.

- One particular concern cited is with the scaling of ECERS-R – are the indicators increasingly difficult as you move up the scale from 1 to 7?
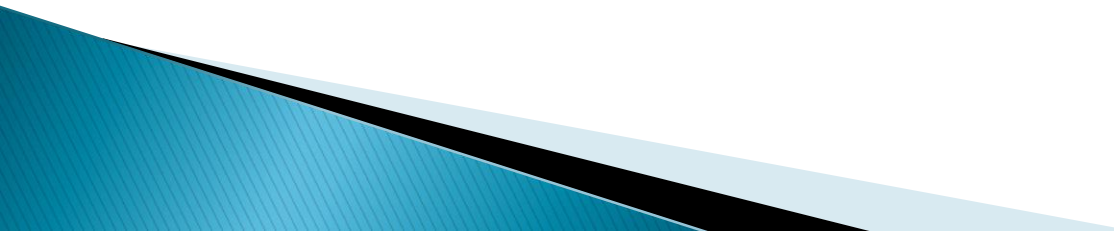
Need for New Scoring System

▸ Current ECERS-R scoring may be too broad and lack sufficient detail.

▸ ECERS-R is related to child outcomes, but the relationship is modest (Aboud, 2006; Burchinal et al., 2000; McCartney, Scarr, Phillips, & Grajek, 1985; Phillips, McCartney, & Scarr, 1987).

▸ Current scoring procedures may lead to incomplete findings regarding program quality.

  ◦ "Stop" scoring approach may lead to the loss of important information.

  ◦ Current subscale scores miss including indicators from other items that are relevant to the construct.
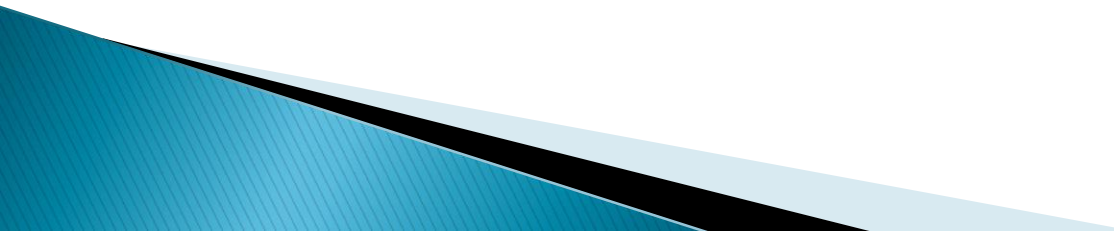
Subscale Scores and Loss of Information

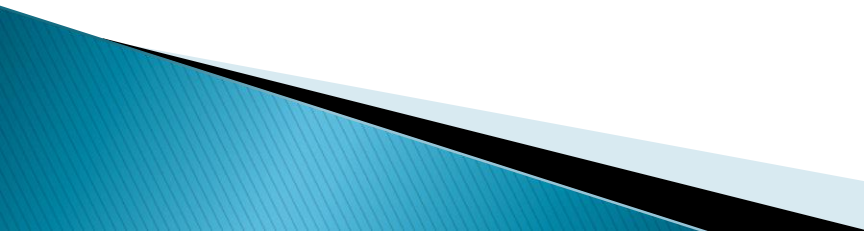| 10. Meals/Snacks			
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1.2 Food served is of unacceptable nutritional value.	3.2 Well-balanced meals/snacks.	5.2 Pleasant social atmosphere.	7.2 Child-sized serving utensils used by children.
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1.4 Negative social atmosphere.	3.4 Non-punitive atmosphere during meals/snacks.	5.4 Dietary restrictions of families followed.	
1.5 No accommodations for food allergies.	3.5 Allergies posted.		
	3.6 Children with disabilities included at table with peers.		

Previous Studies of ECERS-R

- Small to modest associations between ECERS-R scores and child outcomes, which is quite similar to what has been found for CLASS and other measures examining more specific aspects of the environment.
- Items and subscales include indicators that could be associated with numerous domains (e.g., social-emotional, cognitive, health-safety).
- Another limiting factor in predicting outcomes is that child outcome measures may be too restrictive.

Focus of Our Current Work

▶ We set out to address some of these issues.

