Perspectives in Gifted Education: Young Gifted Children

Institute for the Development of Gifted Education, Ricks Center for Gifted Children, University of Denver

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Institute for the Development of Gifted Education
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Perspectives In Gifted Education: Young Gifted Children

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Ricks Center for Gifted Children
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Preface

This is the first in a series of monographs, *Perspectives in Gifted Education*, funded by the Lynde and Harry Bradley Foundation through the Institute for the Development of Gifted Education at Ricks Center for Gifted Children at the University of Denver.

In *Perspectives in Gifted Education*, we hope to provide information related to areas and groups not of traditional focus in the field. The population of young gifted children and the twice-exceptional will be our topics for the first two issues respectively. We invite you to share in this beginning and encourage you to send us your comments, questions and suggestions.

This particular volume of *Perspectives in Gifted Education* includes different perspectives on identification, characteristics and needs of young gifted children. Too little information has been available regarding this special group of learners. At a time when development is occurring more rapidly than any other time of life, these young children must be more understood in order to provide services directly related to their needs. Young gifted children bring unique joys and challenges to those around them. It is our hope that the articles contained in this volume will provide insight into this unique population.

The first article, by Dr. Sylvia Rimm from the MetroHealth Medical Center at the Case Western Reserve School of Medicine, discusses the identification of young gifted children, provides information about the appropriate reasons for identifying young gifted children, and different methods of so doing.

The second article, by the editors of this monograph, considers the social and emotional characteristics of young gifted children and provides a framework for understanding and dealing with these children's sensitivity and intensity. This article first appeared in Roeper Review, volume 41, number 3, and describes a qualitative study on the psychological intensities of young gifted children.

Dr. Nancy B. Hertzog, from the University of Illinois, discusses a study of curricular differentiation in an early childhood gifted program. Using an action-research methodology, the investigator documented the content, processes, and products of learning. From this documentation, questions arose which address broader curricular issues in early childhood gifted education.

The next article, by Dr. Joan Smutney, provides information on appropriate curriculum
development and instructional strategies for young gifted children. This article acknowledges the difficulty of delivering developmentally appropriate curriculum to young gifted children and provides some creative instructional strategies to meet their needs.

Pat Hoelscher, Nancy Riley, and Michelle Ryder depict a successful program that helps develop creativity in young children in St. Louis, Missouri. The goal of Project Starfish is to identify and nurture creatively talented children. One thousand students in kindergarten through second grade regularly participate in Project Starfish, a gifted pilot program, funded by the Missouri Department of Elementary and Secondary education.

The final two articles deal with the problems encountered by gifted boys and girls as they enter school. Dr. Sandra Johnson describes a study of young gifted girls. The purpose of this study was to observe and characterize the biological and physical science interests of gifted kindergarten girls. This is an important study as it directly addresses the gender gap, which continues in science achievement for girls. Research of this kind describes the origins of achievement and motivation in order to help develop ways to nurture talent at home and at school.

The final article, “Learn From Me: When Schools Fail to Meet the Needs of Intellectually Gifted Boys,” was written by Dr. Cheryl Wright in conjunction with the parents of a gifted boy, Christina and Michael Moerer. This is a powerful article concerning the tragedies that can happen when gifted children’s needs are not adequately met. The authors of this article hope that it will help parents, counselors, and educators identify gifted children at risk and to provide interventions that may prevent similar tragedies to other families.

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Despite the common lore that parents always imagine that their own children are gifted, whether or not they are, there is ample evidence that supports parents' abilities to identify their preschool children's intellectual giftedness accurately. Most parents undoubtedly know their own children well and apparently possess informal norms with which they compare their children. Although some parents are indeed mistaken (false positives), and some parents do not recognize their children's giftedness (false negatives), research continuously supports parental ability to identify their children's giftedness (Robinson & Robinson, 1992) (See Table 1).

Identification results of a national survey of 1039 parents of gifted children indicated that 70 percent of these children were identified as gifted accurately by parents by age three (Gogul, McCumsey, & Hewett, 1985).

Of the characteristics that caused parents to suspect giftedness, "early verbal expression" was mentioned most frequently. Other observed characteristics included an unusually long attention span, a good memory, high level of curiosity, and an early demonstration of original and creative behavior (Davis & Rimm, 1998). Figure 1 shows a parent nomination form developed by the North Carolina Department of Public Instruction for the identification of gifted preschool children that incorporates some of these same characteristics.

**Table 1: Percentage of Children Identified as Gifted at Various Ages by Parents**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>0-6 months</td>
</tr>
<tr>
<td>15</td>
<td>6-12 months</td>
</tr>
<tr>
<td>23</td>
<td>1-2 years</td>
</tr>
<tr>
<td>25</td>
<td>2-3 years</td>
</tr>
<tr>
<td>17</td>
<td>4-5 years</td>
</tr>
<tr>
<td>13</td>
<td>later</td>
</tr>
</tbody>
</table>

From Gogul, et. al., 1985, reprinted by permission of first author and The Gifted Child Today magazine.
Figure 1: Sample Parent Nomination Form at the Early Childhood Level

Name of Student ___________________ Age __________
Address ____________________________________________
School ___________________________________________ Grade __________
Parent’s Name ________________________________

Instructions: In relationship to the typical child in your neighborhood, please circle a number for each item which best describes your child: 5 - has this trait to a high degree; 4 - has this trait more than the typical child; 3 - compares with the typical child; 2 - has this trait less than the typical child; 1 - lacks this trait.

1. Has advanced vocabulary, expresses himself or herself well  5 4 3 2 1
2. Thinks quickly  5 4 3 2 1
3. Recalls facts easily  5 4 3 2 1
4. Want to know how things work  5 4 3 2 1
5. Is reading (before he or she started school)  5 4 3 2 1
6. Puts unrelated ideas together in new ways  5 4 3 2 1
7. Bored easily  5 4 3 2 1
8. Asks reasons why, questions everything  5 4 3 2 1
9. Likes “grown up” things and to be with older people  5 4 3 2 1
10. Has a great deal of curiosity  5 4 3 2 1
11. Is adventurous  5 4 3 2 1
12. Has a good sense of humor  5 4 3 2 1
13. Is impulsive, acts before he/she thinks  5 4 3 2 1
14. Tends to dominate others if given a chance  5 4 3 2 1
15. Is persistent, sticks to a task  5 4 3 2 1
16. Has good coordination and body control  5 4 3 2 1
17. Is independent and self-sufficient in looking after himself/herself  5 4 3 2 1
18. Is aware of his/her surroundings and what is going on around him/her  5 4 3 2 1
19. Has a long attention span  5 4 3 2 1
20. Wanted to do things for himself/herself early  5 4 3 2 1

Developed by the Staff of the Gifted and Talented Section, Division of Exceptional Children, North Carolina Department of Public Instruction. This instrument is a part of an identification model developed by Cornelia Tongue and Charmian Sperling, 1976. Reprinted by Permission.
The Assessment of Preschool Gifted Children

The reliability of parents’ recognition of preschool giftedness was also supported by a program at Towson State University in Baltimore, Maryland (Hanson, 1984). Parents were encouraged to enroll their children in a program for four-, five-, and six-year-old gifted children based on their own perceptions of the children’s verbal giftedness. After enrollment, these children were given a battery of tests. Ninety percent of the children tested at least one year above grade level in reading and all of the five- and six-year-olds had high scores in the Fund of Knowledge subtests. Mathematics scores were not consistently high, but parents had not been asked to consider math skill in their decision-making.

A recent experience at Family Achievement Clinic provides further support for parents’ ability to recognize unusual intellectual talent in young children (Rimm, 1996). The first very early evaluation was launched when two parents, who were both members of Mensa, requested that their daughter, age two years, four months, be assessed for membership in Mensa. The author, incredulous at first that parents would request testing of so young a child, met briefly with the child and was immediately impressed by the child’s precocious ability to respond orally and concentrate on a requested task. Furthermore, she recognized letters, numbers, shapes, and colors and was able to count with one-to-one correspondence to 20. An experienced psychological assistant tested the child using the Stanford-Binet L-M and found that the child scored in the very superior range of IQ at above 175. Because the child became the youngest child admitted to Mensa, a Mensa public relations representative arranged for considerable media coverage about this unusual child.

The media attention given to this particular gifted child encouraged a flurry of other parents to call to have their own preschoolers assessed based on their assumptions that their children were also gifted. They gave examples of unusual vocabulary or ability to recognize letters, numbers, and even some words. Not all calls resulted in assessments because a first meeting with some very young children suggested that they would not be able to attend long enough to be tested. However, following that announcement, Family Achievement Clinic staff actually conducted assessments of 16 preschool children between the ages of two years of age and five years, eleven months, based on parents’ assumptions that their children were gifted. Despite the variations and difficulties of testing young children, none of the children scored in the average range, two children scored in the superior range, and the remainder scored in the very superior range at 130 and above in at least one part of the IQ test. Actual scores ranged between 102 and 181. Four of the children were brought to the Clinic because they showed problem behaviors, and the parents of one of those did not suspect giftedness as an issue.
Indeed, the score of the child's PRIDE inventory (a creativity inventory described later in this article) was only at the 4th percentile. To her mother's surprise, the child's Wechsler score was 145 and her Stanford-Binet score was 168. Only seven of the 18 were females, perhaps reflecting a frequent bias of assuming more boys are gifted (see Table 2).

Again, there was confirmation for parents' ability to recognize giftedness in their children. Although we have no way of knowing the percentage of children who are missed by the parent identification procedure, at least we can substantiate that parents do not over identify to the extent that teachers have often believed. In fact, studies indicate that parents usually underestimate, rather than overestimate, their children's giftedness (Chitwood, 1986).

When Parents Should Request Assessment

If parents believe their preschool children are gifted, they might ask when and why it would be good to have them tested. Tests of preschool children are appropriate only if parents see a purpose for testing their children. If there is a valid purpose, they should also understand that such early tests might be somewhat unreliable. Scores can be adversely affected by

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age at testing</th>
<th>IQ</th>
<th>Pride score</th>
<th>Accuracy of parent assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. F</td>
<td>2.0</td>
<td>--</td>
<td>99</td>
<td>uncertain</td>
</tr>
<tr>
<td>2. M</td>
<td>2.3</td>
<td>--</td>
<td>79</td>
<td>uncertain</td>
</tr>
<tr>
<td>3. F</td>
<td>2.4</td>
<td>175*</td>
<td>--</td>
<td>correct</td>
</tr>
<tr>
<td>4. F</td>
<td>2.7</td>
<td>126*</td>
<td>86</td>
<td>uncertain</td>
</tr>
<tr>
<td>5. M</td>
<td>2.7</td>
<td>--</td>
<td>83</td>
<td>uncertain</td>
</tr>
<tr>
<td>6. M</td>
<td>3.0</td>
<td>153*</td>
<td>49</td>
<td>correct</td>
</tr>
<tr>
<td>7. F</td>
<td>3.1</td>
<td>178*</td>
<td>--</td>
<td>correct</td>
</tr>
<tr>
<td>8. M</td>
<td>3.7</td>
<td>181*</td>
<td>47</td>
<td>correct</td>
</tr>
<tr>
<td>9. M</td>
<td>3.7</td>
<td>143#</td>
<td>90</td>
<td>correct</td>
</tr>
<tr>
<td>10. M</td>
<td>3.7</td>
<td>127#</td>
<td>99</td>
<td>correct</td>
</tr>
<tr>
<td>11. M</td>
<td>4.5</td>
<td>151#</td>
<td>79</td>
<td>correct</td>
</tr>
<tr>
<td>12. M</td>
<td>4.6</td>
<td>128+</td>
<td>61</td>
<td>correct</td>
</tr>
<tr>
<td>13. F</td>
<td>4.8</td>
<td>145#</td>
<td>47</td>
<td>correct</td>
</tr>
<tr>
<td>14. M</td>
<td>4.9</td>
<td>143#</td>
<td>47</td>
<td>correct</td>
</tr>
<tr>
<td>15. F</td>
<td>5.3</td>
<td>124#</td>
<td>99</td>
<td>correct</td>
</tr>
<tr>
<td>16. F</td>
<td>5.4</td>
<td>139#</td>
<td>79</td>
<td>correct</td>
</tr>
<tr>
<td>17. M</td>
<td>5.6</td>
<td>120#</td>
<td>83</td>
<td>correct</td>
</tr>
<tr>
<td>18. M</td>
<td>5.11</td>
<td>131#</td>
<td>49</td>
<td>correct</td>
</tr>
</tbody>
</table>

*Stanford Binet L-M (1957)
#Wechsler Preschool and Primary Scale-Revised (1989)
+Stanford Binet IV (1986)
many factors, including fatigue, stress, and diet (Perino & Perino, 1981). Shyness, a bad day, or merely fears of a particular tester can easily lower scores. The scores should not be taken as an absolute measure of the child's ability and certainly not viewed as a limit to that ability. Tests of young children are likely to be conservative estimates of their ability since "test construction makes it unlikely they will perform at a level higher than their potential" (Chitwood, 1986); but they can perform at a lower level. Lucky guesses can enhance the scores a little, but slightly higher scores cause fewer problems than dramatically lowered scores (Rimm, 1994). It is also important to realize that a few missed or guessed items on a young child's test can increase or decrease the overall score substantially. Errors of measurement that reflect factors which interfere with performance can take place for all age children but are even more likely with very young children.

The warning to parents about too low expectations based on testing preschool children is reinforced by a sad, but accurate, case story. Twenty-one year-old Albert was having difficulty at college; thus his parents came to Family Achievement Clinic and reported to the author that they believed their son's low ability was finally causing him too much pressure. Indeed, they were not certain as to whether to encourage their son to drop out of college. His mother, a teacher, explained that a school psychologist had tested her son while in kindergarten, and the test resulted in a reported IQ score of 80. His mother also described the great amount of personal time she had invested in tutoring and encouraging her son throughout his school years but acknowledged that with her continuous help, he had done quite well despite his perception of his below average ability. He had graduated from high school with a 3.7 grade point average. Despite Albert's good performance, he lacked academic confidence, and his parents, likewise, were fearful of setting too high expectations.

In retesting Albert on the *Wechsler Adult Intelligence Scale-Revised*, his IQ score actually was 128 with very even results in most sub-tests. After several months of therapy, Albert returned to college with more confidence and a more determined effort than he had ever needed in his childhood because his parents had always helped him through even the easiest work. His parents, too, had new and revised expectations of their son despite their erroneous assumptions about his ability during his entire childhood.

**Reasons For Having Preschoolers Evaluated**

There are several very good reasons for having preschool children tested with an IQ test, provided that parents recognize the unreliability of early scores (Rimm, 1994):
1) Children who are intellectually gifted may benefit from early entrance to kindergarten; special curriculum planning within kindergarten, or a uniquely enriched preschool environment, and early testing may confirm the need for such special programming.

2) Test scores give quantitative data, which parents may or may not choose to share with the school when communicating about their child's special needs. The quantitative data are normative and permit parents to compare their child's intellectual level more convincingly to educators than parent observations.

3) Testing may discover weak areas that may be masked by children's intellectual giftedness. Specifically, small muscle coordination and spatial skills are less easily identified by observation. Preschool testing permits parents to assist children in learning and practicing skills that could result in future problems.

4) Test scores give parents either confidence in their personal observations or the opportunity to express their expectations appropriately. They can prevent parents from placing too much pressure on children. Hopefully, they will not cause parents to lose confidence in their children as Albert's parents had.

5) Early test scores provide baseline information for monitoring children's intellectual growth and progress.

If parents are considering early entrance to school or entrance to a particular school, preschool testing can help them make a more informed decision. Although research supports the success of early entrance to kindergarten for gifted children, that decision should not be made lightly (Davis and Rimm, 1994; Rimm and Lovance, 1992). In addition to IQ scores above 130, children should have reasonably good emotional adjustment. Girls may adjust to acceleration slightly more easily than boys, and tall boys a little better than short boys. Height, however, is not a critical factor for boys and has no effect on girls (Lueck, 1989). Observation by parents in a nursery school environment may be helpful in guiding the decision provided the nursery school teacher is not biased against early entrance to kindergarten and knows about the characteristics of gifted children.

