

Discovering Multiple Intelligences Through a Performance-Based Assessment: Consistency with Independent Ratings

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ABSTRACT: *The purpose of this study was to investigate the consistency between performance-based DISCOVER (Discovering Intellectual Strengths and Capabilities through Observation while allowing for Varied Ethnic Responses) assessment reports and two independent ratings (teacher, observer) in appraising students' multiple intelligences through specific activities. The comparison showed that the three accounts depicted similar results concerning the participants' strengths and weaknesses in spatial, logical-mathematical, and linguistic intelligences giving reason to believe that when intelligences are assessed through specific activities, the DISCOVER assessment observers were effective. However, the effectiveness of the DISCOVER assessment observers was low in appraising the intelligences not measured through specific tasks, namely bodily-kinesthetic, interpersonal, and intrapersonal intelligences. Specific tasks to appraise those intelligences should be devised for an effective and credible assessment of students' abilities throughout the whole spectrum of intelligences.*

The use of standardized tests to assess the intelligence of culturally diverse groups has been much criticized in literature on this topic (Clasen, Middleton, & Connell, 1994; Cummins, 1991; Maker, 1996; Samuda, 1991). Many researchers have attributed the problem of underrepresentation of minority students in programs for the gifted to the wide use of such tests in which narrow definitions of giftedness are adopted (Cummins, 1991; Gardner,

1992; Maker, 1993). Presently, the field of intelligence assessment seems to be witnessing a paradigm shift, as evidenced by recent definitions of giftedness (Maker, 1993; Renzulli, 1979), the emergence of nontraditional theories of intelligence (Gardner, 1983; Sternberg, 1991), and the rise of alternative assessment methods, namely performance-based assessments (Maker 1993; Plucker, Callahan, & Tomchin, 1996).

In the new definitions of giftedness, a broader view of the concept is adopted, overthrowing the notion that giftedness is merely manifested through outstanding academic performance. For example, Renzulli (1979) hypothesized that giftedness is an interaction between three clusters of basic traits: high levels of general ability, creativity, and motivation. Along the same lines, Maker (1993) postulated that creativity and intelligence are two components of the same construct. She contended that the key element in giftedness is the ability to solve complex problems in the "most efficient, effective, or economical ways" (Maker, 1993, p. 71). In Maker's view, gifted individuals are not only capable of understanding problems and discovering solutions, but also of finding problems and solving them creatively and effectively (Maker, 1993). Similarly, Gardner's (1983) view of high competence encompasses capabilities that are demonstrated through the creation of original products, problem-solving, and problem-finding behaviors. In the theory of multiple intelligences, Gardner (1983) presents seven domains of abilities: linguistic, spatial, logical-mathematical, interpersonal, intrapersonal, bodily-kinesesthetic, and musical intelligences. More recently, Gardner (1997) added one-and-a-half intelligences to the seven previously identified. He called the eighth intelligence "the naturalist" (sensitivity to the ecological environment) and the half intelligence which he is not certain consists of a full-blown intelligence by itself, he labeled "the moralist" (sensitivity to ethical concerns).

The dissatisfaction with standardized tests along with the new conceptualization of human intelligence and giftedness warranted the use of measures with a more adequate fit between theory and application. Advocates of performance-based assessment see many advantages of this technique (Frechtling, 1991). Among the advantages often cited are assessing students in real lifelike and more complex situations, consideration of both process and product (Maker, 1993), and reduction of the gap between testing and instruction (Frechtling, 1991). In particular, performance-based assessments have been advocated as better tools for use with culturally diverse groups because they make use of cultur-

ally bias-free material and are usually conducted in the dominant language of the child (Baldwin, 1985; Maker, 1993).

On the other hand, opponents of performance-based assessment contend that the problems associated with these methods are far more important than, and outweigh, the advantages (Frechtling, 1991). Among the common criticisms of performance assessments are their high cost and time-consuming administration. But in particular, issues of reliability and validity have been of special concern; for example, in performance-based assessments, the domain appraised is often underrepresented (Dunbar, Koretz, & Hoover, 1991). Also, because their scoring is complex and relies on the judgment of observers or teachers, an element of subjectivity is introduced (Dunbar et al.; Frechtling, 1991).