1. Develop a new scoring system using indicator level information regardless of which item they are in.
2. Identify new subscales by analyzing at the item level.
3. Test the predictive power of this new scoring system

ECERS–R Revision Activities

1. Hypothesize a new set of subscales looking at all indicators.
2. Conduct preliminary factor analyses to confirm the existence of the new subscales.
3. Confirm the resulting new subscales on a new data set.
4. Determine the convergent and predictive validity of the new subscales to see if we could improve predictive power and to assist in further revisions of the scale.
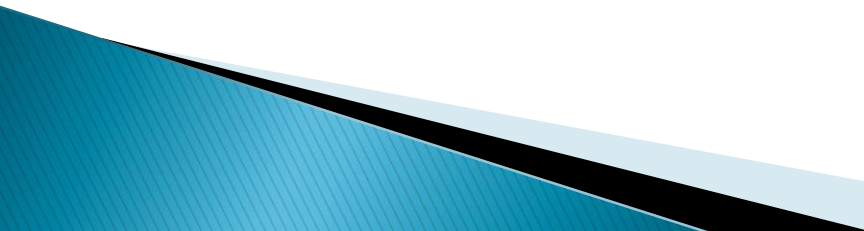
Hypothesized New Subscales

- Access to materials
- Creativity
- Diversity
- Engagement
- Families
- Fine motor
- Grouping
- Gross motor
- Health
- Independence
- Individualization

- Literacy/language/concepts
- Physical environment
- Routines
- Safety
- Science/math/reasoning
- Social-emotional
- Special needs
- Staff
- Supervision
- Teaching
- Use of time

Characterizing Each Indicator
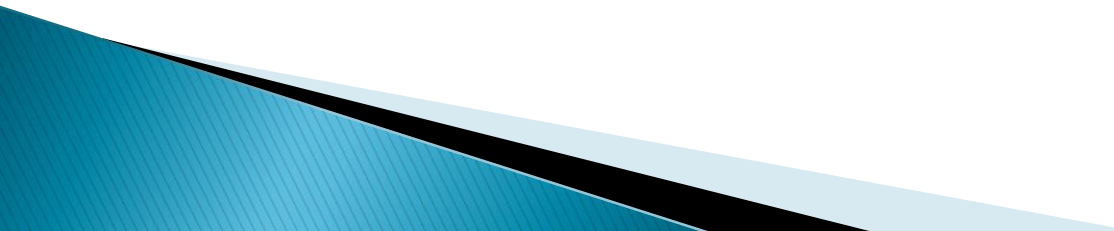
ITEM	INDICATOR	PRIMARY	SECONDARY	TERTIARY
17. Using language to develop reasoning skills	17.5.2 Children encouraged to talk through or explain their reasoning when solving problems (Ex. why they sorted objects into different groups; in what way are two pictures the same or different).	Literacy Language Concepts	Social Emotional	Engagement
	17.3.1 Staff sometimes talk about logical relationships or concepts (Ex. explain that outside time comes after snacks, point out differences in sizes of blocks child used).	Social Emotional	Literacy Language Concepts	Teaching
	17.7.2 Concepts are introduced in response to children's interests or needs to solve problems (Ex. talk children through balancing a tall block building; help children figure out how many spoons are needed to set table).	Engagement	Social Emotional	Literacy Language Concepts

Sample Used for Data Analysis

- 8360 cases, from 6 different studies, in which most cases had all the indicators scored
- States included: California, Iowa, Minnesota, Nebraska, North Carolina, Georgia, Illinois, Kentucky, New York, Ohio, Massachusetts, New Jersey, Texas, Washington, and Wisconsin.
- Issue with skewed distribution, few low scoring programs

Preliminary Factor Analysis

▸ Half of sample was randomly selected to be included in the initial models, the other half used to confirm results.

▸ All indicators for the Parents and Staff subscales were dropped.

▸ Multiple factor analyses were conducted to test the hypothesized subscales.

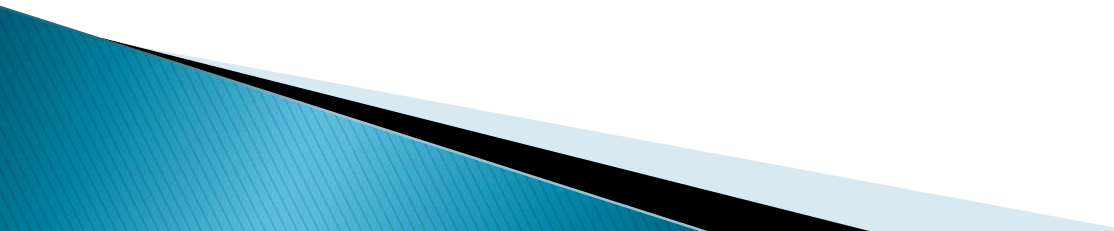▸ Some models included multiple factors.

