Expanding Our Notions of Education: Putting MI Theory into Practice
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First International Early Childhood and Montessori Conference, Kingdom of Bahrain
May 26, 2007

I. INTRO

Very glad to be here and have the opportunity to talk to you re multiple intelligences (MI) theory and some of its applications in our work at Project Zero.

I am extremely honored to have been asked to open your conference.

I'd like to offer you a metaphor which I'd like you to keep in mind, not just during my talk, but throughout the rest of this conference. And that metaphor is a camera. What I think MI theory offers us is new lenses through which we can look both at children and their work and the type of education that we provide them.

The first MI lens is wide-angle. Looking at schools and children through a wider-angle lens than we're used to, we might find some surprises—more children being considered intelligent, not just in language or math, but in the way they move their bodies to music, or how they fashion a sculpture out of clay, or how they care for one another.

The 2nd lens is telephoto: This lens allows us to zoom in on a child's distinctive strengths and to learn more about them—how might we build on a child's bodily or artistic or interpersonal skills? What would it mean to construct that child's education with a broader and deeper knowledge of his or her intellectual profile?

What I hope to do in the next hour is to provide a theoretical basis for this wide-angle lens, and then suggest a way to switch lenses and zoom in on some particulars—showing you an example from some Project Zero research in early childhood.

-So I'll begin with:

      -an overview of mult intells theory
      -tell you little re Project Spectrum (early childhood)
      -describe some of its characteristics and show you some examples of assessment
activities
      -if we have time, I'll show you some videos

How many of you familiar with Project Zero? Anyone know Project Spectrum? Howard Gardner and Multiple Intelligences theory? Read Frames of Mind?

Project Zero is an interdisciplinary research group at the Harvard Graduate School of Education

It's an umbrella group for a number of individual research projects, many of which are engaged in designing alternative forms of assessment and creating cultures of thinking classrooms and schools.

Lot of people ask why it's called Zero - because when we began, very little was known re creativity and development in the arts so we were starting from zero (Sputnik)

Now involved not just in studying the arts, but all subject areas.

Our mission is to understand and enhance thinking, learning, and creativity in the arts and other disciplines for individuals and institutions

To get us started, I would like you to try to solve the following problem <u>in any way you can</u>. (PASS OUT)

"A man and a woman are walking together down the street. The woman's step is 2/3 that of the man's. They start off together on the left foot. They want to keep walking together. How many steps will they <u>each</u> have to take before their left feet hit the ground at the same time again?"

-Take 3 minutes to work on this. Can work alone or with someone. As you work, try to <u>notice what you are doing</u> to get an answer.

-NOW STOP and notice the strategy you are using to find an answer. What approaches are you trying? (What strat's did you use?)

(The answer is not important -- but awareness of how you sought one is!)

-This exercise has been used with hundreds of people in seminars and workshops all over. Without fail, people use a wide range of strategiess to solve this problem.

Some close eyes and try to imagine the man and woman walking
some draw pictures or stick figs on their paper
some want to get up w/ partner and step it out around the room
some try various math formulas, equations, calculations
some try to beat out rhythm of steps w/ hands on table or laps
others discuss with neighbors
others just sit there, meditating on the problem, hoping answer will suddenly come to them from inside (& sometimes it does)

-The point of this exercise is that when we are faced with a problem, we have a variety of ways

of approaching it to which we are almost naturally drawn. Maybe it's a strategy that has worked in past. Maybe simply an approach we're comfortable with.
-Important point is not necessarily which approach we choose, but that we all use diff strategies to get there. [different ways we come to know and understand the world around us]

-So what it intelligence anyway? (talk to your neighbor 1 or 2 things that you think a definition of intelligence should include) If your task were to study human intelligence, what tasks would you assign yourself (how would you try to determine if someone had intelligence? (DISC)

II. MI THEORY

FABLE:

I would like to tell you a short fable which touches upon some of these issues. Two Martians were sent on an expedition to Earth to investigate what Earthlings called "issues of the mind". The first Martian landed quite by chance on the campus of a major university. He stopped people who were passing by and asked them about "the mind". Even though he spent most of the morning in this fashion, the answers were so confusing that he was nearly forced to give up. Then he came upon the Educational Psychologist.

The Educational Psychologist was eager to help. The key to the "mind" is Intelligence, she explained. An individual who is intelligent will do well in school and will be successful throughout her life. To measure this intelligence, she continued, psychologists have recently invented special tests, in which individuals are asked questions that require short answers: "Who wrote the Iliad?" or "Repeat the following digits: 2 5 6 7 9 3 4 2." And so on. Those who answer the majority of questions correctly on these tests are the very ones who will succeed at almost anything they try. The Martian asked why that might be. The psychologist explained that intelligence was a general talent that could be turned in the direction of most any task including the task of answering short-answer questions. Measuring this talent with such tests, she concluded, was quite reliable. The Martian was just about to ask how the short-answer questions informed a theory of "mind", when the Educational Psychologist hurried off to teach her next class.

Meanwhile, the second Martian was pursuing a different kind of investigation. The "mind", he reasoned, should be related to tasks that humans performed. Moreover, different individuals may have different minds, which in turn could account for why they perform various tasks in different ways. The Martian concluded that the most straightforward investigative technique would be a simple observation of humans performing tasks, in which he would pay special attention to those things that some humans did exceptionally well.

The second Martian landed first in the South Seas. During a brief tour of the Islands, he came upon a sailor who had developed extraordinary skills at navigation without the use of sophisticated equipment. The next stop found him in Africa, where he observed an elaborate

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hunting society. Later he landed in a Japanese city, where he watched an expert computer programmer at work, on to India to visit a prominent religious leader, and then to Europe to watch two great tennis players compete. He listened to a musician, observed a biologist, watched a carpenter work, and met a businesswoman, a seer, and a poet. And then it was time to return to Mars.

The Martian stopped at the university campus, where he picked up his colleague, who was playing frisbee with the Educational Psychologist. The second Martian described the people he had seen and the marvelous things they had created. He pointed out that in many cases, these exceptional individuals had taken intelligence tests and had done quite poorly -- this was especially true of the South Seas sailor and the musician. He asked the Educational Psychologist about these other "intelligences".