Research on performance-based assessments has yielded controversial results. For example, in a study conducted to assess the effectiveness of a nontraditional assessment designed to measure multiple intelligences, Hafenstein and Tucker (1994) found mostly positive results. Trained observers assessed 3-, 4-, and 5-year-old children as they worked on tasks in the seven intelligences. Following the assessment, observers classified children's abilities as "not evident," "evident," and "extremely evident" (i.e., gifted). In midyear, teachers were asked to rate the children using the same classification. Content analysis of the two ratings revealed a great similarity between observers' and teachers' ratings. Reports from parents and teachers were similar and indicated that the use of the assessment led to adequate placement of children. Regression analysis suggested that the beginning of year assessment was predictive of future performance. The researchers concluded that the performance-based assessment used in this study was an effective process in identifying young gifted children.

At the University of Arizona, Maker, Nielson, and Rogers (1994) developed a performance-based assessment, designed to identify giftedness among culturally diverse groups, called the DISCOVER assessment. They based the assessment on Maker's (1993) definition of giftedness and the conceptual framework of Gardner's (1983) theory of multiple intelli-

gences. The acronym DISCOVER stands for: *Discovering Intellectual Strengths and Capabilities through Observation while allowing for Varied Ethnic Responses*. The DISCOVER assessment is performance based and the tasks typically require problem-solving behaviors. Different tasks were designed for aggregated grade levels (K-2, 3-5, 6-8, 9-12). The focus of this study is on the DISCOVER assessment.

Plucker, et al. (1996) investigated the psychometric properties of a battery of instruments based on the theory of multiple intelligences. Participants ($N = 1,813$) were assessed using the Multiple Intelligence Assessment Technique, based on the work of Project Spectrum and local modifications of the DISCOVER assessment. Student performance was rated as "not evident or not observed," "evident," or "extremely evident." The results showed high internal consistency of the scales; factor analysis confirmed the presence of the linguistic and logical-mathematical subscales, but the presence of the spatial and interpersonal scales could not be confirmed. Correlations were sufficiently low to provide evidence for discriminant validity, but a relatively high correlation was found between the ITBS (Iowa Test of Basic Skills) language subscale and the math performance assessment as well as between the math checklist and the linguistic checklist. No significant gender or ethnic differences were found. The researchers concluded that although "MI (Multiple Intelligences) theory and alternative assessments may hold substantive implications for education of gifted students . . . educators using MI theory, alternative assessments, and combinations of the two should subject the programs to rigorous evaluation" (p. 87).

In the present study, consistency of the DISCOVER assessment with independent ratings was examined. Two questions guided this investigation:

1. How consistent are the accounts of the DISCOVER assessment observers, those of the classroom teachers, and those of the independent observer in reflecting the superior problem-solving ability of a student given the "Definitely" rating (i.e., gifted) in most of the DISCOVER assessment activities?
2. How consistent are the accounts of the DISCOVER assessment observers, those of the classroom teachers, and those of the independent observer in reflecting the low problem-solving ability of a student given the "Unknown" rating (i.e., lowest rating) in most of the DISCOVER assessment activities?

METHOD

Setting

This study was conducted in an elementary school with a largely Hispanic population of lower socioeconomic status, as determined by the students' place of residence and their participation in the free lunch program. Observations were conducted in one kindergarten classroom with 24 children.

Procedures

The present study was conducted in two phases with the same procedures followed during each phase. Phase I of the study was initiated in the fall of 1995 and Phase II was carried out in the spring of 1996. The method consisted of choosing two extreme cases as participants, a child identified as gifted by the DISCOVER assessment (Phase I) and another one whose strengths were not revealed by the DISCOVER assessment (Phase II). The rationale for using extreme cases was to investigate whether consistency among ratings would hold not only for the highest, but also lowest ability students. The purpose in both phases was to investigate the consistency between the ratings of the DISCOVER assessment observers, the classroom teachers, and an independent observer in appraising students' multiple intelligences.