Confirmatory Analysis

- Once we identified the subscales that held up in the first sample, they were confirmed using other half of the sample.
- We ended up with 16 new subscales for the ECERS-R

Confirmed Subscales From Our Analyses

- Creativity
- Fine Motor
- Gross Motor
- Grouping
- Individualization
- Independence
- Engagement
- Physical Environment
- Diversity

- Language/Literacy
- Science/Math
- Social-Emotional Development
- Supervision
- Teaching
- General Health & Safety
- Supervision to Promote Health and Safety

Revised Scoring Procedures

- Score all indicators on the scale
- Group indicators into new subscales
- Calculate individual scores for each subscale by summing the indicators within each.

Understanding the New Scoring Procedures

- Transfer the checks for each indicator (found on the main ECERS–R score sheet) onto the Creative Subscale score sheet. Each indicator is checked as either 'yes' or 'no.'
- The indicators under 'Inadequate' or '1' are negative things, so checking "no" is actually a good thing.
  - When an indicator under '1' is marked 'no,' this indicator receives a point in the Score column box.
  - All '1' indicators are shaded on the score sheet to serve as a reminder.
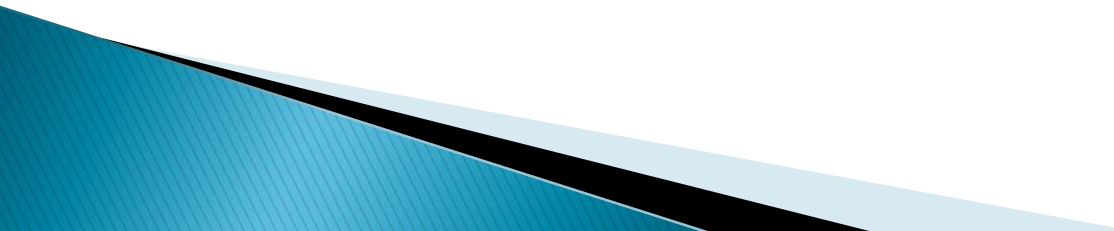- All other indicators get a "1" in the score box if they are scored 'yes'.

Creativity Factor

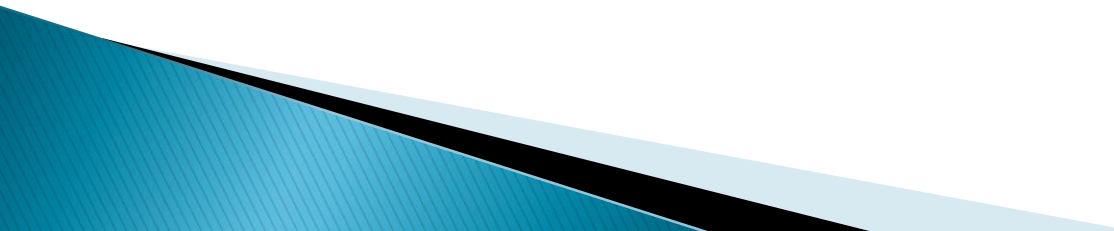| Indicator	Yes	No	Score
2.7.2 Woodwork bench, sand/water table, or easel used.			
6.7.1 Individualized children's work predominates.			
6.7.2 Three-dimensional child-created work (Ex. playdough, clay, carpentry) displayed as well as flat work.			
20.1.1 Art activities are rarely available to the children.			
20.1.2 No individual expression in art activities (Ex. coloring work sheets; teacher-directed projects where children are asked to copy an example).			
20.3.1 Some art materials accessible for at least 1 hour a day.			
20.3.2 Some individual expression permitted with art materials (Ex. children allowed to decorate pre-cut shapes in their own way; in addition to teacher-directed projects, some individualized work is permitted).			
20.5.2 Much individual expression in use of art materials (Ex. projects that follow an example are rarely used; children's work is varied and individual).			
20.7.3 Provisions made for children four and older to extend art activity over several days (Ex. project stored so work can continue; work on multi-step projects encouraged). NA permitted.			
21.1.1 No music/movement experiences for children.			
21.3.1 Some music materials accessible for children's use (Ex. simple instruments; music toys; tape player with tapes).			
21.3.3 Some movement/dance activity at least weekly (Ex. marching or moving to music; acting out movements to songs or rhymes; children given scarves and encouraged to dance to music).			
21.5.1 Many music materials accessible for children's use (Ex. music center with instruments, tape player, dance props; adaptations made for children with disabilities).			
21.7.3 Creativity is encouraged with music activities (Ex. children asked to make up new words to songs; individual dance encouraged).			
22.7.1 At least two types of blocks and a variety of accessories accessible daily (Ex. large and small; homemade and commercial).			
23.5.2 Variety of toys accessible for play (Ex. containers, spoons, funnels, scoops, shovels, pots and pans, molds, toy people, animals, and trucks).			
24.7.4 Pictures, stories, and trips used to enrich dramatic play.			
27.7.1 Some of the computer software encourages creativity (Ex. creative drawing or painting program, opportunities to solve problems in computer game). NA permitted.			
Total number of indicators checked		Total number of positive scores		