The Educational Psychologist was amused at this innocence and patient in her response. She explained that she and others used the term in a different sense. Tasks involving music, sports, navigation, politics, and so on required "talent" or "skill", but not necessarily intelligence. Moreover, although perhaps some talented individuals do poorly on the special tests of intelligence, most people who are successful, regardless of their occupation, do relatively well. Intelligence, in addition to whatever special skill is required, is necessary in any problem-solving setting.

Then she paused. Well, the special tests are only one indicator, she added. For example, when we choose graduate students in educational psychology, we consider many other things as well. We want good "problem finders" as well as good "problem solvers". And before the Martians could ask her to explain this, she rushed off to a faculty meeting.

The Martians climbed into their ship and took off. They had quite a bit to think about on the way home. They had learned a great deal about the "mind" of the earthlings. And they had learned that this "mind," whatever it was, did not as yet understand itself.

This fable is a caricature. It comes from an article by Joe Walters and Howard Gardner on mult intell theory. I hope that today we can pretend to be Martians, and that you begin to question your own views of intelligence -- whether or not you end up accepting the theory I will present.

Like the 2nd Martian, H Gardner prefers to examine intelligence in light of the performances and products that are prized by various cultures **SLIDE**.

-In coming up w/ his theory of multiple intelligences, Gardner examined several large bodies of knowledge:

-research on the development in normal children of different capacities; the breakdown of these capacities under different varieties of brain damage; the existence of special populations such as prodigies and autistic children; abilities found in individuals from different cultures; clues from

evolutionary history; and data from psychometrics and from psychological testing.

-Multiple Intelligences or <u>MI</u> theory (as I'll be referring to it) claims that the abilities to fashion a poem, sonata, or geometric proof, to build a computer or a bridge, to organize a political campaign -- all require some form of intelligence, but they may not require the same form.

Anyway, based on the results of all the evidence he looked at, Gardner isolated seven diff mental faculties or intelligences: linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, inter- and intra-personal. And he has since also identified an eighth intelligence—naturalist. **SLIDE**.

Now, as the educational psychologist in our opening fable points out, many of the skills included in MI theory have traditionally been referred to as <u>talents</u> or <u>gifts</u>. And, to some, calling these talents intelligences is unnecessary and confusing.

From our perspective, the intelligences <u>could be</u> labelled talents. In that case, however, we should also call lang and logical abilities talents. The problem is not the label as much as it is the isolation of one or two talents as more important than others.

While we may not be accustomed to using the term "intelligences" to cover such a wide range of skills, this **linguistic** change is necessary in order to help us change our sense of what an intelligence is and to help us to recognize the diverse skills that are valued in societies all over the world.

[-MI Schools: some made conscious decision to use terminology (empower selves, new Ts, pars and kids)]

This broadening of the term intelligence has also led some people to wonder why we should stop with 7 or 8 intelligences. Why not 80 or 800?

There is nothing magical about the number 7 or 8 (though some ...). We may find, over time, that this survey overlooks certain intelligences (like naturalist) or perhaps includes some that it shouldn't ... (cooking, spiritual). But what's important is that we have introduced criteria which independent investigators can use to debate and determine what "counts" as an intelligence.

    Now, I am going to describe briefly each of these intelligences.

<u>THE 8 INTELLIGENCES</u>: (SLIDE 1 - V. STEPHEN/WOOLF) The first intelligence is called <u>linguistic</u> intelligence. Language is a virtually universal competence: only a few exceptional individuals lack it altogether. A poet is an individual who has a lot of "linguistic intelligence." (WHO?) Virginia Woolf (or actually Virginia Stephen in this slide (1903)) is another. Gardner breaks down language into at least four different core components or operations: 1) the sound

properties or tonality; 2) the grammar or syntax; 3) word meanings or the logical aspects, and 4) the pragmatics or use of language. Of course, there are both oral and written forms of language, and people can be more sensitive to one than they are to the other. Linguistic intelligence is exemplified in the adult endstates of novelist, poet, journalist, lawyer, and lyricist. With young children, we find it in kids who enjoy playing with words - making up rhymes, telling elaborate stories, looking at books, inventing jokes, etc.

(SLIDE 2/EINSTEIN) A second intelligence is <u>logical-mathematical</u>. As the name indicates, it refers to people who are good in logic, mathematics, science (Einstein…). Piaget thought that he was studying <u>all</u> of intelligence, but we think he was basically studying logical-mathematical ability. Mathematical genius flowers young -- we can see it in kids who are always noticing and taking delight in the patterns and numerical aspects of things, noticing the relationships between numbers -- the 6-year-old boy who reports that 5 - 7 is -2, having figured it out by examining a thermometer.

[[Much of our testing is based on a high appraisal of verbal and mathematical skills. If you do well in language and logic, you will do well on IQ tests and aptitude tests, and you may get into a prestigious college, but whether you do well once you leave is probably going to depend as much on the extent to which you possess and use the other intelligences, which are often neglected by our educational system.]]

<u>Musical</u> intelligence develops earliest of all the intelligences; the talents of musical prodigies are often apparent by the age of 2 or 3. (THIS IS A SLIDE (#3) of the composer STRAVINSKY, who was apparently able to remember the first music he ever heard. At the age of 2, impressed his parents by singing a song he had heard a peasant woman sing. (And this is Ella Fitzgerald, one of our great jazz singers.) But musical intelligence is more than competence in the <u>performance</u> of music; at an early age, the musical prodigy will also <u>de-compose</u> music, reordering and reconstructing the music she is playing.

Musical intelligence involves the ability to think in musical terms; to be able to hear themes, to see how they are transformed, to follow those themes in the course of a musical work, and in the best cases, to be able to produce music like that on one's own.

[[But if you want to know how musically intelligent a person is, you can't just give them a paper and pencil test. You've got to see whether in fact they can take musical forms and can work with them. The key to MI theory is that you always have to think in terms of the particular medium itself. It's not fair to approach that medium through the window of language or logic. The problem when standardized testing is applied to an area like music is that it does not allow one to get at musical ability directly [--since it presupposes language and logical abilities as well as musical].]]

[Happy Birthday - end on same, higher or lower note? **How solve it?** Sing backwards? (ends on higher)]

(HB actually very complex. We've asked conservatory musicians to write song beginning with F w/out using instrument. Many trained musicians fail to do it correctly. They think it's correct, but it's not. Type of research into intelligences - create puzzles to reveal what people understand and don't understand…)

(SLIDE 4 & 5/PICASSO & CHESSMASTER) Spatial intelligence involves the ability to match patterns, to perceive similarity in rotated forms, and to conceptualize spatial relationships. It includes the capacity to visualize in 3-dimensional space, like in model building. (Do you know who this is? … PICASSO?)