Data collection proceeded in the following manner: In the fall of 1995, the DISCOVER assessment was administered to all the kindergarten children in the classroom in which this study was conducted. Only one child, Anna, a 5-year-old Hispanic female, was identified as gifted in two intelligences (spatial and mathematical). Consistent with the purpose of the study, Anna was chosen as the participant for Phase I of this investigation.

Next, I observed Anna at school twice, each session lasting 2½ hr. Extensive field notes were taken during each observation. Then, I conducted separate interviews with the classroom teacher and teacher aide. Both were given copies of Anna's DISCOVER assessment report prior to the interviews.

Basically, the same procedures were followed in Phase II of this study, conducted in the spring of 1996 with the only difference being the participant observed. In Phase II, Rita, a 5½-year-old Hispanic female, was chosen as the participant because she was classified as "Unknown" (i.e., lowest rating category) in four of the five DISCOVER assessment activities during the fall administration. Following the spring administration of the DISCOVER assessment, which yielded basically the same findings concerning Rita's strengths, I observed Rita at school on three different occasions, with each observation lasting 2 hr and 15 min; interviews with the teacher and teacher aide followed.

Instrument

The DISCOVER assessment consists of five activities: Pablo®(spatial), Tangrams (spatial/logical-mathematical), Math (logical-mathematical), Storytelling and Story Drawing (linguistic). All tasks are constructed according to a continuum of problem-types (Maker, 1993) ranging from Type I (highly structured) to Type V problems (unstructured).

During the assessment, trained observers take notes, sketch children's constructions, and give helpful hints. To avoid observer's bias, observers rotate at the completion of each activity. Following the assessment, observers meet to discuss the students' strengths and complete a behavior checklist for each child. They classify children's problem-solving ability in each activity according to a 4-category rating scale: Unknown, Maybe, Probably, and Definitely. The category "Definitely" corresponds to superior problem-solving ability, in other words, to giftedness in that particular intelligence assessed by the respective activity. A child rated "Definitely" in at least two of the activities is identified as gifted. The following is a description of the activities as they pertain to kindergarten.

Pablo®: Spatial

The material for this activity consists of colored cardboard pieces of different shapes, designs, and sizes called Pablo®. Children are asked to make different constructions (e.g., mountains, animals, a construction of their choice) using the Pablo® pieces. Observers note the complexity of the construction, the extent to which it resembles the design the child is attempting to make, the number, and the uniqueness of constructions.

Math: Logical-Mathematical

Each child is given a set of Chinese Tangrams (21 pieces of three different shapes: triangles of three different sizes, squares, and parallelograms). Observers ask each child separately to start counting the Tangrams at the number the observer indicates to assess counting ability and understanding of the stable-order principle. Then observers put four or five Tangrams in a bag and ask the child to make a bag that has "more" pieces than that of the observer and another one that has "less" pieces.

Tangrams: Spatial/Logical-Mathematical

Following the Math activity, children are requested to make a square using as many Tangram pieces as possible. Observers note the shape of the construction as well as the number of pieces used. Next, each child receives a booklet of six pages of puzzles arranged from simple to complex. Children are instructed to use their pieces to cover the shapes on the worksheets. Observers record the order in which each child in the group completes the worksheets and the amount of time taken on each. They also note behaviors such as making puzzles in different ways, fitting pieces without physically turning them, and integrating clues in problem-solving strategies.

Storytelling and Story Drawing: Linguistic

In Storytelling, children are given an assortment of toys (two small people, two animals, something on wheels, two things such as furniture pieces) and are asked to group the items that are alike. Children are then asked to tell a story that includes some or all of their toys. Observers note

the logic, abstractness, and functionality of groupings. For stories, observers note whether they have a beginning, middle, end, a plot, dialogue, unique ideas, and appropriate sequence of events.

Approximately a day preceding or following the DISCOVER assessment administration, children are asked to make a drawing that tells a story. Drawings are evaluated separately by two members of the DISCOVER team. They consider the words that children used (added in a written form by the teacher) and whether they correspond to their drawing. If the two evaluators disagree on their assigned classification, they meet and discuss the product characteristics until they reach a consensus. A third evaluator might be consulted in case consensus cannot be reached.