Subscale Score [(Total positive scores/number of indicators checked) X 6] + 1

Example: Social-Emotional Subscale

1. What are your general impressions of the completed score sheet?

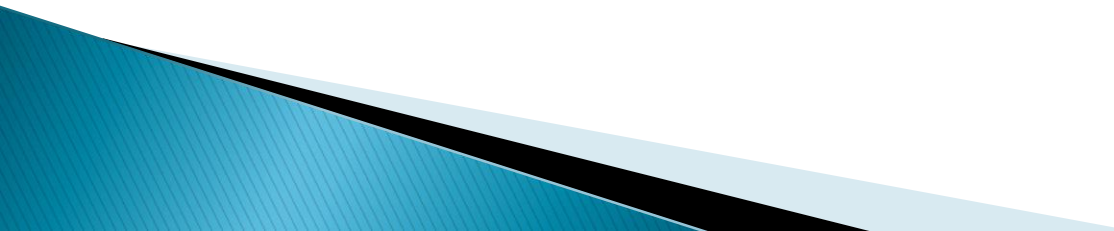2. How do you think you might use this information to improve the environment of this class?

Linking New Subscales to Child Outcomes

- With these analyses, we had to apply our new scoring system to existing data sets.
- Since not all of the assessments in our data set were scored all the way up, there was a good bit of missing indicator data at the upper end of the scale.
- And as mentioned earlier, we also had relatively few really low scoring programs so not many indicators in the Inadequate level were scored yes (meaning negative things were present).

Relationship of ECERS-R with Child Outcomes

- ECERS-R and cognitive skills
  - Relationship of the new Teaching subscale and Science/Math subscale is stronger than the old total score and old factor scores
- ECERS-R and language skills
  - Relationship of the new Teaching subscale, Language/Literacy subscale, and Creativity subscale is stronger than the old total score and old factor scores
- Hightower Internalizing
  - Relationship of Social-Emotional was stronger with than the old total score and old factor scores
  - Not related to LL, SM, or Teaching

What do these findings mean?

- There is some promise in using the new subscale scores.
- Getting some evidence of more precise measurement with these subscales
- ECERS-R is strongest at measuring poor to moderate quality
- ECERS-R doesn't differentiate as well at the upper end of the scale
- This work has let to strengthen the upper end of the scale as we developed the new edition, ECERS-3.

Begin Assessment ✖

Assessment Type: ECERS-R

Room/Home:

Date of Observation:

☑ Enforce scoring through seventh column

Begin   Cancel

ERS* Online Scoring

Home Logout

Coversheet
1 Space and Furnishings
2 Personal Care Routines
3 Language-Reasoning
4 Activities
5 Interaction
6 Program Structure
7 Parents and Staff
Summary

1. Indoor space   Unscored

	Y N N/A		Y N N/A		Y N N/A		Y N N/A
1.1	⊙ ⊙	3.1	⊙ ⊙	5.1	⊙ ⊙	7.1	⊙ ⊙
1.2	⊙ ⊙	3.2	⊙ ⊙	5.2	⊙ ⊙	7.2	⊙ ⊙
1.3	⊙ ⊙	3.3	⊙ ⊙	5.3	⊙ ⊙		
1.4	⊙ ⊙	3.4	⊙ ⊙				
		3.5	⊙ ⊙ ⊙				