(NEXT SLIDE) The chess master also uses visual imagery and spatial intelligence to conceive strategy. However, spatial intelligence is not dependent on vision as such; blind children, using tactile cues, can also develop competence in this area. Other examples of people with spatial intelligence include engineers, sculptors, architects, geometers, and surgeons. There are few child prodigies among visual artists, but there are idiots savants such as Nadia, the autistic child who in preschool was able to draw with accurate detail and perspective at an age when most children are barely able to make simple representations.

(SLIDE 6,7/GRAHAM,BIRD) The fifth intelligence in Gardner's theory is bodily-kinesthetic. It refers to the ability to use your whole body or parts of your body - like your mouth and your hands - to solve problems or to fashion products. Actors, mimes, dancers (LIKE MARTHA GRAHAM IN THE SLIDE (#6)), athletes (BIRD), surgeons again, and mechanics are all individuals with high degrees of bodily-kinesthetic intelligence. In children, bodily-kinesthetic intelligence can be seen either in precocious athletic ability like hitting a tennis ball or skating, or moving expressively and rhythmically to music or images.

(SLIDE 8,9/GANDHI,MLK) Finally, there are two personal or social intelligences, intrapersonal and interpersonal.

Interpersonal intelligence involves the ability to understand other people: how they work, what motivates them, how to work effectively with them. Therapists, teachers, political leaders and actors all use interpersonal ability in understanding, and responding to the emotional cues of other people. (IN THIS SLIDE, we see a highly developed ex of interpersonal intelligence in (...know who this is?) - MLK.) With young children, we see interpersonal intelligence in the child who negotiates effectively with her peers, or the child who notices when a classmate is feeling down and tries to help, or the child who is acutely aware of the social dynamics of the classroom - where children play, who plays with whom, etc.

Intrapersonal intelligence is the analogous kind of ability turned inward. It means having an effective and accurate working model of yourself -- what you can do, what you can't do, what your aspirations are, what your fears are, and the ability to use that self-knowledge to be

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effective. (SLIDE 10 - know this person? FREUD (IN HIS STUDY 1938), like Virginia Woolf, is an example of an individual who was able to reflect on his own emotions and experiences, and then communicate them to others. Since this is the most private of the intelligences, it is usually necessary to gain evidence of it through language, music, art, or some other form of expression. The young child who exhibits intrapersonal ability has a sense of her own strengths and weaknesses, her likes and dislikes, her emotions.

Naturalist intelligence refers to individuals who can discern differences in and categorize the natural world—flora and fauna. Gardners, farmers, botanists. Charles Darwin. Rachel Carson (SLIDE) was an environmentalist and biologist who wrote a book called The Silent Spring.

How do you recognize the naturalist intelligence in young children? (children who notice similarities and differences, good observation skills, understanding of natural phenomena, extensive knowledge re something like bugs or dinosaurs)

So, these are the eight intelligences. Think of them as at least eight abilities which we, as a species have evolved to express, and which we have developed, over many, many years. Everybody who is normal has significant proportions of all of them. But people differ in their particular configurations of intelligences.

-Also, never find an intelligence in isolation. Most roles, tasks, products involve combination.

-Interesting challenge in education is to understand different intelligence profiles and figure out how to build on them.

III. SPECTRUM

So that's a theoretical basis for our wide angle lens. Now we'll zoom in a little and move from theory to application.

-The main way we have come up with to identify and build upon these different intelligences in young children is through the materials, games and activities developed in Project Spectrum.

-1st I'll give you a brief overview of the different phases of Spectrum, then outline a few characteristic features, and finally show you some examples of our assessment activities.

Spectrum History:

Phase I:

-Spec began in 1984 as alternative assessment approach for preschool children.

-In Phase I (- 1988), goal of project was to assess broader range of cognitive strengths in preschool children
        -using MI theory as basis, we worked w/ both classroom teachers and subject-matter experts to develop 15 different activities in 7 different domains (**OVERHEAD 1**)
        -for example, we looked at production and perception in music, invented and descriptive narrative in language, and expressive and athletic movement in bodily-kinesthetic domain
        -we worked in a preschool clrm at Eliot-Pearson, a lab school connected to Tufts University in Medford, MA
        -a Spectrum staff member administered the different activities to the children throughout the whole year
        -assessments looked like other activities and games in classroom, presented as choice
        -then wrote profiles with suggestions which parents could do at home or in community
        -results did show that kids had distinctive profiles of intellectual strengths and weaknesses (compared w/ IQ test) (at least strength relative to self)
        -also looked at working styles: how child approached a task, e.g., how persistent, focused, impulsive, engaged, etc.

Phase II:

-In Phase II, tried to see if could modify activities for slightly older children (k-1) and more at-risk population
        -worked in Somerville, MA, working class community outside Boston
        -did seem to identify strengths which T's had missed
        -also some follow-up on kids from Phase I
          -strengths and styles relatively constant

Phase III:

-In Phase III, we focused more on learning centers and curriculum as a way to identify a greater number of strengths in children, especially those at high risk for school failure
        -worked in 4 1st grade (6 year old) classrooms in Somerville, MA

-Finally, we also developed a classroom-based mentorship program in an inner-city school in Boston called Spectrum Connections, which if you're interested about, you can ask me re after talk

        (2 goals: expose to alternative role models, representing different intelligences; help children make connections bet own strengths and interests and adult roles in community
        (mentors from kids' own community, reflected ethnic diversity in classroom
        (matched w/ children w/ similar strengths: small groups, domain activities
        (young children, focus on cognitive, domain-related activities (self-esteem)

IV. DISTINCTIVE FEATURES

-So what are some of distinctive features of Spectrum approach **(OVERHEAD)**

[(0) Not on overhead, but Spec looks at broader range of areas

       -Spectrum does not think of problem-solving as generalized process, but as specific to different domains-- music, movement, art, soc -- all involve problem-solving abilities, whether using body to express image, or figuring out what colors to put on the page, or how to solve a conflict with a peer**]**

(1) Emphasizing children's strengths

       -instead of focusing on areas of weakness & helping to shore them up, Spec emphasizes strengths
       -if allow child to work in area of strength, increases sense of self-esteem
       -strengths can also be used in service of areas where not as strong, e.g., if child has strength in storytelling, but not in movement, could use storyboard figures to encourage child to move; or have child act out story