Interpersonal, Intrapersonal, and Bodily-Kinesthetic

Although specific activities in the DISCOVER assessment are not performed to assess these intelligences, behaviors that pertain to them are noted while children are engaged in small-group activities during Pablo®, Tangrams, Math, and Storytelling. Observers note the quality of interaction between students, cooperative or competitive behaviors, self-oriented expressions, leadership ability, and bodily movements.

Data Analysis

The method used in this study encompasses the two most common procedures used in qualitative research: observations and interviews. Following the two phases of data collection, content analysis of the DISCOVER assessment reports, teacher interviews, and field notes was performed. Then, the three sources of data were compared to determine consistency among ratings.

RESULTS

Phase I

Three identical sets of data were gathered for each phase of the study: (a) the DISCOVER assessment reports, (b) classroom observations, and, (c) interviews with the teacher and the

teacher aide. In Phase I, the results showed that the DISCOVER assessment report was similar to the teacher's, teacher aide's, and independent observer's ratings of Anna's spatial, mathematical, and linguistic abilities, but inconsistent with their ratings in the personal and kinesthetic intelligences.

In Pablo®, Anna made several constructions; most were three-dimensional, complex, and resembled the design that she was attempting to replicate; she was given the "Definitely" rating. In Math, Anna was able to count correctly and to construct sets that showed her grasping of the concepts of "more" and "less"; she was given the "Definitely" rating in this activity, too. In Tangrams, Anna was able to complete three puzzle sheets, but she did not make a square using the Tangram pieces; she was given the "Probably" rating. In Storytelling, she was able to group her toys according to the common characteristics they had and she started to tell a story that seemed to announce an interesting plot, but was interrupted by one of her peers which made her stop abruptly and leave the story uncompleted. Nevertheless, the beginning of the story showed that she had above-average linguistic ability and she was rated as "Probably." Anna was given the rating of "Probably" in the Story Drawing activity as well. She drew a house with a sun rising behind it, and said: "This is my house; it is the morning and everyone is waking up." On the other hand, none of the three observers who assessed Anna using the DISCOVER assessment noted any strength she had in either interpersonal, intrapersonal, or bodily-kinesthetic intelligences.

The two observation sessions that I conducted in the classroom revealed mostly Anna's abilities in spatial, mathematical, and interpersonal intelligences. When I observed her for the first time, Anna spent more than a half hour working on the computer, coloring pictures, and moving objects on the screen. Her long attention span, enjoyment, persistence, and the quality of her products revealed her advanced spatial ability. In Math, I had the opportunity to observe one behavior in the playground in which Anna's superior logical-mathematical ability was revealed. As quoted from my field notes:

A boy said: "Look, there are eight play-doh boxes!" Anna seemed to be making a mental calculation, then said: "No, there are 12 boxes; 1, 2, 3 . . ." she counted correctly up to 12. Then she said: "There are more if you count the clay boxes, too; 13, 14, . . ." and she counted correctly up to 24. Then she started playing around with numbers: "Thirty, 40, 50."

As for Anna's linguistic ability, I did not witness many occasions during which her verbal or written strengths were manifested. I did, however, listen to her while she was telling a story to the teacher about her drawing. The story was about her family, specifically her brother and sisters; it had a plot, a beginning, middle, and end, a logical sequence of events, and some dialogue. Judging from the little I saw and comparing her with the rest of her classmates, Anna seemed to have an above-average competence in linguistic intelligence which matched exactly the DISCOVER assessment report about her ability in this domain.

About Anna's interpersonal skills, I noticed that she had many friends and was able to communicate well with adults. In one incident, I saw how she was able to resolve a conflict with her friend Katie, who preferred the company of another girl to Anna's; I also saw how her peers listened to her suggestions and followed them, behavior which reflected her leadership skills. My opinion of Anna is that she was a quiet and mature little girl with a great deal of poise. I also thought that her intrapersonal strengths were quite developed; her behaviors showed that she was aware of her abilities and used them to reach various goals. The DISCOVER assessment did not tap into Anna's strength in interpersonal or intrapersonal intelligences. In this, my assessment and the DISCOVER observers deviated.