If parents have doubts about early entrance, then typical-age entrance is recommended together with subject acceleration in the child's area of greatest strength. Observation by the teacher over time in the accelerated subject can provide the required evidence for the next decision. Teachers will be good observers provided they too, have knowledge about gifted children and acceleration research.
The Assessment of Preschool Gifted Children

Recently there has been a trend to delay entrance to kindergarten in the belief that an older, maturer child will have an academic, social, and sometimes athletic advantage. However, research consistently confirms that average children who are delayed entrants do not achieve better academically or socially than typical-age entrants (Davis, Trimble, and Vincent, 1980; Laidig, 1991; Langer, Kark, and Searls, 1984). Ceci (1991), in analyzing 200 studies of the relationship between schooling and IQ, found that a child’s IQ score falls behind that of others of the same age when formal classroom education is delayed, as when entrance to kindergarten is postponed. Perhaps that is not surprising because the child is less likely to be in an enriched learning environment, and IQ scores compare children’s learning performance to their age rather than their grade level. Furthermore, when children who are older in a grade reach adolescence, more of them exhibit behavior problems (Byrd, Weitzman, and Auinger, 1997). These future problems are not readily observable to preschool and kindergarten teachers when they view the easier adaptation to primary grades of children who are older in the grade.

Finding an Appropriate Assessment Professional

Parents who decide they would like to have preschoolers tested will want to find an appropriate psychometrician. If they’re determining whether their children should enter school early, or if they believe their children may require special school programming, they can request that their local school psychologist do the assessment. If the school district does not consider gifted children to be within the domain of the school psychologist, parents will need to find a private psychologist or university psychological center familiar with testing gifted children. There is good reason to emphasize that the psychologist be familiar with the specialty of gifted children because not all psychologists are. The director of gifted education in the state’s department of education is likely to be able to help parents find an appropriate evaluation center. Age four is usually early enough for a first assessment if parents require the information for school decision-making. The Family Achievement Clinic does test younger children if they seem able to attend during testing. However, only very few two-year-olds are candidates for testing. Because gifted children learn so rapidly, there may be a need for further achievement testing just before school entrance for the purpose of academic placement. There is no further requirement for IQ testing for three or four years unless test results don’t seem consistent with teacher or parent observations.

Prekindergarten screenings conducted by schools are typically not intended to assess giftedness. Although they provide the school with some important developmental information, they cannot be used to measure the extent of children’s intellectual giftedness or academic achievement because the difficulty of the test items is not likely to be sufficient.
Appropriate IQ Tests

Two individually administered IQ tests are appropriate for testing preschool gifted children. The *Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R)* (1989) provides both verbal and performance scores, and it is helpful to have both. Its disadvantage is that the scale may not go high enough for some very gifted children. The *Stanford-Binet Intelligence Scale, Form L-M* (1972) is mainly a verbal test with a more extensive scale and higher ceiling. This test is strongly recommended if the child exceeds the limits of the first test although, unfortunately, it is outdated.

The *Stanford-Binet, L-M* has been updated with the *Stanford-Binet IV*, however, the more recent test is not useful for testing gifted children. Not only are children's scores much lower on the new test, but the scores do not discriminate well between children in the superior range and those in the very superior range. Apparently, recent test creators do not seem to see a need for discriminating among gifted children's abilities. Unfortunately, updated tests of intellectual abilities that could best guide parents in planning for very gifted children are simply not available. However, psychologists who specialize in working with gifted children are aware of this testing dilemma and will not hesitate about using and interpreting the older test if children's performance warrants its use. Because IQ tends to increase approximately 3 percentage points per year for our country's children, (Flynn, 1999), subtracting approximately ten points from IQ scores on the *Stanford-Binet L-M* probably provides a more realistic assessment of actual abilities.

If preschool children are already reading and doing math calculations, administering individual achievement tests is also appropriate. Such tests should be given orally in a one-to-one setting to attain the most accurate results for preschoolers. Developmental delays in small muscle coordination or immaturity may otherwise confound and lower the results of a written test for young children. A fair number of suitable tests are available that are relatively brief and provide reading and math information for a preschooler who may be demonstrating skills more typical of school-age children. Most of the achievement test norms begin with kindergarten so that parents will have their children's scores compared to the normal sample of kindergartners. However, that is appropriate if preschoolers demonstrate unusual cognitive skills and the norms are explained to them.

If parents sense that their children are gifted but there are no early entrance decisions or specific curriculum changes that need to be considered, it is probably better to postpone testing until first grade, when scores become more reliable. Many gifted children learn to read only at the typical age in first grade, and for these children, individual psychoeducational testing can wait until school age.
Creativity Assessment

If an assessment is already being conducted for a preschool child, parents may wish to also assess their children’s creativity in order that they better understand their children’s strengths and weaknesses. Creativity assessment may even be useful for decision making about early entrance because it provides helpful information about independence, and a dependent child may, indeed, find early entrance more difficult. PRIDE, A Preschool and Kindergarten Interest Descriptor (Rimm, 1983), was developed to identify creative characteristics in young children. Those characteristics include many interests, curiosity, independence, perseverance, imagination, playfulness, humor, and originality. It is a good measuring instrument for identifying highly creative children as well as an appropriate approach to heightening parent awareness about characteristics of creativity. It also can be used to help parents guide their children toward becoming more creative (Rimm, 1998).

PRIDE is an easy-to-administer, reliable, and valid instrument designed primarily for use in screening preschool and kindergarten children for programs for the creatively gifted. It was preceded in development by GIFT-Group Inventory for Finding Creative Talent (Rimm, 1976, 1980, 1997), a K-6 creativity inventory; G/M I-Group Inventory For Finding Interests (Rimm and Davis, 1979), a creativity inventory for grades 6-9; and GIM 11-Group Inventory for Finding Interests (Davis and Rimm, 1980), a creativity inventory for grades 9-12.

Since a student self-report inventory tends to be unreliable for children who are ages 3-5, PRIDE was created for use by parents based on their observations of their children. It is, of course, only as reliable as are parents’ observations. Thus, parents’ bias can have the effect of raising or lowering scores. (See Table 3 for sample items). PRIDE results in a total score and four dimension scores. Descriptions of dimensions are included in Table 4.

Table 3: Sample Items from PRIDE

<table>
<thead>
<tr>
<th>#</th>
<th>Item</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>My child gets interested in things for a long time</td>
<td>Many Interests</td>
</tr>
<tr>
<td>9</td>
<td>My child has a make believe friend</td>
<td>Imagination</td>
</tr>
<tr>
<td>17*</td>
<td>My child gets bored easily</td>
<td>Independence</td>
</tr>
<tr>
<td></td>
<td>My child has many interests</td>
<td>Many Interests</td>
</tr>
<tr>
<td></td>
<td>My child is reflective, rather than impulsive</td>
<td>Reflectiveness</td>
</tr>
<tr>
<td>26*</td>
<td>My child usually does whatever other children do</td>
<td>Independence</td>
</tr>
<tr>
<td></td>
<td>My child can do some things that seem very difficult</td>
<td>Attraction to complexity</td>
</tr>
<tr>
<td></td>
<td>My child likes to take walks alone</td>
<td>Independence</td>
</tr>
</tbody>
</table>

*Negatively related to creativity
Table 4: Descriptions of the PRIDE Dimensions

Many Interests — High scorers are curious and ask questions. They show high interest in learning, stories, books, and other things around them. Low scorers show less curiosity and have fewer interests.

Independence-Perseverance — High scorers play alone and do things independently. They do not give up easily and persevere even with difficult tasks. Low scorers tend to prefer easier tasks and are more likely to follow the lead of other children.

Imagination-Playfulness — High scorers enjoy make-believe, humor, and playfulness. Low scorers are more serious and realistic.

Originality — High scorers tend to have unusual ideas and ask unusual questions. They are inventive in their art and play and tend to think differently than other children. Low scorers’ ideas and artwork appear to be more typical of children of similar age.

It is, of course, important to use PRIDE scores with caution. That is, creativity inventory scores, like achievement test or IQ scores should be utilized to screen children “into” gifted programs and not “out.” For example, a child with a high PRIDE score should be included in a program although a teacher may not have selected the child (see Figure 4).

However, a child who is selected by a teacher as being highly creative should not be eliminated from the program because of a low or average PRIDE score. Creativity is a subtle characteristic that is especially difficult to identify in very young children. PRIDE can help schools in that identification process and PRIDE can help parents be sensitive to their children’s creativity.

Summary

Although preschool age assessment of gifted children is not totally reliable and is frequently unnecessary, there seem to be some advantages for parents and educators. If parents and educators are aware of the risks, early assessments can provide them information to guide their children and students. Early assessment can also provide developmental psychologists with further information about the development of intellectual giftedness and would seem like a research area that should be further explored. Particularly, longitudinal information on children who are identified early as gifted would help educators better understand whether these early scores predict continued high ability.
The Assessment of Preschool Gifted Children

References


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University of Denver

Introduction
The eighteen 4-, 5-, and 6-year-old children are sitting in a circle, watching their teacher demonstrate how wind is one of the forces that erodes the earth. Peter and Gerald are sitting quietly and seem to be listening intently as the teacher talks. Heather is also sitting quietly. She is sucking her thumb and playing with her hair as she listens. Katrina is wandering around the circle touching children on top of the head. Linda, their teacher, asks Katrina to sit down. She does, but Katrina continues to play with her clothes and ties and unties her shoes. Steven does not seem to be listening. He is staring out the window. Linda asks the class, “What are three ways to erode the earth?” Peter answers, “Water.” Katrina, while playing with her shoes, contributes, “Wind.” Steven turns back from the window to answer, “Ice.” Linda turns on a blow dryer and focuses it on piles of sand, rocks, and soil to simulate the wind blowing. “Which one of the materials will blow away quickest?” asks Linda. Heather answers, “I think the sand. It is softest.” That is a hypothesis, “responds Gerald.

All of these children attend the Ricks Center for Gifted Children, a private school for gifted children located on the University of Denver campus. The children were selected for participation in the gifted program through a multi-faceted identification process. The identification process incorporated data from multiple sources including information supplied by parents and teachers, developmental information, and observations of children engaged in activities. These children would also be classified as gifted using measures that are more traditional; they all have IQ’s in the gifted range. Their IQ scores range from 134 to 177. Typically, a child with an IQ above 130 is considered gifted (Bukatko & Daehler, 1993).

Research suggests that, as a group, young gifted children possess characteristics that distinguish them from their peers in cognitive, affective, and physical development. Cognitively, gifted children tend to use more complex words than their age peers do. As indicated in the beginning vignette, it is not unusual for young gifted children to use words like “hypothesis” and “erosion” in their everyday conversations. They have an ability to generate original ideas and solutions, to synthesize, and to think abstractly. A discussion of erosion may remind young gifted children of other situations in which they have heard that word. They might engage in a discussion of how they could prove or disprove a suggested
Psychological Intensities in Young Gifted Children


Gifted children are curious, intense, creative, and persistent (Clark, 1988; Lewis & Louis, 1991; Parke & Ness, 1988; Roedell, 1994; Roedell, Jackson, & Robinson, 1980; Webb, 1994). As Parke and Ness (1988) state, “They seem to absorb knowledge endlessly. Only sleep closes the storage banks for the day” (p. 197). Many times their attention spans and interests differ from the norm. Whereas one might expect a 3-year-old child to paint at the easel for ten minutes, a 3-year-old gifted child may spend 30 minutes executing a detailed and intricate landscape (Parke & Ness, 1988). In many cases, they develop certain “passion” areas in which they are intensely interested (Parke & Ness, 1988).

Emotional intensity and emotional sensitivity have been cited as characteristics of gifted young children (Clark, 1988; Piechowski, 1991; Roeper, 1982; Silverman, 1983; Webb, 1994; Whitmore, 1980). Young gifted children seem to be highly aware of the world around them, of their place in it, and of the relationships between people and places, time, and spaces. They tend to have unusual depth of feeling (Clark, 1988) which manifests as sensitivity to the emotions of other people and the early development of empathy (Kline & Meckstroth, 1985; Parke & Ness, 1988; Scheckty, 1981; Webb, 1994). While many preschoolers often use hedonistic reasoning, and are preoccupied with gain for the self (Eisenberg, 1986), young gifted children can be extremely sympathetic to a friend who is hurt or unhappy. They are inclined to be concerned about truth, equity, and fair play (Webb, 1994). They are troubled about humanitarian affairs such as wars and starvation (Roedell, Jackson, & Robinson, 1980; Roedell, 1993; Webb, 1994). They have high expectations for themselves and others (Clark, 1988; Scheckty, 1981; Webb, 1994). Gifted children also tend to develop an early locus of control, are more independent, and less likely to conform to peer opinions (Clark, 1988; Lucito, 1964; Smith, 1965; Webb, 1994).

Interest in gifted children has focused primarily on their intellectual and creative traits (Roeper, 1982). However, a child is a total entity, a combination of many characteristics. Emotions cannot be treated separately from intellectual awareness, creativity, or physical development: All intertwine and impact each other (Roeper, 1982). As Roeper states:

The gifted child’s emotions and intellect are different from those of other children his age ... And they can only be understood if they are examined as a unit. In short, giftedness is a
greater awareness, a greater sensitivity, and a greater ability to understand and transform perceptions into intellectual and emotional experience (p. 21).

Dabrowski (1964, 1972) studied gifted, creative, and eminent individuals and proposed that sensitivity and emotional intensity were a part of gifted children's psychosocial makeup (Piechowski, 1992). He suggested that gifted children demonstrated different overexcitabilities as ways to release emotional tension. A child who squirmed in his or her seat, for example, was releasing tension in a psychomotor mode. Instead of viewing these overexcitabilities as neurotic imbalances, Dabrowski viewed them as positive potentials for further growth, which he termed developmental potential (Piechowski, 1992).

The concept of developmental potential is a central idea in Dabrowski's theory of human development, entitled the Theory of Positive Disintegration. According to Dabrowski, developmental potential is composed of attributes which determine at what level of development a person may reach under optimal conditions (Piechowski, 1979). Defining characteristics of developmental potential include talents, special abilities, intelligence, and five forms of psychic overexcitability: psychomotor, sensual, intellectual, imaginative, and emotional. Piechowski (1992) defined the concept:

Dabrowski called them forms of psychic overexcitability to underline the enhancement and intensification of mental activity much beyond the ordinary. Overexcitabilities contribute to the individual's psychological development, and thus their strength can be taken as a measure of developmental potential (p. 287).

Those who work with gifted children often find recognition in these forms of overexcitability because they provide a theoretical model that makes sense of the emotions and behaviors of their students (Piechowski, 1992). Although studies have been done to describe overexcitabilities exhibited in adolescents and adults (Lysy & Piechowski, 1993; Piechowski & Colangelo, 1984; Piechowski, Silverman, & Falk, 1985), little work has described the exhibition of these overexcitabilities in young gifted children. A search of the Educational Resources Information Center (ERIC) database elicited one study (Kitano, 1990) and a search of Dissertation Abstracts revealed one more (Howard, 1994). This study, which describes how Dabrowski's overexcitabilities are exhibited in five young gifted children, addresses the gap in the knowledge base.
The Research Study

Theoretical Framework

A qualitative, multiple case study design was selected for this study. This type of inquiry investigates a particular circumstance within its real-life context and benefits from the prior development of theoretical propositions to guide data collection and analysis (Creswell, 1994; Vin, 1994). The five overexcitabilities identified in Dabrowski’s (1964; 1972) Theory of Positive Disintegration formed the theoretical framework guiding data collection and analysis. Piechowski (1979) described the five overexcitabilities identified by Dabrowski as:

Psychomotor Overexcitability. The manifestations of psychomotor overexcitability are essentially of two kinds: Surplus of energy and nervousness. In nervousness, the emotional tension is translated into psychomotor activity such as tics, nail biting, or impulsive behavior. The surplus of energy can be observed in animated gestures and taking on self-imposed tasks...