(2) Blurring the line between curriculum and assessment

       -Spec has tried to blur the line dividing curriculum and assmt by gathering info over time in child's own environment
       -because believe no such thing as "pure potential" apart from working in domain ...
       -always give chldrn experience with materials of domain before trying to assess potential, so before assessing child's mechanical potential, we'd give them nuts and bolts, hinges, simple gear structures, etc.
       -As I said, Spec activities administered over course of school-year, presented as choice during activity time

(3) 3rd, Spec has tried to use materials, measures which are "intelligence-fair"

       -As I mentioned earlier, rather than viewing all abilities through window of language and logic, as many IQ and pencil-and-paper tests do, we try to tap abilities directly, using tools, materials of domain (sing, play instrumt, work w/ small mechanical objects, not just asked vocabulary Q's ...)
       -Advantage of SPEC for children who are struggling w/ language -- can enter into some activities more easily because don't require language
       -Have found mechanical area to be especially useful for children who teachers have considered at risk

(4) 4th, Spec has tried to embed assessment and curriculum in meaningful, real-world activs

-As I noted earlier, we tried to focus on abilities and activities meaningful in real world terms to children and adults (what I referred to as "adult endstates"), rather than skills useful in school context
-And many different endstates in each area of intell -- in music, can be a singer, play an instrument, compose, conduct, be a sound engineer, etc.

(5) Focusing on stylistic dimensions of performance

-Finally, as I mentioned, to capture fully a child's approach to task, we decided important to look not just at cognitive skills, but style as well - how child approaches, interacts w/ materials of domain -- persistence, confidence, attention to detail, etc.
-while some ch have styles which cut across board, others much more tied to which area working in
-so perhaps become more focused, persistent, reflective in area of str (Carolyn - 3-yr-old w/ mech; Donny)

V. SLIDES OF SPECTRUM ACTIVITIES

-Now I'll show you some slides of our ASSESSMENT activities for pre-schoolers from Phase 1 of the Project.
-Remember, we developed and implemented the assessmt activs at Eliot-Pearson Lab School.
-The children were from a primarily white, middle- and upper-income background. Activs conducted over course of school year, from October to April
-Assmts in classroom, and presented to children as a choice during their inside activity time.
-For most part, the activities were conducted one-on-one with children, and lasted about 10 - 20 minutes.

(SLIDES 1 & 3) This is the Dinosaur Game, a measure from the logical-mathematical domain. It is a board game in which 2 small dinos try to escape from the mouth of a big, hungry diplodocus. The child and adult take turns throwing a directional and number die to move their game-pieces, and also have the chance to make some strategic moves.

As you can see, we try to embed assessment in games and activities with themes which are FAMILIAR TO and MOTIVATING for 4 year olds -- escaping dinosaurs. (Later on, you'll see finding treasures, a birthday party scenario, etc.)

(SLIDES 7 & 8) This is the second number activity -- a BUS GAME. It involves grown-ups and children getting on and off a cardboard bus. As you can see, we try to make the concepts CONCRETE, and give the children something to manipulate like the dinosaurs and dice on the Dinosaur Game, and chips and small figures on the bus game. Children in preschool use chips to help them keep track of people getting on and off the bus, but older children can use

written notation. The activity assesses <u>calculation</u> and <u>notation</u> skills as well as <u>keeping track of several variables</u>.

   This is another example of trying to be "intelligence-fair". Language skills are not needed to complete this task. Of course, if a child's language or other abilities come through, we do make special note of it. For instance, some children on the bus game get much more involved in the stories behind all of these characters getting on and off the bus than keeping track of the numbers.

       (SLIDE 33) The next few slides show some of our science activities. This is the Discovery Area, our natural science activity. The area is stocked with plants, rocks, shells, small animals.

-Over course of year, we can look at children's observation skills, identification of similarities and differences, and understanding of natural phenomena

       (SLIDES 41 & 42) This is the Treasure Hunt Game, which is designed to assess a child's ability to make <u>logical inferences</u> and her <u>categorization skills</u>. We hide four different kinds of objects under four different color flags, and then ask children to predict where they will find the different kinds of treasure.
       (SLIDES 19, 20, 16, 18) This is the Assembly Activity, where we give children mechanical objects to take apart and put back together. Here, she's working on a food grinder, and this is a small oil pump.

       (SLIDE 74) And this is one of our language activities, the storyboard, but you'll hear more re it in bit.

       (SLIDE 75) We break up music into <u>production</u> and <u>perception</u>. This is our production task, where we ask children to sing their favorite song, and then they decorate a playdough cake and sing "Happy Birthday" to the adult. [We also ask them to sing as much as they can remember from a new song which was taught to the class four or five sessions prior to the assessment.]

       (SLIDE 76) This is the music perception activity where we use Montessori bells to assess a child's ability to discriminate pitch. If some of you aren't familiar with Montessori bells, the special thing about them is that they all look alike, but they produce different tones. Children play pitch-matching games and we also see whether they can identify errors in well-known tunes. (Expensive, but can substitute xylophones)

       (SLIDE 59) In movement, we address both creative and athletic movement in a biweekly creative movement session and an outdoor obstacle course. We look at a child's rhythmic and expressive sensitivities, as well as body control and awareness.

(SLIDE 26 & 27) Another year-long assessment is the collection of children's artwork in portfolios. The portfolios include drawings, paintings, collages, and 3-dimensional pieces, and are supplemented by 3 structured art activities.

The core components in this domain include the child's <u>use of lines</u> and <u>shapes</u>, <u>color</u>, <u>space</u>, <u>detail</u>, and <u>representation and design</u>.

(6 SLIDES) Here we see one boy's paintings based on a "<u>vehicle</u>" theme; contrast that with another boy's work who was more interested in <u>design</u>.

(SLIDES 44, 45, 48) Finally, this is one of our social activities, the Classroom Model, where we look at a child's ability to observe and understand social interactions and events in her classroom.

(SLIDE 44) In order to make the child's social world more concrete, a former Spec researcher, Janet Stork, came up w/ idea of creating a scaled-down model of the classroom with little wooden figures of children and teachers, which children could then play with to show their social awareness of themselves and others.

-Around midyear, we photo children and teachers and put the photos on these small wooden figures (SLIDE 45).