▸ 2. Furniture for routine care, play, and learning   Unscored

▸ 3. Furnishings for relaxation and comfort   Unscored

▸ 4. Room arrangement for play   Unscored

▸ 5. Space for privacy   Unscored

▸ 6. Child-related display   Unscored

▸ 7. Space for gross motor play   Unscored

▸ 8. Gross motor equipment   Unscored

PC Sized Screen

Tablet / iPad Sized Screen

Smart Phone Sized Screen

1. Indoor space — Score: 2

	Y	N	N/A		Y	N	N/A		Y	N	N/A		Y	N	N/A
1.1	○	●		3.1	○	●		5.1	●	○		7.1	●	○	
1.2	○	●		3.2	●	○		5.2	○	●		7.2	○	●	
1.3	○	●		3.3	○	●		5.3	●	○					
1.4	○	●		3.4	●	○									
				3.5	●	○	○								

▸ 2. Furniture for routine care, play, and learning	Unscored
▸ 3. Furnishings for relaxation and comfort	Unscored
▸ 4. Room arrangement for play	Unscored
▸ 5. Space for privacy	Unscored
▸ 6. Child-related display	Unscored
▸ 7. Space for gross motor play	Unscored
▸ 8. Gross motor equipment	Unscored

| | 1. Indoor space | Score: 2 |

| | 2. Furniture for routine care, play, and learning | Unscored |

	Y	N	N/A		Y	N	N/A		Y	N	N/A		Y	N	N/A
1.1	○	○		3.1	○	○		5.1	○	○		7.1	○	○	
1.2	○	○		3.2	○	○		5.2	○	○		7.2	○	○	
				3.3	○	○	○	5.3	○	○	○				

| | 3. Furnishings for relaxation and comfort | Unscored |

| | 4. Room arrangement for play | Unscored |

| | 5. Space for privacy | Unscored |

| | 6. Child-related display | Unscored |

| | 7. Space for gross motor play | Unscored |

| | 8. Gross motor equipment | Unscored |

A Look at Each Subscale

The new ECERS-R scoring system is meant to help tie ECERS-R assessments more closely to the developmental outcomes of children in early learning environments as well as to the health and wellbeing of children in these settings. This new supplementary scoring system is designed to maximize the use of data gathered in the normal process of using the ECERS-R to assess environmental provisions in classrooms for preschool aged children.

	Inadequate	Minimal	Good	Excellent
Creativity This subscale covers opportunities for self-expression. It includes indicators that allow children to develop critical thinking skills and experiment with new materials. Creativity fosters mental and emotional growth in children by providing opportunities for expressing both ideas and emotions and leads to new ways of thinking and problem solving.				
Fine Motor Tasks such as writing, cutting, using a fork or spoon, threading beads, moving puzzle pieces, zipping, buttoning, and tying shoe laces help children acquire essential skills for success in kindergarten and beyond.				
Gross Motor This subscale looks at providing proper equipment for growth and development, as well as providing sufficient opportunities and time to acquire key skills.				
Grouping During the preschool period, children learn to work both alone and in small and larger groups. These skills are vital to success in school and beyond in adult life. Effective use of different size of group opportunities for children is key to effective educational practice with young children. The 18 indicators from 5 items in this subscale are related to providing the appropriate balance between small- and large-group instruction, as well as child-initiated and adult-directed activities.				

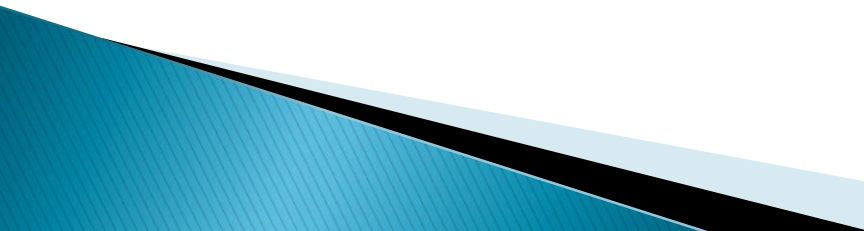| Virtual Subscale	Indicators Met	Score
Creativity	14 out of 17	5.94
Fine Motor	9 out of 10	6.40
Gross Motor	16 out of 18	6.33
Grouping	12 out of 14	6.14
Individualization	12 out of 15	5.80
Independence	39 out of 45	6.20
Engagement	33 out of 38	6.21
Physical Environment	66 out of 78	6.08
Diversity	14 out of 16	6.25
Literacy	49 out of 63	5.67
Science and Math	21 out of 28	5.50
Social-Emotional Development	74 out of 85	6.22
General Supervision	62 out of 70	6.31
Teaching	28 out of 36	5.67
General Health and Safety	42 out of 42	7.00
Supervision to Promote Health and Safety	33 out of 39	6.08