Sensual Overexcitability: Sensual overexcitability is expressed in heightened experiencing of sensory pleasures and in seeking sensual outlets for inner tension ... other manifestations of sensual overexcitability include ... marked interest in clothes and appearance, fondness for jewelry and ornaments...

Intellectual Overexcitability: The manifestations of intellectual overexcitability are associated with an intensified and accelerated activity of the mind. Its strongest expressions have more to do with striving for understanding, probing the unknown, and love of truth than, with learning per se or academic achievement...

Imaginational Overexcitability: The presence of imaginational overexcitability can be inferred from frequent distraction, wandering attention, and daydreaming. These occur as a consequence of free play of the imagination. Here, too, belong illusions, animistic thinking, expressive image and metaphor, invention and fantasy...

Emotional Overexcitability: Among the five forms of psychic overexcitability, the manifestations of emotional overexcitability are the most numerous. They include certain characteristic and easily recognizable somatic expressions, extremes of feeling, inhibition, strong affective memory, concern with death, anxieties, fears, feelings of guilt, and depressive and suicidal moods... (Piechowski, 1979, pp. 32-35).
Data Sources and Collection

Data were collected on five young children, ages four through six from April, 1995, through March, 1996. The five children were purposefully selected for participation in the study to provide examples of different overexcitabilities. Early childhood teachers were asked to identify children from their classrooms who demonstrated the particular characteristics described by Dabrowski. The researchers randomly selected five of the children. Two of the children were female: Katrina and Heather. Three of the children were male: Gerald, Steven, and Peter.

Researchers were members of the staff of the Ricks Center. Both researchers had graduate degrees in gifted education and were familiar with Dabrowski's theory. They believed that Dabrowski's theory was useful in explaining the thinking and behaving of their students. The goal of this study was to discern if the characteristics described by Dabrowski could be documented in young children.

Data sources included: Individual Educational Plans (IEP's) written for each child, intellectual evaluations completed by psychologists, developmental and behavioral questionnaires completed by parents, interviews with teachers, and observations of students in classrooms.

The first source of data consisted of classroom observations. The researchers' roles in the classroom were as nonparticipant observers. They observed each of the children on four or five separate occasions during the school day and wrote field notes during the observations. These field notes were then transcribed into narrative text used during data analysis.

The second source of data included three types of documents providing background information about each child. The first type of document was an educational evaluation on each child. Each of the children had been given an IQ test (either the Stanford Binet or Wechsler Intelligence Scale for Children) and an achievement test (Usually the Kaufman Test of Educational Achievement). Psychologists provided the school with a summary of the test results and observations they made about the children during testing. The second type of document was a developmental and behavioral questionnaire. As a part of the admissions process to the school, all parents completed developmental and behavioral questionnaires. These questionnaires made inquiries about the child's developmental milestones, interests, and abilities. The third type of document was an Individual Educational Plan (IEP) written for each child by his or her classroom teacher. The IEP was the core instructional strategy guiding each child's classroom work during the school year, and included information about each child's present performance level, content area goals, approach to learning, and classroom behavior.
The third source of data included interviews. The researchers interviewed classroom teachers about the behaviors of the five children. Semi-structured interviews, which consisted of questions to teachers, children’s classroom behavior, and about any parts of the child’s IEP that needed clarification, were audiotaped and transcribed for analysis.

Data Analysis
As data were collected for this study, they were coded using the behaviors described in Dabrowski’s theory as initial themes. Data were organized categorically and chronologically and reviewed repeatedly (Creswell, 1994). If a child exhibited a behavior characteristic of overexcitability in three of the five data sources, the child was considered to have a pattern of behavior characteristic of the overexcitability. Systematic data reduction resulted in a narrative description for each child. The narrative descriptions portrayed the themes and patterns discerned in the analysis. Cross-case analysis was used to generate the final narrative description (Creswell, 1994) in an effort to provide an understanding of how the overexcitabilities were exhibited in these five young gifted children.

Because of the naturalistic nature of this study and the small number of participants involved, the research is not generalizable in the rationalistic sense to other situations (Cornett, 1987). However, the transferability of the findings, the appropriate concern for a naturalistic study (Lincoln & Guba, 1985), was enhanced by the triangulation of the data sources.

Results
The children in this study demonstrated behaviors consistent with Dabrowski’s theory. The different overexcitabilities were exhibited by the children’s individual choice in activities, their reactions to stress, and in their daily actions at home and in the classroom (see Figure 1).

All five children exhibited behaviors characteristic of three forms of overexcitability: intellectual, imaginational, and emotional. Behaviors characteristic of the other two overexcitabilities, psychomotor and sensual were exhibited by two of the children: Katrina and Heather.
Intellectual Overexcitability

Intellectual overexcitability is manifested by curiosity, asking probing questions, concentration, problem solving, and theoretical thinking (Piechowski, 1992). In this study, all of the children exhibited some aspects of intellectual overexcitability. An inspection of the data collection matrix indicates Gerald and Peter demonstrated the most behavior characteristic of this overexcitability.

Curiosity. All five children were curious about how things happen. For example, in the admissions questionnaire, Gerald’s parents related, “He is curious about how the world operates and asks many questions once his interest is sparked.” Peter was described as “very curious” by his parents. He was reported to ask questions such as, “Mommy, what happens when red and green are mixed together?” “Mommy what does it mean when birds fly South for the winter?” and “Why did the car make a funny noise?” Heather’s parents stated, “Heather always wants to know why and how, and generally remembers and repeats your explanations.” Katrina’s parents related:

She is a very curious child. She often asks the question why, then will usually repeat your answer out loud, as if processing it. After that she seems to retain it and will apply the newly learned concept freely.

Asking Probing Questions. Though all of the children were reported to ask the question “Why,” Gerald and Peter asked questions that seemed to encompass the striving for understanding, which Piechowski (1979) referred to in describing the overexcitability. For example, Peter’s parents reported, “Peter has an interest in almost everything around him. He is like a sponge, just waiting to soak in as much knowledge as possible. He is constantly questioning, probing, wondering...”

Concentration. Of the five children, Gerald’s and Peter’s behaviors were characteristic of the intense concentration to tasks evident in those possessing intellectual overexcitability. Gerald’s parents stated:

Gerald likes to tackle tasks until he has mastered or completed them ... When we check out books from the library he wants to read over and over again until he has them memorized and can “read” them.

Peter’s behavior also demonstrated this commitment to tasks. His teachers reported, “His very long attention span allows Peter to engage in many lengthy and involved activities.”
His educational evaluations noted, “He displayed intense concentration and was quick to give himself feedback by shaking his head, indicating correct and incorrect answers.”

Problem Solving. Four of the children were reported and observed to have excellent problem solving-skills: Gerald, Katrina, Steven, and Peter. Teachers indicated that one of Steven's strengths was his “problem-solving and critical thinking skills.” Katrina's educational evaluation noted, “Katrina's verbal problem solving strategies are quite remarkable and easily several years beyond her chronological age.” Gerald was reported by his teachers to “use critical thinking and problem solving skills when he constructs elaborate structures with the various blocks.” Peter's educational evaluations noted similar problem-solving abilities:

Peter showed high levels of concentration during this subtest and showed he was quite flexible in his thinking by trying alternative approaches to solving problems. He was quite holistic in his response to Block Design, indicating a holistic rather than a sequential step-by-step problem-solving approach.

Theoretical Thinking. Gerald and Peter both exhibited behavior that displayed theoretical knowledge and joy in learning for its own sake. Gerald’s teachers noted that he especially enjoyed math problem solving. They stated, “He will complete his math problems and then make up two more to do just for the fun of it.” His parents reported in his questionnaire when Gerald was 2 years old:

Since he has learned to add and subtract, Gerald is always trying to apply simple math to situations in everyday life. He will count the people in a family, then add and subtract for visitors or someone in the family leaving. He counts what his age will be at a certain point and then subtracts to find out what his age would be...

Peter’s mother observed similar joy in learning in her son. In his parental questionnaire, completed when he was two years old, his mother related:

Whatever is there to be learned, Peter wants to soak it all up in a hurry. Yesterday, he asked me, “What is 3 minus S?” We made a number line together with negative numbers so we could figure out the answer. In a matter of minutes, Peter was adding and subtracting negative numbers.
Imaginational Overexcitability

Imaginational overexcitability is characterized by free play of the imagination, such as inventions of fantasy, animistic and imaginative thinking, daydreaming, and dramatic perception, (Piechowski, 1992). All five of the children displayed some behaviors consistent with this overexcitability. Steven, however, exhibited numerous behaviors indicative of imaginational overexcitability.

Figure 1: Patterns of Overexcitability

<table>
<thead>
<tr>
<th>Overexcitability</th>
<th>Gerald</th>
<th>Katrina</th>
<th>Heather</th>
<th>Steven</th>
<th>Peter</th>
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<tbody>
<tr>
<td><strong>Psychomotor</strong></td>
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<td>Rapid Speech</td>
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<td>Surplus of Energy</td>
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<td>Compulsive Actions</td>
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<td>Marked Enthusiasm</td>
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<td><strong>Sensual</strong></td>
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<td>Sensory Pleasures</td>
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<td>Appreciation of</td>
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<td>Sensory Experiences</td>
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<td><strong>Imaginational</strong></td>
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<td>Imaginative Thinking</td>
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<td>Fantasy Play</td>
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<td>Dramatic Perception</td>
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<td>Animistic Thinking</td>
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<td>Daydreaming</td>
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<td><strong>Emotional</strong></td>
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<td>Concern for Others</td>
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<td>Shyness</td>
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<td>Fear and Anxiety</td>
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<td>Intensity of Feeling</td>
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<td>Adjustment</td>
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<td><strong>Intellectual</strong></td>
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<td>Asking Probing Questions</td>
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<td>Problem Solving</td>
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<td>Curiosity</td>
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<td>Theoretical Thinking</td>
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<td>Concentration</td>
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Figure 2: Comparison of the overexcitability patterns in the five children

<table>
<thead>
<tr>
<th>CHILD</th>
<th>Psychomotor</th>
<th>Imaginational</th>
<th>Emotional</th>
<th>Intellectual</th>
<th>Sensual</th>
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<tr>
<td>Gerald</td>
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<td>low</td>
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<tr>
<td>Katrina</td>
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<td>Heather</td>
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<td>Steven</td>
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<td>medium</td>
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<td>Peter</td>
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Fantasy Play. All of the children in this study enjoyed and engaged in fantasy play. Heather's parents noted, for example, that she loved to "dress up, play different characters, and make up stories." Since play is one of the chief ways children learn during the early childhood period, this participation in fantasy plan is considered a part of their normal development (Bredenkamp, 1987; Parke and Ness, 1988).

Animistic and Imaginative Thinking. All the children were reported and observed to be imaginative. Katrina's parents related, "Katrina possesses a wonderful imagination. One of her favorite activities at home is the dress-up box. She loves to role play and will create her own dialogue." Heather's parents reported, "Heather often tells made-up stories and describes dreams in detail. She will often 'see' things in other objects and say, 'That cloud looks like a tree,' or 'That rock looks like a big castle.'"

Steven displayed most clearly the "free play of the imagination and animistic thinking" referred to by Piechowski (1979, p. 32-38). Whenever Centers Time was observed in his classroom, Steven was the only one of the five children always engaged in imaginative play. One day he reported, "We are playing that we are bears. We are building a shelter for us." On another day, he was pretending to be a bee. On a third morning, he stated, "We are
dinosaurs. I am a Tyrannosaurus-Rex, arr-r." Even when playing on the computer, Steven had an imaginary story explaining his actions. "We are on a mission." He said to Gerald. "Don't you want to be on a mission?"

Imagination entered Steven's work in the classroom. As the children engaged in writing, Steven said to his neighbor, "The pencils are exploding electricity." His pencil then became a spaceship. Steven made the sounds of an engine as he flew the pencil spaceship around his table.

Steven's explanations for happenings were also very inventive. One morning, as he was cleaning the paint off a table, he told his teacher, "I have cleaned the table with hot water. The hot water burned the paint off the table." According to his teachers, when Steven's parents picked him up, Steven had discovered a new "treasure" on the playground. Each day he would tell his parents very imaginative stories about what these treasures were and where they were unearthed.

**Daydreaming.** Steven's wandering attention was observed both in the classroom and at home. During Circle Time (when the students meet together as a classroom group), he was constantly asked to "come back to the circle" and to "pay attention to his friends." His educational evaluation noted, "Steven had difficulty remaining seated in his chair and needed to be constantly redirected to the task at hand."

**Dramatic Perception.** Gerald, Katrina, and Steven were reported to enjoy using creative drama as a means of expression. However, Steven's preferred way to experience information appeared to involve using his imagination. His teachers reported, "Sociodramatic play is a favorite way for Steven to relay information he has learned; he creates scenarios that incorporate this new information."

**Emotional Overexcitability**
All the children in this study evidenced some of the behaviors characteristic of emotional overexcitability. Emotional overexcitability is indicated by a concern for others, timidity, shyness, fear and anxiety, difficulty of adjustment to new environments, and intensity of feeling. Peter displayed the most behaviors consistent with emotional overexcitability.
Concern for Others. Teachers, parents, and observations noted that all the children were sensitive to the needs of others. Steven, for example, was described as:

... a sensitive boy who is aware of peers and their needs and discomforts. He regularly makes the entire class aware when someone is in need of assistance emotionally or physically.

Katrina was portrayed as, "keenly aware and sensitive to peers' needs." Peter, Heather, and Gerald were similarly characterized by parents and teachers.

Timidity and Shyness. Gerald was described by his examiner as "introverted" and in the classroom he was observed to be quiet and to enter activities slowly. His classroom teacher noted it that it took him the first half of the school year to become comfortable enough in the classroom to share his extensive information during class discussions.

Peter was also depicted as a quiet, introverted child. His teachers related, "He breaks into big smiles when asked to relay information to the class discussion." They noted, however, that Peter was not likely to contribute unless asked. Peter was described by his teachers as:

... hesitant to do some activities until he has had time to watch and evaluate the process. He then engages in the activity when he feels comfortable ... His recall of information shows that he is absorbing the information he is observing.

Fear and Anxiety, Difficulty Adjusting to New Environments. In addition to his timidity, Peter demonstrated fear and anxiety in the classroom on occasion. Like Gerald, he had difficulty in adjusting to new environments. His teachers recounted, "At times he is uncomfortable with the noise and activity level in the classroom." They also noted, "He does not like transition between new situations or classrooms."

Intensity of Feeling. When Peter was afraid or anxious, he demonstrated a very intense level of feeling. He covered his ears and cried when the noise level in the classroom became uncomfortable for him. Peter became so upset at the prospect of attending physical education in the multi-purpose room that he rarely went. His teachers allowed him to remain with them in the classroom. Peter infrequently attended activities or assemblies involving the whole school, as the noise and number of people made him intensely uncomfortable.
Psychomotor Overexcitability

Psychomotor overexcitability is evidenced by a surplus of energy including marked enthusiasm, rapid speech, pressure for motion, and impulsive actions (Piechowski, 1995). Katrina was the one child in this study whose behaviors indicated these characteristics.

Marked Enthusiasm. Katrina exhibited the marked enthusiasm characteristic of psychomotor excitability. Her psychological examinations noted, “Katrina displayed hesitancy about entering a new, unfamiliar situation. She easily separated from her mother and approached the testing with curiosity and enthusiasm.” Katrina’s teachers also reported her enthusiasm. They stated in her IEP, “Katrina expresses herself through movement and liveliness during class activities ... There are times when Katrina’s enthusiasm overwhels her classmates in various situations.”

Rapid Speech. Katrina also displayed a tendency to speak rapidly and to hurry through activities. Her examiner reported:

In her desire to accomplish the task, Katrina responded so quickly she did not plan ahead. Counting gave Katrina some trouble, this was primarily because she counted items out faster than she could track them with her eyes.