-Then we ask the children questions, but they don't need to use words to answer, they can just SHOW US. (SLIDE 48) For ex, we ask where they like to play or where their friends like to play or who likes to play alone (or who plays at blocks, or who helps you find s/t that's lost)

Examples of different kinds of responses which children give when they are asked about their understanding of <u>friendship</u> range from the common 4-year-old response with which we may all be familiar -- "if you're <u>my</u> friend, you can come to my birthday party" to the more unusual "Well, Joe is <u>my</u>, friend, but I am not so sure he thinks of me as one of <u>his</u> friends."

One child when asked who he would choose to be teacher for the day, said "I would choose Sara because most of the things I <u>DON'T</u> know, she knows. And she knows the thgs I know. That means she <u>knows more</u>." (dem awareness of own limits and apprec str's of fellow classmate).

To give us some insight into <u>intrapersonal</u> intell (or ch's und of self), we also showed children photos of Spec activs in which they participated and asked which ones they thought they were the best at and which were hard or easy. (1 girl said drawing was her favorite activ, but also the hardest bec she doesn't know how to draw that good. Many say bus-hardest, clear right v. wrong)

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One spinoff of this activity was that children began making their own dioramas at the art table after the model was introduced.

[This was also task where children served as our consultants. It involves a lot of Q's, and we learned our lesson when 1 child, 1/2 way through the activity, looked up and asked "So when's this game gonna start anyway?"]

The classroom model can also be used to look at SPATIAL abilities (placement of furniture). [Some children immediately recognize it as their classroom, others have no clue. Some can id diff areas of their class & locate themselves w/in it, but for others, much more difficult.]

Well, I hope these examples give you a feel for some of our assmt activities.

Most of the activs have scoring or obs sheets. We also filled out working style sheets for ea activity.

And as I mentioned, the info which is gathered on each child is compiled at year's end into what we call a Spec profile.

-Addresses each child's areas of strength, relative to peer group, or self

-Also give par's concrete suggestions for follow up activs which can be carried out at home or in community

-A Parent Activs Handbook includes suggestions for home activs using inexpensive and easily acquired mat's, e.g., diff ways to grow seeds, counting and measuring games, art projects, music games, etc.

-Also community resource list with activities, classes in local children's museums, libraries, etc.

-Handbook documenting each activity is available through PZ ebookstore for those who are interested in buying it. (pzweb.harvard.edu/ebookstore) It includes info on how we conceptualized the domain, how to build materials, how to administer and score activities, preliminary results, further suggestions for domain…

-Two other books…

VI. CLIPS (if time)

Now I'll show you some clips ...

(1) DINO GAME: To play the Dino Game, the adult has one dino, and ch has the other.

They take about 10 turns throwing 2 dice: one # die which indicates the # of spaces to move the dinos, and a directional die with 3 +'s and 3 -'s which tells the child whether to move her dino forwards or backwards

The first part of the task assesses the child's <u>counting skills</u>, <u>one to one correspondence</u>, and her <u>adherence to rules</u>.

In the next part of the task, the child is given the choice of 2 new dice: one with 5+/1- and the other with 5-/1+, and is asked which one she'd like to use for her dino and why.

To give you an example of what a child might say, one boy last year chose the 5- die because he said "these (referring to -) keep going straight, and with "+" you'll go in different ways (revealing a quite literal reading of signs, sensitive to visual cues, interfered w/ his performance - T hunt game).

Children are then asked to use the # die and dir die and
place them so as to make the v. best move for their dino to help him win (+3) and v. worst move for the adult's dino to make him lose (-3).

There are also 4 more chances to choose strategic moves for the 2 dinos (with adult controlling +/- die and child controlling # die).

This 2nd part of the task assesses the child's <u>use of strategy</u> and <u>ability to fully optimize her moves</u>.

Now this game gives us a lot of different kinds of information on the individual children. For instance, one child demonstrated an unusual concern for the welfare of the adult's dino and could not bring herself to try to make it lose. Another little boy, when asked what he could do to help the teacher's dino win, replied "I'd hold his hand". (they would score high on social)

Now we'll look at a clip of a child from few years ago playing the dino game with a Spectrum staff member.

[SHOW CLIP: BEN- 4.65 - 6.12, "2-much better" - "big deal"]

[W/ regard to scoring, we filled out score sheets (**OVERHD**)
Scored directionality, counting, and strat choice of dice**]**

(2) STORYBOARD: The next clip shows the Storyboard - one of our language activities where we give children an assortment of enticing characters, props, and creatures which serves as a stimulus for them to create their own stories.

Before introduced, teacher goes over storytelling components: dialogue, narrative,

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modelling diff voices, simple story scene

CLIP-JOE 320

OVERHEAD - SCORESHEET From stories, can look at such comps of ling abil as types of narr lang, complex of vocab, thematic coher and sent str in context ...

[Big range: tenuous links bet chars, props, actions to more of frwork for action, consistent storyline comb char, props, action in common enterprise, indiv motiv, contrasting moods, scenes, maybe narr prob.**]**

Ch bld own storybds

(3) ASSEMBLY: Somewhat diff, not as directly related to 1 of intells. COMB of WHICH? log-math, bod-kin, spat

Before, nuts, bolts, hinges, wrenches, tools, bks re tools, machines

CLIP Sara 100

Imp to use real obj -- pieces functional when apart

OVERHEAD - Scored in terms of var categs - sense of parts/whole, prob-solving, attn to detail, fine motor skills

-No apparent gender diffs, transformed task (let fall), esp gd for working styles: persistent, foc'd, planful, self monitor

VII. CONCLUSION

Spectrum has generated a tremendous amount of interest nationally and internationally. The approach can be used on many levels: as assessment, as curriculum, or as a powerful philosophical framework or lens -- wide angle and zoom -- through which to view children and their distinctive sets of strengths and styles. It is as much as a framework and a set of ideas as it is a discrete program.

I hope I have given you some sense for how MI theory and the Spectrum approach can help us identify and build on the potential of today's children by viewing them more broadly and more deeply;

and also provided some support for the idea that instead of asking "how intelligent am I?", a better question to ask is "In what ways am I intelligent?" The difference is not just semantic. It

makes a difference in attitude and expectations and in our approach to education. Rather than treating ourselves as either successes or failures, we can come to understand our strengths and weaknesses and temper our expectations accordingly. We do not have to adhere to a theory of Mult Intell (or go to Mars) in order to take this approach or hold these beliefs, but I hope I have illustrated for you this morning how the theory leads in this direction.