Another discrepancy between my records and the DISCOVER assessment report was in the domain of bodily-kinesthetic intelligence. During my second classroom observation, Anna suddenly started to dance as soon as the teacher turned on the tape recorder. A children's song was playing, and Anna began to swing and move her arms and feet in a very elegant manner. Her movements were extremely coordinated and fine tuned to the song. Anna's dancing did not last

long, but it showed explicitly her developed bodily-kinesthetic ability.

What the teacher and teacher aide had to say about Anna's abilities matched to a great extent the findings of the DISCOVER assessment, except for the interpersonal, intrapersonal, and bodily-kinesthetic intelligences. As the teacher explained:

I see her [Anna] as maybe being even a little bit of what I would call more mature emotionally than other children. She's usually able to resolve conflicts herself without a whole lot of intervention on the part of adults. But I don't even think that she gets into conflicts that much.

About Anna's bodily-kinesthetic ability, the teacher reported having seen Anna show strengths in this domain on more than one occasion. She said that Anna loved to dance and that she did it quite gracefully; the teacher aide added that, compared to her classmates, Anna had more coordinated gross and fine bodily movements and was less "clumsy."

In sum, the views of the teacher, teacher aide, and observer matched to a great extent the DISCOVER assessment report about Anna's problem-solving abilities in spatial, logical-mathematical, and linguistic intelligences. On the other hand, the views of both teachers and independent observer departed from the DISCOVER assessment report with respect to Anna's strengths in the personal and kinesthetic intelligences (see Table 1).

Phase II

In this study, the findings of Phase II were quite similar to those of Phase I. Consistencies as well as some discrepancies were found between the three sources of information (DISCOVER report, classroom teachers, and independent observer) concerning Rita's (participant chosen for Phase II) problem-solving abilities in the different intelligences.

The report of the spring DISCOVER assessment of Rita's problem-solving abilities was similar to that of the fall administration and yielded the following results: In Pablo®, Rita was given the rating of "Definitely." Her constructions were complex and three-dimensional

TABLE 1

Comparison of Anna's Strengths as Revealed by Each Account

<i>DISCOVER Activities</i>	<i>DISCOVER Ratings</i>	<i>Teacher/ Teacher Aide</i>	<i>Observer</i>
Spatial	Definitely	Definitely	Definitely
Logical-Mathematical	Definitely	Definitely	Definitely
Linguistic	Probably	Probably	Probably
Interpersonal	Unknown	Definitely	Definitely
Intrapersonal	Unknown	Definitely	Definitely
Bodily-Kinesthetic	Unknown	Definitely	Definitely

and resembled to a great extent what she said they were. On the other hand, Rita was given the "Unknown" rating in all of the following activities: Storytelling, Story Drawing, Math, and Tangrams.

In Storytelling, Rita was unable to group the items in terms of similarities and her story lacked coherence. In Math, Rita was unable to construct sets that demonstrated her grasping of the concepts of "more" and "less." Also, she was unable to start counting at the number indicated by the observer. In Tangrams, Rita made a square with only two Tangram pieces and completed only two puzzle sheets. In Story Drawing, Rita drew the picture of a house and colored it, but refused to comment on it.

Hence, the DISCOVER assessment observers did not see any strengths that Rita might have had in linguistic and logical-mathematical abilities. The same applied to Rita's interpersonal, intrapersonal, and bodily-kinesthetic abilities, with the exception of some evidence of interpersonal skills in Pablo®, the same activity in which she was found gifted.

My three observations of Rita corresponded to a great extent with the DISCOVER assessment report, except for Rita's strengths in intrapersonal and interpersonal intelligences. As revealed by the drawings she made, Rita seemed to have certain definite artistic skills. Her drawings were creative and showed harmony in color

and shapes, but no sense of proportions (a logical-mathematical skill) or perhaps Rita lacked the motor skills necessary to draw in proportions. For example, the size of a bird in one of her drawings was as big as that of the man standing next to it. About her linguistic ability, I was unable to detect any strengths she might have had in this area. I did not witness any incident during which she was particularly verbal; even when the teacher was reading a story to the children, Rita seemed more interested in the pictures of the book than in the story itself, as evidenced by a comment she made to a classmate sitting next to her: "Look! Gilda (the girl in the picture) is wearing a nice dress! I am going to draw it," and she did. As for her logical-mathematical ability, here too my observation and the DISCOVER assessment report matched because I did not see any behavior that might reveal Rita's strength in this domain.