Surplus of Energy, Impulsive Actions. When Katrina was observed in the classroom, she demonstrated a need for constant motion and engaged in impulsive actions. During a period of thirty minutes, she was first observed poking her friend with a marker. After she was told to stop doing this, she walked over to look at pictures, then went to sit down at the computer. After a minute or two, she got up and went to the bathroom. When she came back, she grabbed her friend by the neck and started to dance with her, yelling, “Chug, chug, choo, choo.” Then she went to the table to paint for a few minutes. She got her hands dirty, began running around the room saying, “Green messy-green messy, say green messy.” Next, she went back to the table to paint for another few minutes, then she changed table to draw. She would choose one marker from the marker box, run over to the table and draw with it, and then run back to the marker box to put it away and get another marker.

Her teachers communicated Katrina’s need for motion in her IEP. They wrote, “...If an activity is stationary, Katrina’s attending time is brief. If the activity involves movement, she’s engaged for a much longer period ... She learns best by physically experiencing information.”
Sensual Overexcitability

Sensual overexcitability is manifested in the extreme appreciation of a variety of visual, auditory, tactile, olfactory, or oral experience (Ogburn-Colangelo, 1979). Heather evidenced behaviors characteristic of sensual overexcitability, which include enjoying sensory pleasures and using sensual expressions of emotional tension (Piechowski, 1992).

Sensory Pleasures. When Heather was observed in the classroom, she spent her free time sitting in the costume trunk stroking the many different fabrics and putting on the costumes and jewelry. While drawing pictures, she spent time smelling each one of a set scented magic marker before she decided which one to use. During story time, she sucked her thumb and pulled on her hair, and teachers reported that if she got in trouble in class, she would exhibit those same behaviors. As she wrote a letter to some children in the Arctic, she talked and hummed to herself, exclaiming, occasionally, “This is fun.”

At lunch she was very concerned with the smell, taste, and texture of her food. During one observation she related that she could not eat the cheese in her lunch because, “I do not like how it smells.”

Appreciation of Sensory Aspects of Experience.

Many of Heather’s comments referred to the sensual aspects of an object or place. Her parents reported that she noticed everything going on around her and commented on it. They related that she said things like, “The sky is really blue today” or “Those flowers have a wonderful smell.” When the teacher asked about the feelings of one of the characters in a story, she said, “He feels a little twinkle of sorry for the dog.” In describing her nanny’s dog to the researcher, she stated, “It is very, fluffy, with white hair, and tiny.”

Discussion

The data analyzed for this study supports the use of Dabrowski’s theory as a means of identifying and understanding some aspects of the behavior of young gifted children. According to Dabrowski’s theory, there are five stages of emotional development: primary integration, unilevel disintegration, spontaneous multilevel disintegration, organized multilevel disintegration, and secondary integration. At the highest level of development, secondary integration, an individual will develop authentic hierarchy of values, empathy, and responsibility (Piechowski, 1979). This level of development has been shown to correspond to Maslow’s (1970) highest level of moral development, self-actualization (Piechowski, 1978). Potential for advanced development is strongest when all five forms of overexcitability are evident. The presence of imaginational, intellectual, and emotional overexcitabilities are essential for multi-level development (Ogburn-Colangelo, 1979). All
five of the children in this study displayed some behaviors indicative of these three overexcitabilities. Therefore, according to the Theory of Positive Disintegration, these children all evidenced the capacity for advanced development.

Of the three overexcitabilities that must be evident for multi-level development, emotional overexcitability is most often associated with developmental potential, and its presence is necessary for the highest level of development to occur (Ogburn-Colangelo, 1979). The relationship aspect of emotional overexcitability allows the development of the autonomous hierarchy of values, empathy, and responsibility noted by Piechowski (1979). All the children in this study displayed this relational aspect of emotional overexcitability. They demonstrated a strong concern for others and their feelings, compassion, and self-reflection through behaviors and comments. Katrina's parents recounted:

*She is hurt very easily when teased or called a name. She is very attuned to other people if they are happy, sad, or angry. She will often ask, “Why is that child crying?” She becomes very upset if she is talked to harshly.*

Peter's teachers provided a similar example, "Peter is sensitive to the needs of other children .... He has developed many friendships in the classroom and he eagerly becomes involved with friends."

Though all the children exhibited to some degree three overexcitabilities, most displayed characteristics consistent with one of the overexcitabilities more than the others did. One overexcitability is often dominant in an individual (Piechowski, 1979). As Piechowski explains:

*The five dimensions can be thought of as the main channels of perceptions-apprehension of the patterns of experience, and of conception-the formation of the images of experiences. They may be likened to color filters through which the various external impingements, and internal stirrings reach the individual (p. 29).*

The type of response to experience depends on the dominant overexcitability in each person. In this study, Gerald exhibited the most behaviors consistent with intellectual overexcitability, Katrina with psychomotor, Heather with sensual, and Steven with imaginational. Peter exhibited many behaviors consistent with both intellectual and emotional overexcitability (see Figure 2).
Psychological Intensities in Young Gifted Children

Other Explanations for the Children's Behavior

Some of the characteristics noted in this study could be attributed to other factors. Human behavior, after all, is very complex. Examining young gifted children's behavior through the lens of Dabrowski's theory, however, reminds us that careful consideration and appropriate professional evaluation is necessary before concluding that bright, creative, youngsters have attention deficits, neurotic tendencies, or other behavior problems (Lind, 1994; Webb, 1993).

Bright children have been frequently referred to psychologists or pediatricians because they exhibited certain behaviors such as restlessness, inattention, impulsivity, high activity level, or daydreaming (Lind, 1994; Webb & Latimer, 1993). These behaviors can be indicative of children who have Attention Deficit/Hyperactivity Disorder (ADHD). These traits in young gifted children may look like ADHD, but in many cases, there is a difference. The energy of a gifted child is focused, directed, and intense. Young gifted children are able to concentrate for comparatively long periods on subjects that interest them. In contrast, children (both gifted and of the general cohort) who are genuinely ADHD cannot focus their attention on one particular activity for any length of time, even if it is of interest to them. (Clark, 1988; Parke & Ness, 1988; Schectky, 1981; Webb, 1994). Although, Katrina's activeness and Steven's daydreaming might seem to be indicative of ADHD on initial inspection, they both have the ability to pay attention. As illustrated in the initial descriptive incident, Katrina could answer a question about the topic under discussion while playing with her shoelaces. Steven could listen and look out the window. They were gathering information in the form most comfortable for them.

The sensitivity and intensity indicative of emotional overexcitability may be considered by some as neurotic tendencies. The stronger these overexcitabilities are, the less welcome they are among peers and teachers (Piechowski, 1992). Peter, for example, is very sensitive and intense. He reacts strongly to new experiences, locational changes, and noise. However, these intensities of emotion, this sensitivity, and his proneness to riding a roller coaster of emotional extremes, may be seen, as they were by Dabrowski, not as neurotic imbalances, but as a potential for further growth. It is this emotional sensitivity and intensity that fuels the commitment to ethical principles and provides the impetus for advanced development (Dabrowski & Piechowski, 1979).

Sensual overexcitability may look like Sensory Integration Dysfunction. These dysfunctions are disorders of neurological development that hinder not only children's ability to learn but also their ability to interact effectively with other children and to function appropriately in the classroom (Chan, 1995). Heather's sensory interests, however, did not inhibit her ability to learn or function appropriately in a classroom. Her choices of activities during free time
included sensory type activities. She used sense words to describe experiences. She rarely refused to participate in an activity and her classroom interactions were not affected by her behavior.

Of course, gifted children may be both ADHD, have a Sensory Integration Dysfunction, or develop neuroses as they mature. Educators, clinicians, and parents should have a better understanding of giftedness and overexcitabilities before they diagnose certain disorders, because, as Lind (1994) notes, “The way we treat a child with ADHD is certainly different from the way we treat a child who is overexcitable, highly gifted, or intense” (p. 11).

Conclusions
Roeper (1982) related that concerns for the psychological development of gifted children needs to become a part of education of the gifted. She wrote:

*A child is a total entity; a combination of many characteristics. Emotions cannot be treated separately from intellectual awareness, or physical development; all intertwine and influence each other* (p. 21).

In order to deal effectively with gifted children, teachers need to understand and work with both the psychological and intellectual facets of giftedness. The concept of developmental potential allows teachers a way of assessing their students’ psychological and educational needs. If teachers were made aware of the five overexcitabilities and that their presence is intrinsic to a child’s giftedness, they would have additional conceptual tools for understanding the emotional development of advanced children. Behaviors which may have been viewed as indicators of psychological problems are more positively understood as manifestations of advanced development.

References


Psychological Intensities in Young Gifted Children


Perspectives in Gifted Education: Young Gifted Children


Psychological Intensities in Young Gifted Children


Gifted Education
in an Early Childhood Context
A Secret We Should Share
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Previous research on young gifted children has focused primarily on ways to identify and assess talents and abilities, and on examining factors influencing the development of these abilities. This paper examines early childhood gifted education from a curricular perspective and presents a conceptual model for redefining gifted education in an early childhood context. Based on a prolonged study of curricular differentiation in an early childhood gifted program, this paper provides the data for discourse and further exploration of what distinguishes a curriculum designed for identified gifted children from curriculum which would be espoused in any early childhood program.

The school providing the context for this study aims to model exemplary practices in early childhood and gifted education, intersecting “best practices” of early childhood education and infusing teaching strategies from the gifted education literature. Children are engaged in a project-based curriculum with emphasis on providing opportunities for children to foster critical and creative thinking skills. The umbrella research question guiding the investigation was “What is the nature of curricular differentiation in a project-based, student-centered early childhood gifted education program?” The purpose of this qualitative study was to examine how the curriculum was differentiated and to enlighten our awareness of the processes, content, and products of emergent curriculum at this age level.

To address the general research questions, the author documented a) the processes of learning (i.e., teacher guidance, teacher questioning, student dialogue, student responses, student products); b) the processes of facilitation (teacher-to-student dialogue, teacher-teacher dialogue, use and selection of materials, teacher responses); and c) student outcomes (products, ideas, language, etc.).

Perspectives
Guidelines set forth by the National Association for the Education of Young Children (NAEYC), now under the rubric of Developmentally Appropriate Practices (DAP) have been in the forefront of early childhood programs for nearly a decade. Inherent in the guidelines are general “should statements” for practitioners in the field. As the guidelines have been
revised, discourse and debates about their applicability to special populations of young children have been pervasive in the literature (Mallory & New, 1994). A renewed emphasis on the individual (individual capabilities, cultural characteristics, and life situations) versus the "group" of young children and a refined definition of developmentally appropriate to include age and individual appropriateness promotes the case that DAP can be applied to any population of young students, including those identified as gifted or talented.

Many leaders in the field of gifted education have published “should statements” about differentiated curriculum (Kaplan, 1986; Maker, 1982; Passow, 1982, Renzulli, 1977). Consensus among the “should statements” is that the content, product, and process of learning must be modified to meet the needs and abilities of the students. Curricular differentiation “denotes sets of specialized learning experiences which develop the unique abilities of students identified as gifted/talented” (Passow, 1982, p. 6). Curriculum should be thematic, broad-based, and designed for depth and complexity. (Kaplan, 1974; Maker, 1982; Passow, 1982; Renzulli, 1977). These principles lead to the conclusion that curriculum for gifted children should be distinguished from that for non-gifted children.

When the curriculum is student-centered and generated by the ideas and thoughts of young children, how are the content, process and product modified? In curricular models which focus on the curriculum emerging from the child, where is the fine line of differentiation? "By definition, to be individually appropriate requires that programs attend to individual and cultural variation among the children they serve" (Bredekamp & Rosegrant, 1992, p. 5). What distinguishes an “individually appropriate” curriculum from a “differentiated” one? Are there aspects of the curriculum that benefit solely an identified gifted population? Gallagher stated, “We have yet to document that the differentiated curriculum we propose is curriculum that could not be of benefit to other students as well” (Gallagher, 1996, p. 235).

In this paper, I present the reader with an overview of the research project. Then I provide several examples of the data that emerged from observing the student’s investigations. Finally, I discuss questions, which arose throughout this investigation, and implications for the field of early childhood gifted education.

Research Methods

Design

An action research paradigm characterizes this qualitative study because the collaboration between researchers and teachers was a key component of the design. Teachers and researchers collected observations and other forms of documentation as the teachers
facilitated the students in their endeavors. Borrowing from the Reggio Emilia approach in which teachers act as classroom ethnographers, our teachers, with the researcher, observed, recorded, photographed, and documented the progress of student projects.

The qualitative design included the five characteristics of most other qualitative research described by Bogden & Biklen (1992):

1. Qualitative research has the natural setting as the correct source of data and the researcher is the key instrument.
2. Qualitative research is descriptive.
3. Qualitative researchers are concerned with process rather than simply with outcomes.
4. Qualitative researchers tend to analyze their data inductively.
5. Meaning is the essential concern in the qualitative approach (29-32).

**Data Collection and Analysis**

Data sources included field notes of daily observations of “activity time” or “project time” in three classrooms, video-taped observations, documentation of student projects, ongoing dialogue with classroom teachers and students, and notes of informal discussions with teachers as well as notes of more formal discussions of projects during staff meetings. Analysis by the classroom teachers and university researchers took place throughout the process of data collection. The data fell into three categories:

1. Children working on individual or small group activities (some of them may be projects) during activity time;
2. Children working on individual or small group projects as a result of a project being initiated by the teacher; or
3. Whole group activities related to projects (such as group discussions, guest speakers, field trips, etc.).

The data selected for discussion in this paper are representative of the larger data set.

**Establishing Trustworthiness**

In qualitative research, trustworthiness, rather than reliability or validity, are terms used to describe the quality of the research. Techniques used to enhance the trustworthiness of this study included triangulation, prolonged engagement, peer debriefing, and member
Early Childhood Context

Triangulation involved comparing observational data, photographs, videotapes and their transcriptions, and other project documentation, and interviews with children and teachers. The collaborative nature of the project provided member checks and dialogues about the meanings derived from the data. The prolonged nature of the study provided opportunities for the researcher and teacher to observe children's growth and learning process over a two-year period.

Setting and Participants

University Primary School, affiliated with the University of Illinois at Urbana Champaign, has served preschool and primary-aged children identified as gifted for the past 25 years. In a recent effort to reestablish itself as a research and teacher training site, the administration and staff examined the curricular practices associated with the school as a result of an external evaluation of the program (Hertzog & Fowler, 1999). There are one preschool classroom of 3 and 4 year olds and two K/1 classrooms. Each K/1 classroom has 25 students and is staffed with a Head Teacher and a Teaching Assistant. The preschool classroom has two graduate students assisting the Head Teacher.

At the time of the study, the students were selected for the program after completing a screening process which included parent questionnaires, samples of art or other types of products, an open-ended drawing activity, and results from an individual administration of the Kaufman Assessment Battery for Children. The selection criteria were not determined by the highest score on the K-ABC. Teachers also considered demonstrated creativity as perceived through students' drawings and parent questionnaires. It should not therefore, be assumed that the children in the study were all at the highest performance levels of the K-ABC or that they were all necessarily ahead of their peers academically. The classroom had children from diverse backgrounds with a wide range of abilities. The teachers felt that the scores on the K-ABC were not highly related to how successful children were in our program. Therefore, the admission process was changed to no longer include a standardized assessment. Current admission procedures focus on "program match." Parents must visit the program, complete a Site Questionnaire, a questionnaire about the strengths of their child, and submit three samples of the child's "work." The rationale for this change in admission process reflects the vast amount of research that suggests parents know their young children well and are able to identify their strengths (Silverman, 1997; Smutney, Walker, & Meckstroth, 1997). We have also found that parents who are supportive of the program also have children who succeed in our school environment.
The Handbook for Families (1998) describes the unique features of University Primary School curriculum.

The University Primary School Curriculum represents an eclectic approach to early childhood gifted education programming. A blend of student-initiated, teacher-guided, and teacher-directed activities present students with opportunities to pursue their own interests and progress at their individual level of instruction. Creativity, problem solving, and self-directed learning are common threads woven through all areas of the curriculum. Students become actively involved in the inquiry process through projects.