Thank you.

QUESTIONS?

The Ring-around-the-Rosy Game

Though this project was conducted with all the children from the same class, our narrative deals with only part of the story. This episode concentrates on the graphic representations of the Ring-around-the-Rosy game produced by three children: Giulia (four years, ten months), Leonardo (five years, six months), and Giovanni (five years, seven months). The episode is emblematic of the individual learning that is constructed within and with the contribution of the group.

The children play Ring-around-the-Rosy, talk about "Ring-around-the-Rosys," predict the way in which they can be represented graphically, and then draw them. We will begin by putting together the verbal predictions and the individual drawings of the three children who are the protagonists of the story.

Giovanni: *Drawing a Ring-around-the-Rosy is easy! Because you draw some kids with their faces in front and then... not all of them with their faces, but also with their backs.*
Giovanni seems to have clear ideas about what to do: he identifies the need to draw children from various points of view.
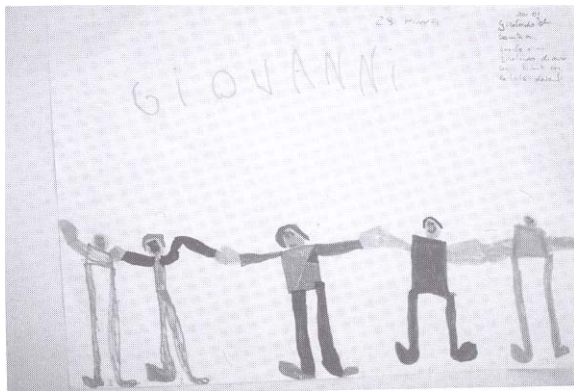
This is the Ring-around-the-Rosy that Giovanni drew after making a verbal prediction of the representation. He comments on his drawing as follows: *I drew a different kind of Ring- around-the-Rosy, with the kids with their heads in front.*
Giovanni seems to make light of his error by giving a definition of "difference" that can include many things, even a Ring-around-the- Rosy in a straight line.

Leonardo: *I think it's easy to draw a Ring-around- the-Rosy of kids because you draw a round shape like this* (he traces it in the air), *then the kids... then... its done.*
To Leonardo, the circle seems to be the
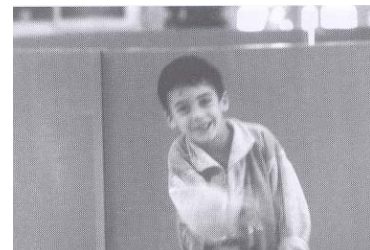
guiding shape of the whole representation. Once his drawing is
completed, to his great satisfaction, Leonardo comments on it
like this:
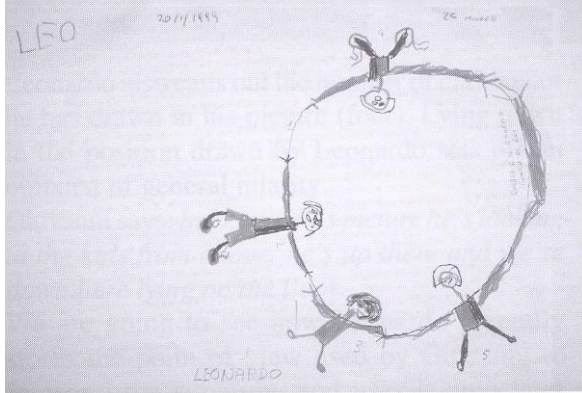
*Look what a great Ring-around-the-Rosy! There's
an arm here that's a little long; but otherwise it
wouldn't reach!*
In his drawing, Leonardo followed
the schema that he had previously
hypothesized verbally, drawing
the circle first and then drawing
four children on it.

When the children have completed their drawings, they are called
on in groups to comment on their own Ring-
around-the-Rosy and those of the other
members of their group. The groups are
formed partly following the children's own
suggestions and partly under the guidance
of the teachers, who take into account the
different strategies adopted by the
children, both in the way they define the
problems and in the search for different
ways to resolve them.

The children begin to make their first comments, and then turn to
Giulia:
What about your drawing, Giulia? Will you show it to us?
Giulia (leaning her elbows and forearms on her drawing):
*No, okay, I know I got it wrong, I made a line, not a circle of
children... it's hard!*

The teacher's assessment is not as harsh as Giulia's, since in
her drawing she set the children
on a diagonal line across the
page. From this layout we glean
that she has been asking herself
some intelligent questions and
playing with ideas intelligently
to convey the spatial situation
of the Ring-around-the-Rosy
through her drawing. The teacher
elicits comments on all the

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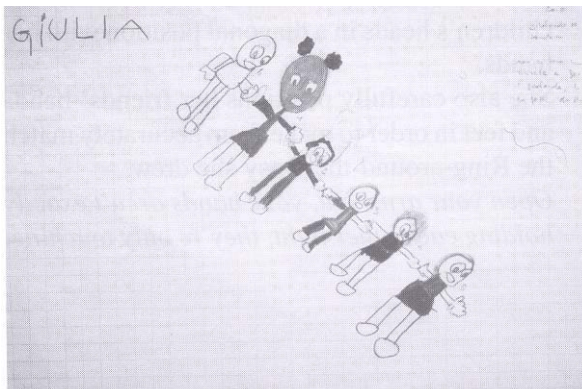
drawings. Giulia: *Well, they're not really Ring-around-the-Rosys but we did the best we could.*

Giovanni: (laughing) *Why don't we all stand like the kids in our drawings?*

Giovanni's idea, which turns around the usual approach of interpreting reality through drawing, appears to us to be excellent; in this way, even the trip-ups of the representation can become elements of fun in order to advance thinking. It is an intelligent idea, brimming with questions, trials, and fun. The teachers pick up the idea and later re-launch it to all the children in the class, group by group.
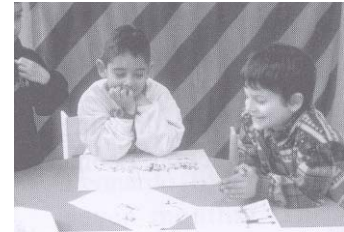
Here we will follow only the work of two of the children we have already introduced.

Giulia: *I want six kids because I drew six!* She examines her drawing at length and appears to be wondering how to get her classmates to stand in the strange diagonal position she has drawn.