Concerning Rita's problem-solving ability in the personal intelligences, my observation notes and the DISCOVER assessment report deviated from each other. In each of my observations of Rita, I found her to have certain definite interpersonal skills. She seemed quite caring of other children, as this excerpt from my field notes shows:

A little boy hit Lisa on her forehead. Rita went to the teacher and reported the incident. The teacher asked the boy to move to another loca-

tion. Rita held the hand of Lisa and asked her whether she was feeling okay. Lisa nodded.

Rita seemed to get along well with children and adults. She related well to the teacher and teacher aide who seemed to be quite fond of her. Also, I saw some evidence of Rita's intrapersonal ability. In one instance, the counselor who was visiting the classroom asked the children to designate the animal they most identified with; Rita decided that she was more of a "lion than a lamb." Finally, my observation of Rita's bodily-kinesthetic ability corresponds to the DISCOVER assessment report in which no particular kinesthetic skill was mentioned.

Interviews with the teacher and teacher aide yielded basically the same results. Both believed that Rita was gifted in spatial intelligence. The teacher marveled at Rita's ability to draw and at the artistic skills she had acquired throughout the year. She also agreed with the DISCOVER assessment report about Rita's linguistic and mathematical ability. As she stated:

Her linguistic, I still see that one as needing to be developed . . . a lot of times when I go to ask her about the stories of her pictures, she still kind of limits herself to labels of what she's done, like "my house," "my tree," "my car." For math . . . I don't see anything standing out

Both the teacher and teacher aide disagreed with the DISCOVER assessment report concerning Rita's intrapersonal and interpersonal abilities. They thought that Rita's skills in these domains were quite developed and that if the DISCOVER assessment observers failed to see her superior strengths in these areas, it was probably because of her being extremely quiet and shy rather than because she lacked social skills. About her intrapersonal ability, the teacher said that Rita had a "deep sense of self-understanding."

Finally, the teacher and teacher aide agreed with the DISCOVER assessment report concerning Rita's bodily-kinesthetic ability. According to them, Rita did not show any behavior throughout the year that might indicate developed kinesthetic skills.

In sum, the results of Phase II of this study showed that the DISCOVER assessment report matched to a great extent the indepen-

dent observer's records and those of the teacher and teacher aide concerning the participant's problem-solving abilities assessed through specific activities. Differences in the three accounts were found concerning Rita's personal intelligences (see Table 2).

DISCUSSION

The results of this study in both of its phases showed that the DISCOVER assessment reports, observer's records, and teachers' interviews were quite similar in Pablo®, Tangrams, Math, Storytelling, and Story Drawing, but discrepancies were found between the DISCOVER assessment reports and both the teachers' interviews and the independent observer's records in three domains of intelligences. In other words, the findings may indicate that the DISCOVER assessment observers were quite effective in assessing the intelligences appraised through specific activities, namely linguistic, logical-mathematical, and spatial intelligences, but that their effectiveness may somewhat be lower in appraising intelligences not assessed through specific activities, namely interpersonal, intrapersonal, and bodily-kinesthetic intelligences.

An important finding is related to the high consistency between the teachers' statements and the independent observer's records about both participants. Content analysis of teacher interviews and field notes revealed a perfect match between these accounts. This is significant and may provide support for the use of qualitative methods in assessing students' abilities.