Activity Time and Project-Work are highly valued in our curriculum. Activity Time allows students to make choices about their own learning and provides important school time to work on an area of interest. During this period, teachers facilitate students' learning by building upon their ideas. Project-Work presents learning to children in real-life contexts and integrates the acquisition and application of basic skills through inquiry modes of learning. Activity Time and Project-Work strive to foster "the love of learning" and provide an opportunity for teachers to engage in the learning process with their students (Handbook for Families, 1998, p. 11).

Activity Time takes place in all of the classrooms during the first hour of the day and often the last hour of the day. Children make decisions about their own learning by signing up for an "Activity Board" for an activity of their choice. Generally children choose among two to four different things to do. Examples of student choices may be: reading books, art activities, sometimes art is more specific such as paper mache, spin art, watercolor, etc.), dramatic play blocks, pattern blocks, sewing, or working on a project that is predetermined by the student such as The Great Wall of China, the Egyptian pyramids, building a bird feeder, or making a rain gauge. The list of activities changes daily as children's choices and ideas change. Choices may arise out of a whole class project-investigation or out of a student-initiated one. Activity Time is supplemented with whole group, outside play, and small group instructional time for language and math (in the K/1 classrooms). Teachers are encouraged to use local resources. All of the teachers go on numerous field trips, use parents as resources for the projects, have student and parent volunteers in the classroom, and use various resources from the academic departments of the university to support their project investigations. The environment is structured so that students have access to a wealth of materials including paper, markers, tape, rulers, scissors, paints, playdough, etc. One of the students' favorite activities is called "boxes and junk." When they sign up for boxes and junk, they may make anything, but often times, they use the boxes and junk materials to make something related to their project under investigation.
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An Emergent Curriculum

Some of the experiences of the children are illustrated through their constructions made out of "boxes and junk." This activity not only promotes creative thinking, but also involves the children in a great deal of problem solving. An example of content acquisition is demonstrated through a project-investigation of weather. Salient features of these examples provide the context for discussion about differentiation.

The Power of Construction

Boxes and junk was (and still is!) a favorite Activity Time choice. As I collected data in the morning, children often talked to me and to other children about their constructions. Many of them asked me to take pictures of their finished products. This was a standard routine in the classrooms to document continually what children do and learn. Four examples of boxes and junk constructions are documented below:

1. Billy said, "Look at this! I started it today. It's a machine that opens its mouth." He had a string tied to an egg carton and pulled the string to make the egg carton half lift off. It looked like a mouth, indeed. I asked Billy, "What do you call this string?" Another child who was studying there looking on said, "A pulley."

2. Michael came to me and told me, "I kind of added more on since you took the picture." I asked, "What did you add on?" Michael said, "I added these." He had added little pieces of egg carton as pinchers for the crab. He had also added some eyes to his crab construction.

3. Katherine came over to brag that she had made "binoculars."

4. Billy called me over again, "Hey, Nancy. Want to see what else we put in? We put in cannon balls. His eyes could be cannons and they can be flashlights."

Their boxes and junk constructions demonstrated the fluency of their ideas and their willingness to revisit those ideas and elaborate upon them. Task persistence was inherent in their determination to "improve" upon their constructions by enacting their newer and more elaborate ideas.

In one K/1 classroom, several boys repeatedly made spaceships over the course of two months. Their dictations from the spaceships included the following:

1. "It is a space shuttle. It shoots lasers right out of nowhere. It has radar and it can also go to planets that not even the biggest microscope can see."

2. "This spaceship travels into time and it separates."
These constructions clearly were initiated by the boys and meshed what they knew (conceptions) about space and space travel with things they did not know (misconceptions). Opportunities were given for other children to ask the boys questions about their constructions. Some children had different opinions about ways that space travel occurs and what astronauts take up into space. Although children could not easily gather first hand data to answer all of their questions, they were able to make predictions and theories about how the spaceship would travel into space.

Children made other constructions after having had first hand experiences with a topic. Following a visit to an apple orchard where the owner showed the children how bees are helpful in pollinating trees, several children became interested in insect homes and the equipment that the apple orchard owner showed them. One child dictated the following to go along with this construction:

This is a killer bee powered sting gun. The bees go into the plastic part and when they try to get out they use their stinger part. Then the sting poison goes into a wire, and then it comes out through the shooting part of the gun. The removable part is a glove you put on when you put the killer bees into the gun. Killer bees have more powerful stings than regular bees.

Another child, Michael, made a beekeeper’s hat like the one that he saw at the apple orchard. It had a white fabric veil and the top was made out of furry material. As he dictated the explanation to the teacher, she interrupted him by sounding out the “h” for the word hat and asking him what it began with. He answered her. Afterwards, the teacher told me that he does not like to spell words that are sounded out, but today he did when he dictated. “I made this out of fabric. This is a bee keeper’s hat.”

On another day, Michael showed me his Empire State Building made out of boxes and junk. He had dictated:

This is the Empire State Building. It has “m w” because that is the bathroom. “M” stands for “men” and “w” stands for “women.” This has six people in it. This is the biggest Empire State Building in the whole wide world. It has a security guard to make sure no one steals anything. This is the elevator.

In another location inside his building, he showed me the stove and said, “This is a stove you can carry around easily. It has handles for carrying. It has a cabinet that has everything you want inside it.” Two empty cinnamon jars sat on the shelf of the stove. He used the cans from a game as the bottom part of the stove. A yogurt container and an egg carton container
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with a large juice box were the top. He explained that he made it so the food comes out the top. Michael told me that he made a lower case “x” right here and he pointed to where it was on the stove.

The boxes and junk activity was an outlet for Michael to demonstrate his sophisticated thinking, which was clearly ahead of his literacy skills. The construction of objects out of boxes and junk is in and of itself, a topic worthy of study that is more comprehensive. The content of the student’s constructions is difficult to extract, but the inherent creative aspects of the activity are too blatant to ignore. Mindess (1994) related the conditions necessary to promote creativity, such as teachers acknowledging children’s contributions, children learning from mistakes, destroying and rebuilding as part of the creative process, and valuing the process as well as the product. All of these prerequisites for enhancing the creative potential of children are evidenced in the pursuit of creative constructions out of boxes and junk. The compelling question persists: Through this practice of creative behavior, what are the children learning?

The Rain Gauge

I share a description of the “Rain Gauge” construction and investigation, as a demonstration of the problem solving that is inherent to making models and representations. Two children, James and Susan, age 6, signed up during Activity Time one morning to make a rain gauge, an outgrowth of their recent trip to the Water Survey. As they constructed their instrument, according to directions that were in a book, they engaged in problem solving. First, they could not physically cut the plastic coke bottle to make the top of the instrument. James called first for his mother whom he thought might still be in the room. Then he went to find the Head Teacher who came over to the table and offered to be the cutter.

The teacher said, “All right. You need a little help cutting. Let’s see what I can do. Where do you want it cut?”

James answered, “Well, it says to cut this part off.”

Teacher remarked, “All right. So where should I cut it? I’m the cutter.”

The teacher also experienced difficulty trying to cut a plastic bottle with a small scissors so she went to get a sharp tool. The children were excited about the use of a knife and the little girl gasped when the teacher returned with it. The teacher poked a hole in the plastic bottle with the knife and then started to cut. Then she turned it back over to the children to finish cutting the top off. James proceeded to cut the top off while Susan watched. She said, “Yes!” when he mentioned to her that it was working.
Susan read the directions and picked up some marbles that were on the table to be inserted in the bottom of the bottle to hold it down. James called for the marbles and the children discussed the flatness of one marble. Susan wanted to go ahead and use the marble; James pulled it out, never satisfied with the fact that it was flat. The children went to get some tape for the top of their rain gauge. James led Susan mostly in this activity and volunteered to carry the tape over to the table and hand him the pieces.

After testing the rain gauge outside, the children discovered that they had two major problems. The first problem was that the marker lines washed off the side of the bottle during the rain. The second problem was that it didn't rain enough to come to the top of their first marked line. The teacher said, "So figure out a way that you can make the gauge where you put your lines and the numbers start a little bit lower."

After discussing these problems with the teacher outside, they brought the rain gauge inside to fix. The teacher asked them to first come up with a way to dry out their rain gauge.

Evidenced throughout the videotape and the transcriptions is the ownership that James had with his friend Susan over the construction of the rain gauge. When other children went outside to see how it worked, he wanted them to know that he and Susan were the ones who made it. When other children came over to the table where he was working, he did not stop what he was doing to join them. He persisted until the problems were solved and the rain gauge was constructed.

The children had the opportunity to correct their work and were very interested in doing so. This kind of correction does not happen in other types of instructional strategies, especially not in textbook assignments or worksheets with drill and practice activities. The motivation to bring the project to completion was internalized by this child. In other words, he was not doing it to please the teacher.

When viewing the videotaped segments of this construction, our discussion centered on what if any principles of science were they learning? What dispositions toward learning were they gaining? Would "typical" children age 6 be so engaged? How did they calibrate the instrument to measure the inches of rainfall? What is the content of the activity?

David Brown's (1996) articulation of six modes of engagement enlightened our study—exploration, engineering, pet care, procedural, performance, and fantasy. Were the children in the procedural or engineering mode throughout the construction? How do these modes reflect the level of thinking that is involved in the construction activity? How are they...
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content, processes, and products modified in this activity to meet the needs of these children? To examine the notion of differentiation and modifications, the teacher and I discussed in particular what was different about the engagement of the children in the video-tape from what other children in a first grade classroom might be doing. Some of these differences included:

1. Susan was reading the directions independently.
2. Children seemed to understand the concept that a rain gauge measures water as well as a rudimentary principle of measurement.
3. Children selected this activity from the Activity Board because of their own interest. (They were not following specific directions planned by the teacher).
4. Teachers were available to perform difficult procedural tasks. (Teachers were available to move about the room as needed).
5. Weather instruments were atypical of first grade curriculum (according to the teacher who taught in a general education kindergarten classroom for 27 years before teaching at University Primary School).

The teacher did not plan to modify the curriculum to include the making of a rain gauge. Instead, the differences in the curriculum emerged out of the opportunities and choices children had to pursue. We believed that it was not the particular abilities of the children that were different, but the kind of environment and facilitation that allowed those differences to appear. The project investigation of weather included many questions initiated by the students. They wanted to know how tornadoes and thunderstorms were formed, how weather affected animals and people, how clouds moved, what makes wind, and so forth. These questions are outlined in Table I according to the content, processes by which the questions were pursued, and the products, if any, that students completed to answer their questions. The rain gauge was one of their products, which answered the question, "What kinds of instruments do weather people use?"

The project-approach (Katz & Chard, 1994), much like Renzulli's Type III enrichment (Renzulli, 1977), engages children in first hand inquiries. Children learn to ask their own questions, take their own data, organize these data, and then find ways of representing the data to a "real" audience. Dr. Katz described a distinction among projects, units, and themes developed by the teachers. In project work "... children ask questions that guide the investigation and make decisions about the activities to be undertaken" (Katz, 1994, p. 1). Although the project approach shares methods of inquiry with other constructivist models
Table 1: Weather Investigation Analysis of Content, Processes, and Products.

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<th>CONTENT</th>
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<th>PRODUCT</th>
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<td>How does it rain</td>
<td>Field trip to Weather Survey,</td>
<td>Bird Feeder</td>
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<td></td>
<td>Interview Experts</td>
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<td>How are tornadoes and</td>
<td>Observation on Playground</td>
<td>Anemometer, Weather Vane,</td>
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<td>thunderstorms formed?</td>
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<td>Discussion and experiments with</td>
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<td>clothing</td>
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<td>“Some people want to do experiments”</td>
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<td>Making snow, making icicles,</td>
<td>Icicles</td>
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<td></td>
<td>playing with snow, observing snow</td>
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<td>What is an insulator?</td>
<td>Experiment-Who can design an</td>
<td>Insulators</td>
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<td>insulator that keeps an ice cube</td>
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<td>for the longest period?</td>
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<tr>
<td>Do clouds move?</td>
<td>Asked to guest speaker</td>
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<td>What makes wind?</td>
<td>Guest Speaker</td>
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</table>

... of teaching, it is different from problem-based learning because the teacher does not give the students ill-structured problems. Instead, many ill-structured problems arise in their pursuit of answers to their questions. Children engage in problem solving continually throughout the duration of the project investigation. Another distinguishing feature of the project-approach is that it helps children "uncover" topics, rather than being the organizing structure for teachers to design lessons and "uncover" topics.

Within their study about weather, other groups of students explored other topics. One child wanted to know how mittens keep our hands warm. The concept of insulation was discussed and the child designed an experiment in which she would determine which ice cube would melt first: one in the mitten, one on the table, or one in a sock. Another child wanted to watch the water rise and fall in a bottle thermometer. With a friend, he devised ways to make the water inside the bottle hotter and colder. The teachers played key roles as facilitators, getting materials, helping the children clarify their questions, and then when necessary, guiding them to draw conclusions from their investigations.

**Salient Features of the Data**

One striking feature of all of the data was the high level of engagement of the students in their activities. Students demonstrated a high level of task persistence because it was their ideas they were examining. According to Duckworth, "The having of wonderful ideas is what I consider the essence of intellectual development" (Duckworth, 1996, p. 1). Using the project approach, the children were able to not only learn new skills and acquire new...
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knowledge, but even more importantly, form dispositions to learning. Katz stated, "The disposition to take an experimental and problem-solving approach to activities can also be strengthened as the various parts of the project develop. Because project work focuses on learning rather than on performance, the dispositions toward effort, mastery, and challenge seeking can be developed" (Katz & Chard, 1994, p. 74).

A second feature of the data was the important role that dialogues played in children's wrestling with the new information and concepts. Children had many opportunities to express themselves verbally throughout the day. During Activity Time, they talked as they worked with their friends. The teacher held large group meetings to discuss what children did, to share products, and to give students opportunities to ask other students questions. After the sharing session, some students tried experiments that others had already completed and shared. "It is in the process of considering other children's solutions that they reach a higher level of understanding, learn more efficient procedures and/or clarify their thinking" (Anderson, 1996, p. 37). The dialogue included an emphasis on questioning and problem solving. The environment was designed to encourage scaffolding. "Children serve as effective scaffolders of one another under certain conditions. Specifically, peer interaction stimulates cognitive development when children reach intersubjectivity—that is, when they work toward common goals by merging perspectives and engaging in truly cooperative problem solving" (Berk & Winsler, 1995, p. 132). The teachers were instrumental in providing the contexts for scaffolding to occur. They also provided opportunities for children to explore their own misconceptions rather than trying to correct them. Teachers frequently arranged field trips and guest speakers to help the children clarify their concepts about the various investigations into weather, shadows, and other topics.

A third salient feature of the data was the children's tolerance for ambiguity. They genuinely were interested in designing their own experiments. They were not asking for the "right" answer. They felt empowered to arrive at their own conclusions. These dispositions toward learning and inquiry are critical as they relate to definitions of gifted behaviors, which include task persistence and creativity. In this environment, children became risk takers and tried several times to make an experiment work. If it did not work, they engaged in problem solving to try again.

Discussion — Differentiation Redefined

The emergent curriculum described above and the teachers who guided in its development cultivated a classroom culture of children who inquire, problem-solve, observe, hypothesize, theorize, reflect, design, construct, produce, and acquire new knowledge. Each student becomes a "creative producer" in this environment. All children would benefit from learning
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in such a classroom culture. This type of environment and curriculum provides the context for all children to work in their zone of proximal development (ZPD) as defined by Vygotsky (1978). He defined the ZPD as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Berk & Winsler, 1995, p. 26). Children are challenged, by definition, when they work in their ZPD. Vygotsky informs the fields of early childhood and gifted education by placing significance on the dynamic nature of that zone. He "argued against the use of standardized intelligence tests of his time because they only assessed 'static' or 'fossilized' abilities, leaving out the dynamic and ever-changing quality of human cognition" (Berk & Winsler, 1995, p. 26).