She solves the problem by positioning the children's heads in a diagonal position with her hands. She also carefully positions her friends' hands and feet in order to make them accurately match the Ring-around-the-Rosy she drew. *Open your arms out, your hands aren't exactly holding each other tight, they're only touching.*

Leonardo also calls out the number of classmates he has drawn in

his picture (four). Lying down in the position drawn by Leonardo

sets off an outburst of general hilarity. Giovanni says: *In Leonardo's picture he's looking at the kids from above, he's up there and we're down here lying on the floor.*
We are going to see how Leonardo mentally stores the point of view used by Giovanni to interpret the situation, and uses it on a later occasion. Very often it is other people who, with their comments and interpretations, make us more conscious of the choices we make.

Leonardo: *To make it into a real Ring-around-the-Rosy we need everyone to stand up!*
One of the most amusing moments is when the children move from lying down to standing up, as requested by Leonardo. The children do stand up, but they find, themselves with their shoulders facing each other in an improbable Ring-around-the-Rosy back to front.

Leonardo: *No, this isn't right. This Ring-around- the-Rosy is kind of small and a little silly. The backs are turned toward the other backs, but the bodies have to face the other bodies.*
Giulia: *But the picture is always still. How can you make the Ring-around-the-Rosy so that it shows?*

Giovanni: *Come on guys, let's try to do a Ring- around-the-Rosy for Giulia, then we can see what we like, like a photo!*
Through his words, Giovanni seems to be positioning himself from an external point of view in order to get an overall view of the situation. It is important to know how to move through space with your thoughts.

Giovanni: ***There are some kids that you only see their backs. I can see Giulia's back; she's looking at Giorgio's face; Leonardo's side (profile), who's looking at Matteo's face.***
Some statements can be seen as generators of thoughts that enlighten the mind. Giovanni's is one of these: backs and fronts, then profiles and fronts of human figures who are looking at each other and are positioned in a relational space. This relational situation will become an important aspect of the experience that other children will take up and use as guidance.

Ring-around-the-Rosy 2

At this point, we suggest that the children make a second individual graphic representation of the Ring-around-the-Rosy, and place them in mixed-gender groups of four to six children. The groups are proposed based on the interpretations the teachers made during the first Ring-around-the-Rosy experience. We continue our focus on Giulia, Leonardo, and Giovanni.
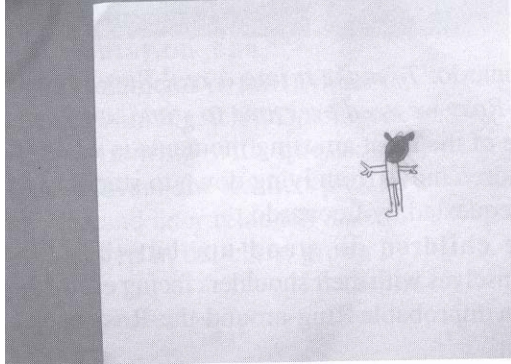
Giulia seems to be the most perplexed: *I'm going to do the kid from the back because you need...*

She gets up from the table and holds out her arms to look like the figure she has drawn, thinking and expressing her thoughts aloud. *Okay... I have to draw some kids who are standing like I am right now. I made this girl with her back turned...* (she holds her arms out in front of her). *But what about the others, how do I get them to look like they're standing up? I don't know how to draw the kids from this side.*
Giovanni: *Giulia, you have to draw the profile...*
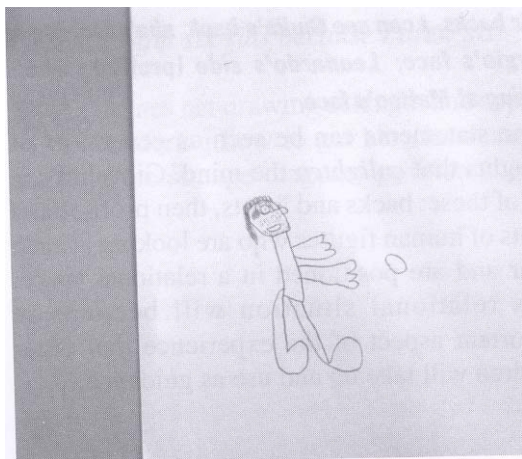
He shows Giulia the first figure he has drawn. The strategic position of the figure is worth noting: the arms are stretched out in front, ready to link up with another figure seen from a front view and one seen from behind. The figure shown in profile is a structural peg of Giovanni's Ring -around-the- Rosy.
This is the profile. Giulia, it's better to draw the profile first because otherwise you keep going on and on and then you can't tell

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what's going on any more!
This may be what happened to him in his first drawing (the Ring-around-the-Rosy in a line).

Leonardo: *I know how you draw a Ring-around- the-Rosy of kids. First you draw a circle, like a Ring-around-the-Rosy... then you need a kid who's standing outside and looking at it. ..*
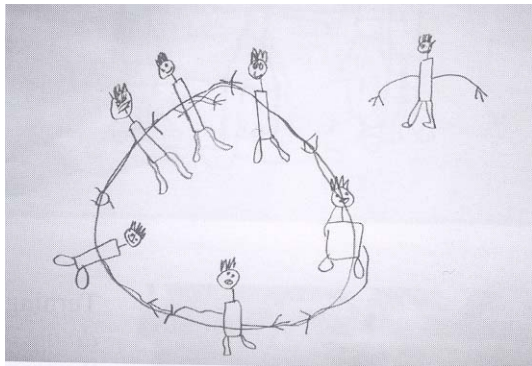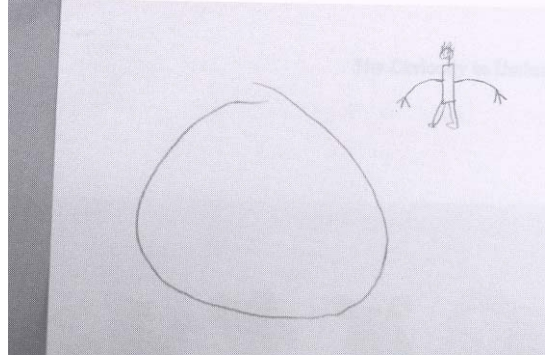

Leonardo's initial schema that we saw earlier is still very strong and seems not to have been undermined by the real-life trials of the Ring-around-the-Rosy or by his classmate's comments. Or, if it has been undermined, since a graphic model is a conceptual schema, it will need time to be modeled. At times we may notice that the schema we are using is not appropriate, but we do not know how to modify it.