Another major finding of this study is that the DISCOVER assessment observers were more successful in assessing intelligences that had corresponding activities. A pertinent recommendation to increase the effectiveness of this assessment would be to create tasks that elicit behaviors in the domains of interpersonal, intrapersonal, and bodily-kinesthetic intelligences. For example, according to Gardner (1983), bodily-kinesthetic intelligence is defined as "the ability to control one's bodily motions and to work skillfully with objects that involve the fine motor movements of one's fingers and hands and those that exploit gross motor movements"

TABLE 2

Comparison of Rita's Strengths as Revealed by Each Account

<i>DISCOVER Activities</i>	<i>DISCOVER Ratings</i>	<i>Teacher/ Teacher Aide</i>	<i>Observer</i>
Spatial	Definitely	Definitely	Definitely
Logical-Mathematical	Unknown	Unknown	Unknown
Linguistic	Unknown	Unknown	Unknown
Interpersonal	Unknown	Definitely	Definitely
Intrapersonal	Unknown	Definitely	Definitely
Bodily-Kinesthetic	Unknown	Unknown	Unknown

(p. 206). Dancers, athletes, surgeons, and actors exemplify high levels of bodily-kinesthetic intelligence. Therefore, to assess bodily-kinesthetic intelligence more effectively, tasks such as repeating a sequence of video-taped movements or creating a dance or a play might be included in the DISCOVER assessment.

The same applies to the personal intelligences. According to Gardner (1983), interpersonal intelligence is "the ability to notice and make distinctions among other individuals and in particular among moods, temperaments, motivations, and intentions" (p. 239). Salesmen, therapists, teachers, and leaders exemplify high levels of interpersonal intelligence. Therefore, adding an activity such as a game that elicits interactions among students would increase the effectiveness of the DISCOVER assessment in appraising interpersonal intelligence.

Finally, Gardner (1983) defined intrapersonal intelligence as "the ability to have access to one's own feelings, to effect discriminations among these feelings and . . . to draw upon them as a means of understanding and guiding behavior" (p. 239). To assess this intelligence effectively, tasks that bring out students' self-efficacy beliefs, future goals, and various feelings may be included in the DISCOVER assessment. For example, an interview with students following administration of all the DISCOVER assessment activities might reveal students' beliefs about their strengths and weaknesses. These

could be compared with observers' ratings to determine consistency among records.

The limitations of this study must be kept in mind when interpreting the results. Studies on consistency among ratings are usually conducted on larger samples; therefore, the major limitation of this study in both of its phases is its use of a single participant. Although more in-depth data are usually obtained from such designs, the generalizability of results cannot be established. Another limitation of this study is that it was not a "blind" investigation. The observer was aware of the purpose of the study and the ratings given to both participants by the DISCOVER assessment observers. A more precise inquiry would involve asking the independent observers to note students' strengths and rate their ability in the various intelligences prior to their knowledge of the ratings given by the DISCOVER assessment observers.

In future research, studies on the validity and reliability of the assessment are needed. For example, studies in which the performance of students identified through the DISCOVER assessment is compared with their overall GPA as well as studies on interobserver reliability would shed more light on the assessment effectiveness.

To conclude, the DISCOVER assessment seems to show consistency in ratings with other independent sources in students' linguistic, spatial, and logical-mathematical intelligences. Although this constitutes a significant finding, the

theoretical underpinnings of the assessment require further justification for its use. The emergence of performance-based assessment has evolved from the limitations of IQ tests in assessing the whole spectrum of abilities (Gardner, 1992). Also, the theory of multiple intelligences on which the DISCOVER assessment is based holds the promise that people have the potential to be successful and act intelligently not only in intellectual areas, but also in nonacademic activities (Shearer & Jones, 1994) and that all forms of ability are equally important and relatively worthy (Gardner, 1992). Thus, if the DISCOVER assessment is to be effective and credible, all areas of human potential must be appraised, emphasized, and celebrated.

IMPLICATIONS FOR PRACTICE

In this study, the DISCOVER assessment reports were found consistent with those of the classroom teachers and independent observers. These positive findings might encourage practitioners to use the DISCOVER assessment reports as supplementary data to other measures of multiple abilities. Also, because the DISCOVER assessment is easy to use, trained teachers can administer it to their students to identify strengths which are not usually revealed in a paper and pencil test, such as the ability to make creative constructions and solve puzzles.

This research suggests that the DISCOVER assessment reports on spatial, logical-mathematical, and linguistic intelligences draw light on students' strengths mostly in those areas. Also needed, however, are activities that focus on bodily-kinesthetic, interpersonal, and intrapersonal abilities to assess the whole spectrum of Gardner's (1983) multiple intelligences.

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