Virtual Subscale Detail

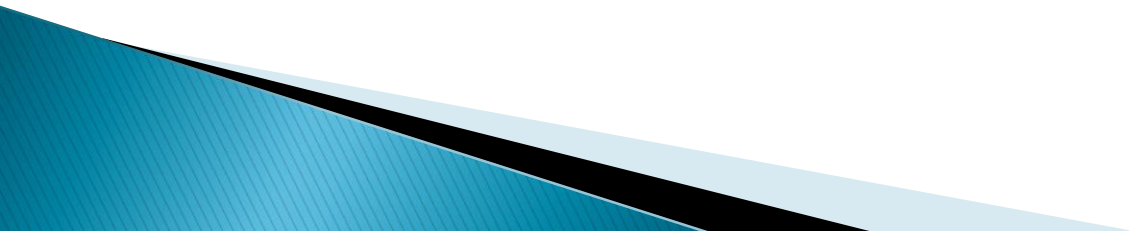**Creativity**   *Score:* 5.94   *# of Indicators Met:* 14   *# of Indicators:* 17   *# of Indicators Marked NA:* 1

Item	Indicator	Met
2 - Furniture for routine care, play, and learning	7.2 - Woodwork bench, sand/water table, or easel used.	☑
6 - Child-related display	7.1 - Individualized children's work predominates.	☐
	7.2 - Three-dimensional child-created work (Ex. playdough, clay, carpentry) displayed as well as flat work.	☐
20 - Art	1.1 - Art activities are rarely available to the children.	☑
	1.2 - No individual expression in art activities (Ex. coloring work sheets; teacher-directed projects where children are asked to copy an example).	☑
	3.1 - Some art materials accessible for at least 1 hour a day.	☑
	3.2 - Some individual expression permitted with art materials (Ex. children allowed to decorate pre-cut shapes in their own way; in addition to teacher-directed projects, some individualized work is permitted).	☑
	5.2 - Much individual expression in use of art materials (Ex. projects that follow an example are rarely used; children's work is varied and individual).	☑
	7.3 - Provisions made for children four and older to extend art activity over several days (Ex. project stored so work can continue; work on multi-step projects encouraged).	☑
21 - Music/movement	1.1 - No music/movement experiences for children.	☑
	3.1 - Some music materials accessible for children's use (Ex. simple instruments; music toys; tape player with tapes).	☑
	3.3 - Some movement/dance activity done at least weekly (Ex. marching or moving to music; acting out movements to songs or rhymes; children given scarves and encouraged to dance to music).	☑
	5.1 - Many music materials accessible for children's use (Ex. music center with instruments, tape player, dance props; adaptations made for children with disabilities).	☑
	7.3 - Creativity is encouraged with music activities (Ex. children asked to make up new words to songs; individual dance encouraged).	☑
22 - Blocks	7.1 - At least two types of blocks and a variety of accessories accessible daily (Ex. large and small; homemade and commercial).	☑
23 - Sand/water	5.2 - Variety of toys accessible for play (Ex. containers, spoons, funnels, scoops, shovels, pots and pans, molds, toy people, animals, and trucks).	☑
24 - Dramatic play	7.4 - Pictures, stories, and trips used to enrich dramatic play.	☐

What is next?

- This work helped inform the creation of a new version of ECERS, called ECERS-3 (published at the end of 2014).
- A new study has just been funded by the US Dept. of Education to evaluate the reliability and validity of the ECERS-3.
- This new study will test the 16 new virtual subscales to see if they are also found in ECERS-3, as well as what aspects of program quality effect child outcomes.

Wrap Up Q&A

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