Giovanni: *Hey Leonardo, you can only see your kids from the front! Because the ones you see it from the back are always there, always!*
Leonardo: *Okay, then I'll put some hair on this I one, this one, and this one.*

Leonardo takes a pencil and covers up the faces of the figures in the foreground.
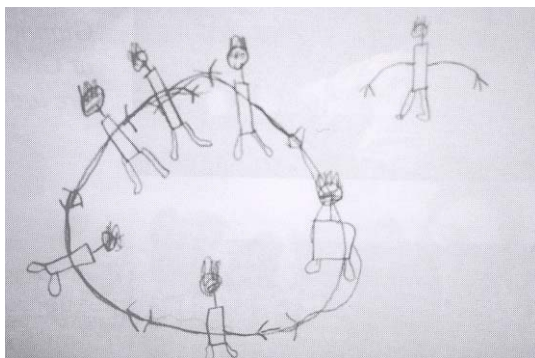
In this second Ring-around-the-Rosy all the children have chosen to use pencils, a choice that probably shows an awareness of the

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difficulties involved and therefore of the possibility of modifying the drawing. Error and modification are integral parts of research and learning. It is necessary to accept them as such intelligently and without worrying about them.

Leonardo: *This is okay because... look: this kid is looking at this one, then this one's looking at this one, this one's looking at this one... there, it's done!*

Then, as a final comment on his drawing, he adds: *You can see these kids from above, like this.* He stands up and raises a hand, almost as if he were defining a point of view from as high as possible: *...and, from the top they look like they're lying on the ground!*

In interpreting and commenting on his drawing, Leonardo uses two interpretive readings that were made earlier by Giovanni: one child who, in the relational space of the Ring-around-the-Rosy, is looking at the face of another child; and the point of view from above. **Here we can see quite clearly how, during the process of learning, continuous loans of knowledge, hypotheses, and points of view are being made among the children.**

This drawing by Giulia shows three figures seen from behind. Giulia is still a prisoner of her dilemma. She has understood that it is necessary to It draw the children's backs, a conviction that has been strengthened by the dialogue taking place in the meantime between Giovanni and Leonardo. As a result of this, she has added two more girls, who can be seen from behind, but she is still not satisfied.
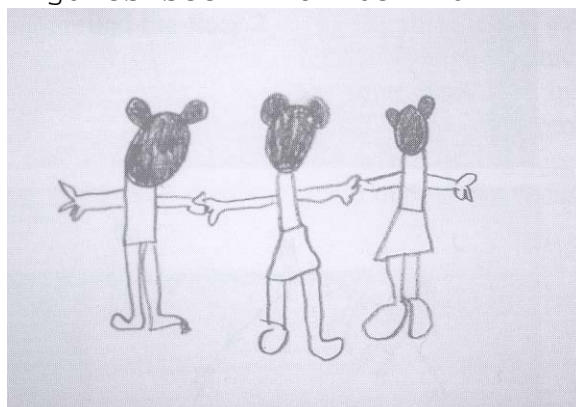
Turning to Giovanni, Giulia says: *How did you do the ones on the other side (the children facing the front)?*

Giovanni (pointing at Giulia's three figures seen from the back one by one): *Giulia, I have an idea! Who are these kids looking at? Who's this one looking at? You have to put in the ones on the other side, otherwise they're not looking at anything.*

Giovanni: *Just look at this, we're doing a real Ring-around-the-Rosy.*

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Guys, come here, let's do a Ring-around-the-Rosy! Okay, I'm looking at Giorgio for a while, then Leonardo for a while, Giorgio's looking at Leonardo, Leonardo's looking at Giorgio, then we go around, and for you who are looking at us, everything changes.


Leonardo: *Now, Giulia, I'll explain the profile to you... look at me! See? It's like a little line that goes all the way down, like this.*

Finally reassured, Giulia then draws two figures from a side view, but the problem persists:
Yes, but now where am I going to put the other heads? Can I draw some
more faces ?
Giovanni: *You can see a little bit of the front... not all of it, but you can see it... there's a little bit of room here in the middle to put in the kids who are looking at these ones!*
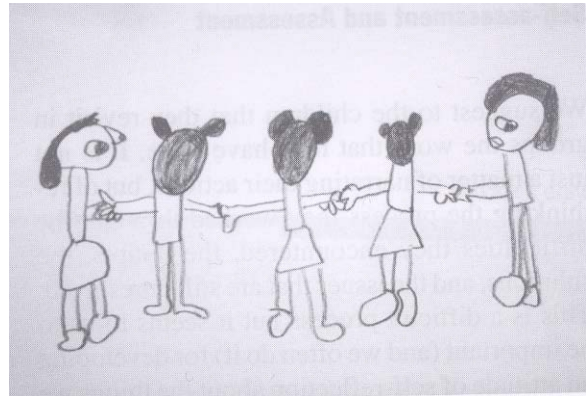
Giovanni: *Look at my Drawing!*
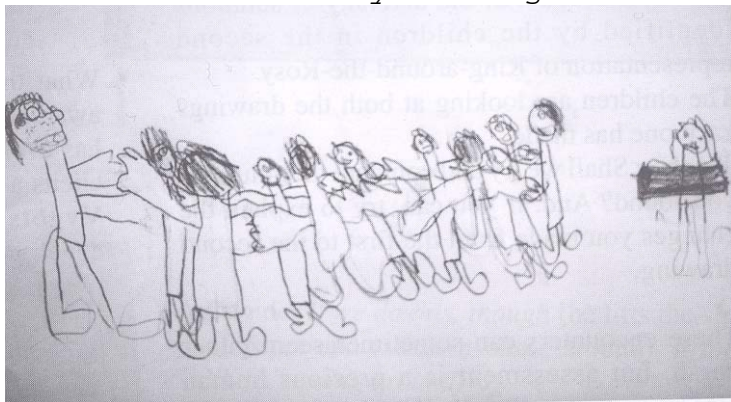
After a few more hesitations, and casting a sidelong glance at Giovanni's drawing on the table every now and then, Giulia completes her drawing.

The rotation of the figure seems to have been understood,

though perhaps not the representation of space yet, since the foreground and background figures appear to be compressed almost on a single baseline.