Vygotsky's work implies the importance of potential within the individual and the role that the teacher plays in developing that potential within the educational setting. Thus, I draw some conclusions about the nature of curricular differentiation in an early childhood context. The first of which is an issue of legitimacy. How legitimate is it to ask Passow's three questions (Passow, 1982): Should all students be doing this, could all students be doing this, would all students want to do this, in an early childhood program? Perhaps the criteria for differentiation should be, are all children challenged, are the students interested and intellectually engaged, and are students' strengths and talents recognized, nurtured, and developed? If the answer were "Yes" to all of those questions, the program would be suitable for all children of all abilities, including the child with the highest measures of intelligence.

The second is an issue of definition and identity. What distinguishes an early childhood gifted education program from other early childhood programs? Are there instructional strategies that define the program or do the participants define the program? Do gifted programs have to be for "gifted only?" Does gifted education have an identity without gifted children or gifted programs? If programs are differentiated, do they need to be "for gifted only?"

Recent literature in the field of gifted education refutes the notion that children need to be labeled gifted. In fact, Feldhusen stated "It is undesirable to identify some students 'gifted' and the rest as 'ungifted' (Feldhusen, 1998, p. 738). He spoke about the immorality of identifying a large majority of our young people as "ungifted" (Feldhusen, 1998, p. 736). Instead, there is a call for our schools to become places for talent development. Renzulli's vision encompasses a vision for all children, "Our vision of schools for talent development grows out of the belief that everyone has an important role to play in the improvement of society and that everyone's role can be enhanced if we provide all students with the
opportunities, resources, and encouragement to develop their talents as fully as possible" (Renzulli, 1998, p. 107).

The field of gifted education has much to infuse into the field of early childhood education. Gifted education demands a classroom culture that nurtures talents and challenges all minds. Most importantly, educators in gifted education have learned how to guide project investigations, and have demonstrated techniques to be responsive facilitators of learning, to probe, provoke, suggest, and guide students' questioning. Gifted education specialists have the tradition of teaching using methods of inquiry, project-based classrooms, and making learning real and meaningful to their students. Gifted education specialists can share with others ways to create a classroom culture of inquiry and learning, rather than enculturating students toward "schooling" (rules, conformity, authority, quiet, etc.).

Gifted education has been a dynamic field with emerging paradigms in the literature since the early 1990's. Cohen (1996) identified three distinct paradigm shifts from the 1) Recognizing gifted children as a group (characterized by a focus that selected and labeled children by (IQ), to 2) gifted education modeled after special education focusing on the children's needs and services, to 3) a focus on the potential for excellence where many and varied talents are nurtured and recognized through multiple approaches.

With this third paradigm in mind, I propose that an emergent curriculum in an early childhood program can serve as an exemplar of differentiated instruction in which multiple approaches are used on a daily basis to maximize the potential of every child. When children pursue project-investigations, or create meaningful (to them!) constructions out of junk, they make decisions about their own learning, have opportunities to pursue their own interests and take turns posing questions, doing field work, collecting and organizing their data, and sharing their findings with their peers. Early childhood gifted education can be defined by pedagogy and not by labeling the participants. Educators sharing this pedagogy can lead reform movements in both fields of early childhood and gifted education by modeling children's engagement in thinking in a way that builds upon their existing knowledge and challenges them to the next level of learning. Gifted education need not be defined by labeling children and by predetermining the types of opportunities that may be appropriate for some children and not others. Instead, gifted education in an early childhood context can be defined by the way it nurtures the love of learning and develops talents in all students.
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Creative Instructional Strategies  
for Young Gifted Students  
Joan Smutney  
National-Louis University

Creativity has always held a prominent place in early childhood education. Research on child development and cognition has provided a great deal of information on how young children learn. During the toddler years, exploration is the primary means for discovery and learning; they finger, touch, taste, and shape whatever they can get their hands on. This explorative behavior gradually extends to testing and experimenting with materials at hand to understand how they work and what can be done with them. As higher level thinking advances even further, young primary students engage in constructive behavior, where they create and improvise with these materials to invent things from their own imagination (Belgrad 1998, pg. 373).

It is the constructive behavior of young children that has become the foundation of many preschool and kindergarten programs throughout the United States (Cohen & Jipson 1998). This constructivist model is not merely an accommodation to young children's learning styles, but an attempt to "foster structural change in children's reasoning" (Cohen & Jipson 1998, pg. 406). In other words, it is not enough that students engage themselves in activities that stimulate and interest them; cognitive growth should result from these activities and extend children's critical and creative thinking to new levels (see also Clark 1997, pg. 104). Even in first, second, and third grade, many teachers incorporate activities that enable their students to interact with creative learning environments and construct knowledge through invention and experimentation.

In order for teachers of young children to design these activities, they need to know where the students are developmentally and how to shape a curriculum that enables them to extend their conceptual understanding of the subjects at hand. Teachers play a key role here, not merely exposing children to the materials that will help them grasp new concepts, but anticipating their learning needs, and guiding and supporting the process of thinking, experimenting, creating, testing, comprehending, analyzing, and synthesizing. Vygotsky believed that instruction should lead development, rather than simply provide contexts that may stimulate it (1962).
Creative Instructional Strategies

Creative Teaching and "Developmentally Appropriate" Curriculum

The constructivist model accommodates gifted children well as long as teachers are aware of the fundamental developmental differences that occur in high ability students. The practice of delivering developmentally appropriate curriculum can become problematic when gifted children are involved. A child who is reading before she reaches kindergarten or who demonstrates a highly imaginative talent will become stifled in a classroom where the teacher decides a student of five should not be reading or undertaking tasks that exceed the norm for her age. As Morelock and Morrison point out, while the position statement of the National Association for the Education of Young Children (NAEYC) acknowledges the need to tailor instruction to individual needs, it still adheres strongly to age-based expectations as a guide for curriculum planning (1999).

In addition, young gifted students can baffle some teachers because of their asynchronous development—expressing extraordinary sophistication in reading and writing and art production, for example, while still struggling with fine motor skills and exhibiting emotions more typical of their age. All young children exhibit uneven patterns of development, but with gifted students, these patterns can be even more extreme, causing professionals and parents to question their abilities (Meininger 1998, pg. 493). Teachers may wonder how they can meet the educational needs of a first grade student who can read at the sixth grade level but cannot express what he reads. Does he understand what he reads, or is his language skill temporarily lagging behind his advanced reading ability? For this reason, Barbara Clark emphasizes the importance of a "responsive environment" that adjusts to individual differences and patterns of growth (1997, pg. 132).

Creative teaching strategies can adjust an early childhood curriculum to the advanced and asynchronous development of young gifted students. By providing more options for activities, as well as greater challenges for advanced thinking and application, teachers can differentiate instruction for children with a variety of strengths and talents. In addition, they can design projects that not only enable children to use their gifts, but strengthen the areas where they are weak. Creativity helps redress the imbalances gifted children feel in their performance by integrating media and thinking processes in unique and stimulating ways.

In this respect, Gardner's research on multiple intelligences has provided a wide range of possibilities for developing young children in a variety of talent areas (Gardner, 1993). By using such different media as drama, art, storytelling, creative movement, imaginative writing, maps, diagrams, simulations, computers, and independent research, educators...
create experiential, integrated learning activities that can meet more of their students' educational needs. The interaction of these different media and disciplines promotes complex thinking and problem solving. (Hollingsworth 1998, pg. 442).

Creative instructional strategies do more than provide diverting options for bored students. Creativity is a higher order intellectual process (McCallister & Nash 1998, pg. 505). It often involves many of Bloom's higher order thinking categories with the added dimensions of innovation, invention, and originality. Creativity can become the channel for highly advanced and complex critical thinking and research, leading children to make discoveries they might not make through conventional means. Even more important, from the point of view of early childhood education, is the fact that creative instruction impels young children to become active, innovative participants and even contributors to the subjects they are studying (Smutny, Walker & Meckstroth 1997, pg. 57).

Creative teaching must also include structure and guidance for young gifted students, who need more involvement from the teacher than to simply be “turned loose” in a learning situation. In this respect, the constructivist early childhood model serves them better than the more open-ended models, where the goal is to “motivate, rather than elicit cognitive change” (Cohen & Jipson 1998, pg. 408). Even in a creative context, steps and sequences help gifted children formulate unique ideas and then develop them into original projects of their own choice. There are moments when the right kind of guidance on how to approach a particular problem will challenge them to extend their thinking in new directions. Without any tangible structure for support, many creative ideas fall by the wayside because the children feel uncertain about how to proceed; even highly creative students may abandon a promising idea. As teachers become more familiar with the children's strengths and abilities, they will know the kinds of activities and materials best suited to the subjects at hand and can improvise with their own input in the process. Ultimately, gifted students need teachers who can be flexible in their roles—at times, allowing the children to explore a process without any tangible goals and at other times, guiding their work more actively toward specific ends. The advice of an art educator provides some insight into the teacher's unique role:
Creative Instructional Strategies

(The Job of a Traveling Teacher)
By Marji Purcell Gates

Take a deep breath.
Dramatic entrance; intriguing tools.
Unfurl exemplary creative expression.
Examine its power.
Teach technique.
Tell true stories.
Engage imagination.
Bestow possibilities.
Protect incubation and reflection.
Respect evidence of flow.
Reward striving.
Steady each stumble.
Encourage, nourish, and reinforce.
(Learn to whisper, "Yes.") Bestow more possibilities.
Return to earth.
Clear debris.
Step back.
Promise more.
Tiptoe out.


Creative Instructional Strategies for the Regular Primary Classroom*

Because of shrinking funds at the federal and state levels, the need for adjusting primary school curricula for gifted children has become more critical. This need has inspired an exploration of practical instructional methods that will develop the gifts and talents of high-ability children and all children (e.g., Winebrenner, 1992; Smutny, Walker & Meckstroth, 1997). Educators are focusing on areas in the curriculum where they can design creative options for gifted students. In early childhood and primary classrooms, where creativity and experiential learning already play a major role in the curriculum, these options will only enrich and expand the program students currently follow.

The Learning Environment

In order for young gifted children to create, the environment has to challenge them—stimulate their interests and imagination (Clark, 1997).

Gifted children respond well to learning centers (reading, writing, art, science, math, etc.), especially when they are accompanied by vivid posters, displays, multimedia technology, plants, animals, and flexible seating arrangements, including some private areas for quiet study (Vydra & Leimbach 1998, pg. 465). In examining their classrooms, primary school educators could ask:

Is this a child-friendly classroom?

How are the seats arranged?

Does the room have learning centers that reflect Gardner’s intelligences?

How are materials displayed (e.g., do you have a wide range of books reflecting different reading levels?)

Are there colorful posters that incorporate the themes the class is exploring?

Are there plenty of hands-on materials that will enable students to examine a subject from multiple viewpoints?

Do children have opportunities for creative movement, mime, dances, singing, and dramas?

Teachers also generate environments by the way they organize the curriculum and respond to learning styles.

A child-friendly classroom is one where students feel encouraged to explore in the way they learn best—through auditory, visual, or kinesthetic means. This means that there are plenty of hands-on activities for tactile-kinesthetic learners who understand by doing; pictures, paintings, photos, charts, diagrams and computer software for visual learners who think analytically by viewing images; discussions, reading aloud, audiotapes, musical recordings and lectures for auditory learners who acquire knowledge through listening and speaking. Teaching to their learning styles will benefit more high-ability students in a variety of talent areas. It will also accommodate underserved gifted populations—children who, for reasons of culture or economic disadvantage, for example, may manifest giftedness in unique ways.
Creative Instructional Strategies

Compacting for Gifted Learners

Compacting allows high-ability students to engage in creative and divergent activities by skipping content where they have already demonstrated mastery. Using portfolios of gifted children's work, observing their preferred learning styles and strengths, testing their abilities, and discussing their interests, teachers acquire considerable information on the kinds of alternative activities that these students can undertake. This should not be busy work, but projects that extend their learning in new directions (e.g., exploring a concept through other disciplines and media; devising a course of individual study in an area of particular interest to the student; collaborating with other children in a multi-faceted, multi-media endeavor). An imaginative child who loves to read, for example, may enjoy exploring a story from another point of view than the one presented in the book. For successful compacting, teachers need to create simple contracts that outline: what the students wish to learn; what they plan to do; when they will complete their projects. A line each for the children's, parent's and teacher's signatures reinforces the arrangement and keeps all parties informed.

Flexible Group Work

Sensitive teachers also help gifted students work with other children by orchestrating a variety of learning situations—working in pairs, ability groups, interest groups, task groups, or independently. This flexibility gives children different kinds of experiences working with others, but also adjusts the arrangement to the requirements of the curriculum and the individual learning needs of students. In a reading lesson, the teacher may choose to break the class up into groups and assign different tasks—one group may work on letter recognition, another on combining letters to make new words, and a third on writing stories (Smutny, Walker & Meckstroth 1997, pg. 44). There may also be a few highly advanced children who could read independently.

Even though tiered groups such as the above are arranged by level of mastery in a subject, the focus remains on the tasks at hand, and because of this, the children do not feel identified by the groups they join (there is always the possibility of mobility; once a child demonstrates mastery of specific content, he/she can advance to more challenging material). In another class, the teacher may have children who have completed a particular assignment form groups according to mutual interests. With the teacher, the group could brainstorm alternative, creative activities. For example, if several students want to pursue the study of elephants, they could undertake any number of projects to extend their knowledge: read a book about and view pictures of them and then compose a free-verse poem; write or tell a story about an elephant who visited the city and the problems he encountered finding food and shelter; act out the story; see the video, How the Elephant Got His Trunk, and then make up a different myth about the elephant's trunk.
Creative Processes in the Curriculum

One of the best ways to meet the needs of young gifted students in the regular classroom is to integrate creative, imaginative processes into the curriculum. The genius of creativity in the classroom is that all students can participate simultaneously and at their own level. For gifted students, creative contexts for learning stimulate their cognitive growth in significant ways and provide the challenge so many of them miss in more linear, unidirectional tasks. A taxonomy of imaginative thinking (using the study of a fairytale as an example) will provide a practical guide for incorporating creative processes into the curriculum.

These categories are flexible, allowing teachers to apply those that best suit their curriculum and the classroom activities of the day.

Using the Imagination

Imagination comes naturally to young children. It not only appeals to their sense of whimsy and play, but imagination is the medium through which they first begin to explore and understand the world. Used in the classroom, an imaginative activity allows children of all ability levels to move to more advanced thinking. It stimulates curiosity, research, and critical thinking, and enables children to interact with information as a source with which to create (rather than just absorb). Whether the class is studying animals, trees, reading stories, learning

**Taxonomy of Imaginative Thinking**

<table>
<thead>
<tr>
<th>Category</th>
<th>Focus</th>
<th>Process</th>
<th>Example</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative Response</td>
<td>Free response to catalysts</td>
<td>Exposure to stories, art, science, film, math, etc.</td>
<td>Children listen to or read a fairy tale; explore other media</td>
<td>Awareness and expression of creative ideas</td>
</tr>
<tr>
<td>Creative Divergence</td>
<td>Imagined variations of existing creations of phenomena</td>
<td>Changes to stories through imagination or creative use of math, science, art</td>
<td>Children create an alternative ending or add another ending to the existing one</td>
<td>Creative adaptations of existing works</td>
</tr>
<tr>
<td>Creative Exploration</td>
<td>Discovery of many dimensions to an idea or phenomenon</td>
<td>Development of an idea in depth through structured imaginative activities</td>
<td>Children consider aspects of tale in new ways; experiment with meaning, explore plot to reimagine what might happen</td>
<td>Interpretive expression through variety of media</td>
</tr>
<tr>
<td>Creative Composition</td>
<td>Novel invention</td>
<td>Creation of unique images and perspectives</td>
<td>Based on fairytale, children create a dramatization, science experiment, math problem, music production, etc. to illustrate original view or perspective</td>
<td>Original composition (poems, stories, art; pieces, science, or math project, computer design, drama or dance production)</td>
</tr>
</tbody>
</table>

geography, or exploring number concepts; teachers can exploit the imaginative potential of their students and transform their perceptions of a topic or subject.

An approach used successfully by many teachers is an imaginary "what if?" process that can apply to almost any subject area. Children place themselves in the position of a tree, an animal, an element, a phenomenon, a historical figure and gather information from the standpoint of the object or subject of their study. The children gain a new motivation for learning facts—the transformation of knowledge into the creation of an original work. The desire to contribute to knowledge by creating (a story, painting, dramatization, construction, etc.) inspires them to search and investigate information from new points of view. Translating this information into creative projects adds dimension to a study and expands critical thinking. A child imagining herself as a chameleon, for example, might invent a story about how she camouflages herself in the woods and in the process explore new details—on how she eats, finds shelter, communicates with other chameleons—in order to add complexity to her tale.

The process of identifying with someone in history or literature is also a potent teaching tool. Actors have long understood how playing a dramatic role can transform one's understanding of historical events or human dilemmas in ways that reading a book or hearing a lecture can not. Tapping this imaginative source for young children can have the same effect (especially for the gifted), stimulating more advanced levels of comprehending, comparing, analyzing, and synthesizing. It encourages more flexibility in critical thinking by raising issues and questions that might ordinarily remain in the background (e.g., investigating the Pilgrim experience from the point of view of a Native American or a Pilgrim grandfather who risked the trip across the ocean to stay with his family)—to make mental leaps, hypothesize about living conditions, dangers, and survival issues that influenced decisions and actions in the colony.

Providing Creative Catalysts
In order for children to engage in an imaginative process like this, they need a wide range of materials and sources. Most stimulating for imaginative young gifted children, are those that involve a variety of media (books, magazines, posters of pictures and paintings, videos, audiotapes, art materials, building materials, computer software, etc.). Students need time to explore their subjects creatively, moving freely between books, diagrams, paintings, cartoons, stories, and videos to construct different perspectives on their subject. A kindergarten child pretending to be a tree may use creative movement and dramas in response to Thomas Locker's paintings (1995). A second grade child who enjoys science could explore the process of photosynthesis and the relationship between trees and animal
life, and then represent what she has learned in painting. A first grade child interested in
math may create a series of drawings about the adventures of a character who is an addition
symbol, drawing on games, stories, pictures, and magazines as sources.

Creative catalysts are essential as stimuli to cognitive growth. Students need a repertoire of
images with which they can improvise and explore their ideas. If a first grader, for example,
tries to represent what he has learned about humpback whales through drawing,
painting, or storytelling, he will automatically seek to re-define what he knows and
investigate more information to broaden his understanding. Viewing his subject through
sketches, stories, or imaginary dramatic scenes raises issues and questions that he may not
have thought of before. Integrating media and disciplines promotes analytical and
comparative thinking while also enabling students to exploit newly synthesized
information for creative projects that interest them. If the class has project centers with
materials that include a range of learning styles, the children can gather their ideas from
different sources and broaden their experience of subjects that interest them.

Encouraging Creative Responses
One of the most effective strategies for advancing students through the creative process is
the art of questioning. A teacher may present queries that demand specific, factual
information, but he will also need to include a series of other, more open-ended questions
designed to stimulate original, even inventive responses. If the class is studying a unit on
trees, for example, the teacher could encourage students to assume the identity of any tree
of their choice and could include some of the following questions (Smutny, Walker &
Meckstroth 1997, pgs. 10-112):

Factual
Where do you live?
What kind of bark do you have? What do your leaves look like? How tall are you?
What kinds of animals live around you? Inside you/in your branches? Who crawls or hops around
in your branches?
How do you make food for yourself?

Interpretive/open-ended
Look down at the ground. See how far down your trunk goes. How do your roots feel? How deep
are they? Feel the rain. Feel your roots soaking in the water. Can you feel the water seeping up
into your trunk?
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Stretch up to the sky, as high as you can. Look up at the sun. Feel your leaves taking in the sun for you, taking in the energy and the carbon dioxide. What does this feel like? Like breathing? Like taking a shower?
Feel the sun, the carbon dioxide, and the moisture in the earth combining to make sugars for food. Can you taste these sugars?
How does the air feel around your branches and leaves? Is it warm? How long are the days now?
What changes do you feel happening (here children could focus on the breakdown of green chlorophyll, allowing other pigments to become more visible).
How long have you lived? What are some of the changes you have seen around you?
What does the world look like to you?

Exploring Creative Activities

With an environment full of stimulating catalysts, as well as a series of questions from the teacher to stimulate imaginative work, children are free to create. A rich array of possibilities exists, depending on the subject at hand, the sources available, and the time teachers can allow for divergent activities. The importance of mixing media and disciplines cannot be overstressed. Children gain unique perspectives and insights when they explore an interest across subject areas or attempt to represent, for example, a mathematical concept in a story, a drawing, or a dramatization. Some examples are:

- Expressing the concept of addition in a cartoon or dramatization
- Telling or writing a fairytale that revolves around fractions
- Writing a free verse poem based on the life of a tree
- Creating an entire building or object out of one geometric shape, using math and art
- Exploring the process of photosynthesis that combines poetry, painting, and science
- Re-creating the life of one day of an animal based on science stories and/or art

Making Links to Critical Thinking

Allowing students, particularly young gifted students, to play imaginatively with a subject naturally leads to more advanced critical thinking. However, the teacher may need to help them make this link, at least initially. To use the example of trees, the teacher could begin by focusing the students' attention on what trees need to survive. After discussing the basic science of trees and acquainting themselves with the various terms and life processes, the children can select a particular area that interests them. Some students may express an interest in how trees feed themselves; others may prefer to focus on the function and variety of leaves from one tree species to the next. The teacher could ask students to choose one or two science facts and invent a tale, myth, or an imaginary conversation (between trees) in the woods that involves those facts. For example, one child may decide to explore the whole
relationship between the soil and the tree's roots and perhaps write a myth about how trees once walked the earth like people and then discovered they could feed themselves by planting their roots in the earth. A gifted child would relish discovering all the different ways that trees gain nourishment and then weave them into a story or myth. In most cases, an interactive relationship develops between the creative process of inventing stories and the scientific process that uncovers new aspects of arboreal life forms in order to embellish and elaborate these stories.

This kind of inquiry is a marvelous opportunity for discussion. Together, the teacher and students can decide where they can bend the facts and where not, how their knowledge about a tree's life can enrich their story and where they need to venture beyond that knowledge. In a sense, the children are inventing science fiction and discovering the tenuous areas where fiction and science meet and where they diverge. The class could decide that they can give trees personality, memory, even speech, but that they will not diverge from the laws of science that rule the trees' physical life. With the parameters set, the children could then consider new questions. How is a tree like a person? How are branches like arms? How are leaves like clothes? What would tree language be like? Can you imagine a whole forest of trees discussing the humans who have moved into their neighborhood? Can you imagine a story where trees express courage, kindness, anger, or hope? Can you think of a story about a tree that laughs a lot?

Young gifted children thrive in contexts where creative and critical thinking impinge on each other and lead them to more advanced applications of their ideas. Students who are more creatively than academically talented particularly enjoy integration, because it gives them new directions for their imaginative work. Without the freedom or encouragement to "play" and experiment with knowledge—whether it be a science process, a math problem, a period of history, or a reading assignment—gifted students feel constricted within limits that do not allow them to explore and expand.

Imaginative representations of knowledge provide new critical perspectives, give students an awareness of subtle distinctions and nuances they might overlook if they had just memorized the facts, and make knowledge less inert, less affected by the addition of new perspectives. When children imagine themselves as either Pilgrims or Native Americans during the early Pilgrim settlement period, when they draw maps of their own villages and home areas, write or tell stories, write journal entries of daily life, compose poems or songs, construct models, or paint portraits of family members, they do far more than enrich their study. These activities stimulate continuous research and critical thinking as the children have to check facts against their own impressions, re-conceptualize their stories to fit new information, and gain new perspectives based on their identification with a particular
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community. By placing themselves in another time—an activity most young students enjoy—they begin to perceive the vital importance of point of view in relation to history. Gifted children enjoy this kind of mind-stretching challenge—to think, not simply of the facts they know, but how a particular person in a particular society would see and understand the events of her/his time.

Language arts subjects are especially well suited to imaginative work and can go far in teaching children about such basic topics as the elements of narrative. At the same time, it permits gifted students who may already be avid readers and well versed in these elements, to explore them at more advanced levels. A common critical and creative thinking strategy is "fractured fairytales" (which can be easily extended to any story or book). The main question talented language arts students have to consider is: How can I change this story and still make it a workable tale (i.e., still maintain the suspense, the characterization, the climax, and the conclusion that made it a powerful narrative in its original)? Examples of published fractured fairytales would set the stage nicely here and provide students with some ideas on how they can diverge from traditional stories (e.g., Ernst, 1995; Gwynne, 1990; Scieszka, 1989). In addition, other cultures have told similar fairytales, such as Cinderella, that teachers can use to stimulate original ideas about stories they know well (e.g., Cimo, 1989; Martin, 1992).

Involving students in creating alternate narratives from stories they either know or read can prompt some fruitful discussion and problem solving. Using published fractured fairytales as examples; the class can critically examine the importance of different story elements. What happens when you change the nature of the characters? If the big bad wolf is no longer bad or no longer big, how does that change the tale? How does it affect plot, conflict, and suspense? Plot is another topic for exploration. How are characters/suspense/conflict affected when you make even a simple change to a story's plot? This kind of creative process covers a great deal of ground for all the students in a class, and will enable gifted writers to manipulate the dramatic elements of a story with far more mastery than before. This is an activity where teachers can easily coach gifted language arts students, encouraging them to consider new and more complex dimensions to their work, while also advancing the whole class in a deeper understanding of narrative structure.

Using Assessment Creatively

Young children find it difficult to sustain their interest in a project long enough to assess what they have done. Gifted students typically have longer attention spans; yet, once they have finished an activity, they too can be impatient to move on to something else. They lack the life experience to know how valuable assessment can be to developing their ideas. Evaluating their work to see what adjustments might be necessary, or what further
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developments might improve it, will present new challenges. All the students will benefit from opportunities to look at their projects from different angles, and explore new directions for their ideas.

How far a class of young children can undertake this process depends on the kinds of projects they have done and the time available. Some students may have gone as far as they can with an idea and may want to investigate another, related concept in a different medium. The point of assessment is not to force children to make critical adjustments to their projects, but to give them the freedom to go farther if they can or to expand their thoughts in completely new directions as a way of furthering their research and interests. Some questions teachers might ask include:

- What do you like about your idea? What works?
- What is missing? Can you see what does not work?
- What do you want your idea to be?
- What do you need in order to make the changes that you want? What materials?
- Who might be able to help you?
- Imagine solutions to your problem (or your idea for expansion), however outrageous.

Keeping gifted children focused on the project and what is important to them will keep them from becoming distracted or overly concerned about how “good” their project looks or what other people think.

Whether or not the children change their projects is less important than the fact that they have an opportunity to identify where the problems are and what new options exist for them to learn and develop their ideas further. For gifted students, this is vitally important because many of them give up on their most innovative concepts out of frustration, harsh self-criticism, and impatience. They need a chance to reflect on what they have done and consider modifications for their ideas in an open, non-pressured environment. Gaining early experience in assessing their work constructively and experimenting with new possibilities and perspectives will diminish the detrimental effects of perfectionism and make them feel freer about what they can do with their most creative inspirations.
Providing Opportunities to Share

Most children love talking about their ideas, especially their creative ones. It validates their worth as originators and makes them feel that they have something special to contribute. To provide the most learning from this experience, teachers need to offer a variety of options for the children to share. They could even have the students brainstorm on the different ways they could demonstrate their learning. Here are some (Smutny, Walker & Meckstroth 1997, pgs. 94-95):

- Teacher regularly displays pictures, poems, stories, and other works created by students.
- The class invites young or older children into their room to see their works.
- Different groups who have collaborated on activities present to the rest of the class or to another class at the same grade level.
- Teacher creates opportunities for the performers in the class to present Chamber Theater pieces, songs, dances, poems, and stories for others in the school.
- The class invites parents to visit and see their projects and productions.
- Students whose projects fall under particular themes, collaborate on how they could integrate their presentations.
- Teacher starts a newsletter where students can report on their accomplishments and/or write original stories, poems, etc.
- Teacher makes a video of the children's work to show at an open house or other appropriate school-wide event.

Since all children and particularly gifted children tend to judge themselves harshly, teachers need to play an active role in guiding the class to share and evaluate their own and each other's work constructively. By setting a couple of ground rules, the teacher can encourage maximum participation and keep the process moving. Here are a couple of useful ones (Smutny, Walker & Meckstroth 1997, pg. 73):

- Offer helpful ideas. Students should understand that negative comments are not permitted, that they should share only what they think would improve the idea or how they think the idea could be extended. What worked? What did not?
- Don't judge or criticize. Students should know how to state problems with a fellow student's idea. For example, they can say, "I think it would be good if..." or "The problem I see is...", but not, "This is stupid" or "I don't like this."

For young gifted students, sharing activities can make a significant difference in the way they view themselves as well as how they interact with others in the class. In some cases, the display of children's talents and strengths will reveal students who have acquired...
considerable skill and expertise. Gifted students with particularly strong interests in an area could become resident experts in the class and assume new roles where they can benefit other classmates without feeling like geeks or oddballs.

Sharing is a powerful instructional strategy, especially when teachers explore different, creative options for the process. From the children's perspective, it is practically revolutionary for them to be in a position where they are the experts, leading the class through their own discoveries and ideas. For gifted students who often fear what others will say or think it can be extremely beneficial to find that the class likes their ideas and that fellow students can be a valuable resource for developing them further.

Sharing is not about deciding whether a child's creation is good or bad, right or wrong. It's about continuing the discovery process—helping each child investigate what other directions are open for research and exploration. Investigating student work together as a class provides many opportunities for teachers to support creative learning, using the children's own products as a catalyst to higher-level thinking. This kind of class environment will teach all children that learning is an adventure, that everyone has a role to play in the process, and that each of them has a unique contribution to make to the world around them.

References


Creative Instructional Strategies


Books for Young Readers.


Creative Instructional Strategies


Experiences during a child’s early years profoundly affect later years. Some children bring to kindergarten a wealth of experiences from family and preschool interactions. Other children bring to kindergarten a background of more limited experiences with language and the world around them. Sometimes educators quickly make decisions about a child’s ability based on what they initially see and what school traditionally looks for, and some talents and strengths of students are overlooked. Children are naturally curious and eager to learn. Both parents and educators must build on that innate desire and maximize positive, effective experiences.

Robert Sternberg has said, “Creativity is an attitude toward life. Young children naturally display creativity. Creativity is often difficult to find in older children and adults because it has been suppressed by systems that encourage intellectual conformity” (Sternberg, 1996, p. 191). Creative talent needs to be identified and nurtured in order to grow. Nurturing and identifying creative talent provides some children the opportunity to experience success in a setting where they might struggle with regular academic tasks.

Over one thousand students in kindergarten through second grade in the Lindbergh School District in St. Louis, Missouri, regularly participate in Project Starfish, a gifted pilot program funded by the Missouri Department of Elementary and Secondary Education. Creative problem solving lessons are taught in whole class settings to all students in kindergarten through second grade by a teacher certified in gifted education. The classroom teacher remains with the class to participate and observe her students during these lessons.

The goals of Project Starfish are: to provide appropriate programming to foster creative and intellectual development through enrichment opportunities; to gather information to identify students with strengths in the area of creativity; and to facilitate professional opportunities in identifying creatively talented children.
The Composition of Project Starfish Lessons

Each Project Starfish lesson is composed of a brainstorming circle where everyone contributes an idea for a specific topic, an activity time where individuals or small groups of students try to accomplish a task, and a sharing time for everyone to acknowledge the variety of ideas that the class has produced. Following each lesson, a conference between the Project Starfish teacher and the classroom teacher is held.

Topics for the brainstorming circle are concrete in nature at the beginning of the year and become more abstract and open-ended as the year progresses. Topics range from “things found in a classroom” in kindergarten to “things with a beginning and end” for intermediate students. Every topic that is used has enough different responses so that each child in a class can be successful in thinking of an original response.

The routine for the brainstorming activity remains the same in all grade levels. Students and teachers sit in a large circle on the floor, enabling everyone to see one another and to hear each person’s response. The teacher allows time for everyone to think after announcing the brainstorming topic. Everyone is encouraged to think of many ideas for the topic because all ideas shared in the circle must be different.

Once sharing time begins, the participants may only talk when their turn comes. If someone can’t think of an idea during his or her turn, that person can pass and ask to have more thinking time. The teacher reassures each person who passes that they will think of an idea because everyone has ideas and we never run out of ideas. Allowing more time and relieving any pressure the person might be experiencing sets the expectations that everyone participates and succeeds.

Activities begin with 2-dimensional paper and crayon projects, proceed to 3-dimensional projects, and end with abstract creative problem solving during the school year. Young children are primarily concrete thinkers and are comfortable using familiar materials such as drawing paper and crayons. These initial lessons use paper and crayons and encourage children to stretch their thinking by drawing different things using the same shape, such as a circle, or to changing a squiggle into something familiar. This allows the children to keep one foot firmly rooted in the familiar, the materials, and step with the other foot into the world of creativity. Changing only one variable or element in a familiar process at a time supports a child in his or her risk-taking.

Further lessons move from two-dimensional activities on paper to using three-dimensional materials such as creating with a piece of paper and a section of cardboard tube.
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Children are always encouraged to move past their first idea to other ideas because their unique ideas come after some initial thinking has been done. The process of creating allows children to move from common ideas to uncommon ideas as they continue to work with the materials. They experiment with changing the shape of the materials as well as looking for alternative ways to attach the materials together.

As Starfish activity time continues, hands-on creative problem solving is a natural progression from the three dimensional projects. The creative problem solving model that is used in Project Starfish follows the five-step plan of fact finding, problem finding, idea finding, solution finding, and acceptance finding that was formulated by Alex Osborn (1963) and refined by Sidney Parnes (1966), E. Paul Torrance (1969), Donald Treffinger (1992), and others. These steps guide the creative process, incorporating divergent and convergent thinking.

In one creative problem solving lesson, students are given a piece of paper and a short strip of tape to create a holder for a weighted bucket. Initially, students make large paper links. After testing and revising their design, students realize that a small, tight design is more successful than a long, open design. Students use creative and critical thinking, analysis, and evaluation in this creative problem solving process.

Four Aspects of Creativity

Four aspects of the creative process became important in developing these lessons: the qualities of the student; the stages of the process; the dimensions of the environment, and the characteristics of the product. First, creativity involves the qualities of the student. This includes a student's natural inclination to think "out of the box," and the abstract and spatial abilities which are innate to him or her. Second, the stages of the creative process were considered. Creativity can flourish by beginning with the familiar and moving to the unusual. Using common items in uncommon ways stretches a person's ability to think of ideas that are fluent, flexible, original, and elaborate. Third, the dimensions of the environment are the scaffolds which supports the qualities of the student and the stages of the process. An environment that nurtures and encourages creativity allows creative talent to blossom. Creativity thrives in settings where ideas are things with which to have fun, with which to play, and which constantly can be changed. Frequently, silly ideas, when adapted, become useful ideas. The fourth aspect of creativity involves the characteristics of the products of creative thinking. The usefulness and practicality of the outcome of creative thinking distinguishes creative products or solutions from other products or solutions. Creative talent emerges from an integration of natural aptitude and an environment rich in experiences.
Csikszentmihalyi (1996) cites several elements instrumental in the creative process. It is important that there are clear goals related to the task or problem. Also, immediate feedback to one's actions guides the revision process. A balance must occur between the challenge of the task and the skills of the child. He notes intrinsic concentration is focused on the problem. The child is not worried about failure at the task, nor self-consciousness during the task. There is no sense of time when the child is involved in the task.

**Results**

There is visible evidence of the effects of this project with both students and their teachers. There are several areas where the effects on students are visible. Starfish lessons allow students to become fluent by thinking of many ideas, flexible by stretching and adapting existing ideas, original when finding that unique idea, and elaborate in embellishing an idea.

When brainstorming, students can think of multiple responses to a suggested idea and they are able to think more abstractly. While doing activities, they are able to consider many ways to accomplish a task. After participating in Project Starfish for a year, one classroom teacher concluded, “In Project Starfish, kids are being taught a thinking process which can transfer to other settings.” Once she reached this conclusion, she was able to support this thinking process even more in her classroom, promoting even more growth in her students’ deductive reasoning skills.

The children’s self-concept also shows improvement, especially for those whose self-esteem is fragile. Over the course of the first few lessons, it is amazing to see hesitant children change from wearing a frightened expression and barely speaking to sitting up straight, eagerly waiting for their turn to share an idea, and beaming with a broad smile on their face. They move from being a distant, reluctant participants to children who eagerly anticipate Starfish lessons. One Project Starfish student shared, “Ever since we’ve been doing Starfish, I feel good about myself, and now I know how to use my imagination. When I grow up, I’m going to be a teacher, and I will teach my students how to use ideas.”

Project Starfish students learn to value ideas, both their own and those of others. They develop the skill of evaluating ideas and this allows them to use those ideas which best help them complete a task. Beginning creative problem solving activities are done with a partner. Each child learns to take risks in thinking and experimenting in a supportive environment. Each child stretches his ideas as he works with a partner by piggybacking ideas off each other, experimenting, and cooperatively evaluating them. A Project Starfish student shared, “The problem solving is hard, but it makes me think. But best of all, it makes me feel good!”

Students become comfortable taking risks with ideas. Starfish lessons are a safe time to stretch one’s ideas in an accepting atmosphere where there can be more than one right
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solution. If a first solution doesn’t satisfy a student, he knows he has additional ideas that can be used. Students learn to focus on the task, relax and continue thinking, and know that ideas will come to them. As children become comfortable that they have plenty of ideas and their ideas can be original and elaborate, they anticipate Starfish lessons as a time to play with ideas. As the year’s lessons progress, the students respond to brainstorming topics faster and faster, often allowing time to give everyone a second turn. A student concluded, “When you’re with Starfish, time flies!”

However, it is not only the children who are changing as a result of Starfish lessons. Teachers also are changing. During Starfish lessons, the teachers participate and observe the children in the brainstorming circle, the activity time, and the sharing time. The classroom teachers find it valuable to observe their students in a teaching situation with another teacher in charge on a regular basis. This gives them the opportunity to really watch the student to teacher, and student to student interaction, which results in a better understanding of the children. The teachers begin to see creative talents in their students that they had not seen or looked for before. A classroom teacher says, “Project Starfish allows teachers to see children in a different light.” The recognition of these talents in Starfish lessons prompts the teachers to share that information with parents at conference time and to include it in the comment section of the report card. Parents are specifically inquiring about their children’s progress in Project Starfish. Children talk about the ideas and activities they did in Project Starfish with their parents. The importance of Project Starfish became apparent when a classroom teacher reported that one autistic kindergartner in her class only talks about school with his parents on Project Starfish days.

The teachers value the opportunity to discuss their students with Starfish teachers on a regular basis. During each lesson, the Starfish teacher and/or her assistant complete script sheets detailing each student’s responses to the brainstorming and activity sections. During the conference with the classroom teacher following each lesson, these notes aid the teachers in discussing lessons, students, and student responses. These notes highlight talent and growth in students.

The conference allows time for the characteristics of creativity and giftedness in students to be discussed. It also provides the opportunity to discuss ways to intentionally use the stages of creativity and creative problem solving in many areas of the curriculum. Brainstorming ideas for parallel lessons occurs. Following a Starfish lesson, a classroom teacher was so excited about the activity and the students’ responses that she wanted to extend the lesson and do it again. She began by thinking “in the box” as she wondered whether the lesson would fit best into reading, science or math. As she brainstormed ideas, it was evident that
her ideas could fit into any or all of those areas and more. She was delighted that so many ideas could be generated once she began thinking. Other teachers have commented, "I'll have to think how I can incorporate more of this," and "Who's supposed to get more out of this, the students or me?" After teachers pattern extensions from lessons they have observed in Project Starfish, they gain confidence in creating more lessons that incorporate divergent thinking. They feel comfortable in asking for extensions of curriculum that better integrate creative thinking directly into curricular content.

Because of these needs, supplemental materials have been developed which teachers borrow as needed. Brain-storming charts, student-made tangram job cards, books authored and illustrated by students, and other displays of creativity are visible in the classrooms. With guidance, many teachers are curriculum compacting, allowing more time for students to explore subjects in which they are interested. One teacher intentionally includes Starfish activities in her lesson plans for a substitute teacher because she knows her students will be on-task and the lesson will be successful.

Teachers are now taking advantage of enrichment opportunities for professional development within our school district, our city, our state, and our nation. Three classroom teachers have begun work on gifted education certification since Project Starfish has been implemented in their classrooms. Another teacher has based her graduate action research project on brain-storming.

Growth in students and teachers participating in Project Starfish is evident. The creative abilities of all students are distributed along a continuum of varying degrees. Project Starfish has heightened teacher awareness of students, focusing their attention on the strengths of each student. Now, Lindbergh School District can begin to guide creatively talented students by providing appropriate challenges.

References
Project Starfish


Gifted Girls: Lost Potential
The Science Interests of Gifted Kindergarten Girls

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"Oh! This is my favorite toy, but I hardly ever get to play with it!" Rachel, a gifted kindergarten girl, commented as she spotted colorful plastic pieces to build marble ramp structures. "Oh? Why not?" asked the researcher. "It's my brother's and I'm not allowed to use it very often!"

Science is not seen as a necessary part of early childhood gifted programs. Most gifted curriculum in Texas, for example, is aimed at language arts, math, and/or creative and critical thinking. Little is done to stimulate interest in science, especially for girls. One aspect of this gender bias is the belief by parents, as well as teachers, that girls are not interested in science, particularly physical science. Rachel was one of 14 girls from two central Texas school districts who took part in a study of the science interests of gifted kindergarten girls.

Silverman (1991) found that young females tend to begin hiding their abilities at about the age of seven and that there are three critical periods in girls' development: preschool/kindergarten; third/fourth grade; and seventh/eighth grade. "Because life goals and attitudes toward achievement are usually forged before school age, the earlier positive intervention occurs the more likely that girls will value and develop their intellectual capabilities" (Silverman, 1993, p. 304). Therefore, it is necessary to determine younger females' interests in order to develop appropriate early childhood curriculum, teacher-child interactions, and supplementary parent-child activities which will help to set the stage for future achievement and alleviate the lost potential which these girls now represent.

Many of the females interested in science who have been studied, i.e. National Science Talent Search Winners and top Scholastic Aptitude Test (SAT) scorers, represent the population of gifted females (Jones, 1990; Rand & Gibb, 1989). Often older girls lose interest and drop out of science. Those gifted junior high and high school females who continue to study science often demonstrate (through choice of courses they take and types of science projects that they enter in contests) a preference for life science over physical science (Baker, 1987; Jones, 1990; Rand & Gibb, 1989; Vokell & Lobonc; Johnson, 1981). This study conducted an investigation to see if this preference for life science is found in gifted females at the beginning of their school experience.
The Purpose of the Study

The purpose of this study was to observe and describe the biological and physical science interests of gifted kindergarten girls. The central question addressed by the study was: Do girls enter school with more interest in the biological sciences and less interest in the physical sciences? Girls in the current study demonstrated interest through amount of time spent on task, number of interactions with the materials using the science process skills, and number of cognitive levels used in each activity. Parent interviews gave additional information on interests exhibited outside of school. One reason so little research is found on the interests of young gifted girls is that most research has been focused on how to identify young children for inclusion in gifted programs. In addition, most research into student interests has been done on older children using paper and pencil methods. Young children have difficulty with paper and pencil tasks due to developmental factors such as coordination. No standardized science interest inventories exist for young children. Direct observation was, therefore, the most appropriate method of determining the science interests of gifted kindergarten girls.

Rationale

Research on young gifted children is needed to describe the origins of their achievement and motivation in order to develop ways to nurture talent at home and in school (Sisk, 1987). "Special attention should be provided earlier to minimizing girls' lack of interest and the gender gap in science achievement" (Levine, Sabar, & Libman, 1991, p. 327).

In the sciences, older girls tend to show highest interest in biological science and the least interest in physical science (Baker, 1987; Jones, 1990; Rand & Gibb, 1989; Vokell & Lobonc, 1981). Interest is highly motivating, facilitates learning, and increases effort (Dewey, 1913; Levine, Sabar, & Libman, 1991; Perrone & Male, 1981; Renninger, 1989). Yet little is known about the science interests of young gifted girls who represent the best untapped source of new scientists (Sisk, 1987).

Review of Related Research on Interest

Interest has been considered highly motivating and important to learning. It increases effort, concentration, attention, and memory (Dewey, 1913; Hidi, 1990; Perrone and Male, 1981). Linder (1976) examined children's interests by looking at time on task, number of ways materials were used, and the objects that were most attractive to boys and to girls. Renninger (1990) studied the interests of preschool children and used time on task, repeated use, and variety of play as the identifying criteria for determining children's interest. Time on task and number of ways the materials are used are reported in the present investigation. Hidi (1990) defined increased interest as increased cognition, and found that
interest has a profound effect on cognitive functioning. Therefore, looking for higher levels of cognitive activity may help to gauge interest and will be reported in the present study. Informal science experiences and family outings, according to Kyle (1985), play a part in the science interests displayed by students and will be reported by this research.

For the purpose of this study, interest is described by the percent of time spent on a physical science or biological science activities, the number of interactions with the materials using the science process skills, and the number of cognitive levels used in biological and physical science activities. Information was gathered through parent interviews concerning books, magazines, and television programs involving science that children indicate to parents that they enjoy; science-related questions that children ask parents; science-related activities in which the family participates or science interests shared by the parent with the child; toys with science applications with which the child plays; and any special science interests exhibited outside of school.

**Description of Methodology**

Girls were observed interacting with science materials in order to ascertain any interests they might demonstrate. Open-ended science activities were developed with the assumption that this type of activity would allow girls maximum opportunity to explore each kind of task and demonstrate interest. Kindergarten gifted girls were videotaped individually at their schools interacting with science materials. Videotaping of the girls' interactions with the materials allowed close observation of time on task, use of science process skills, and cognitive activity exhibited by the subjects. Families of the girls were interviewed to determine any informal science experiences in which the families provided opportunities for the girls to participate. Interviews were conducted before videotaping girls interacting with the science materials. Parent interviews were audio taped. The study involved the collection and analysis of both qualitative and quantitative data sources.

**Sample Population**

The sample population was drawn from two central Texas school districts. Districts were chosen for their reputations as having good gifted programs. Identification of gifted kindergarten girls involved in this study was through the school district using their normal gifted student identification procedures as required by the State of Texas (Texas Education Agency, 1981). These gifted and talented students were identified using the definition found in the Texas Administrative Code as persons who excel consistently or who have the potential to excel in any one or combinations of the following six areas:

1. general intellectual ability
2. specific subject matter aptitude

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3. creative and productive thinking
4. leadership ability
5. ability in the visual and performing arts
6. psychomotor ability as determined by five measures chosen to match the services provided.

These students require educational experiences beyond those normally provided by the regular school program. All fifteen girls who were identified as gifted by their districts were given an opportunity to take part in the study. Fourteen of the fifteen families gave permission for their daughters to take part.

**Instrumentation**

**Observation Forms**

There were three types of observation forms. One form provided places to record the total time spent on biological science activities and the total time spent on physical science activities for each girl. This form had an inter-rater reliability of 89 percent. Another observation form permitted the user to record science process skills used in each activity. It included the name of the process skill, an operational definition, and a place to check if a skill was observed. The science process skills that were recorded, based on the Texas Essential Elements in Science, included: observing, manipulating, describing, measuring, comparing, sequencing, classifying, experimenting, predicting, and communicating (Texas Education Agency, 1991). There were two identical science process observation forms, one for biological science activities and one for physical science activities. The inter-rater agreement using the process skill observation form was 95 percent. The third type of observation form looked at the cognitive levels used by the child. It included the six levels of Bloom’s Taxonomy (Lafrancois, 1982), operational definitions, some examples, and a place to check if a behavior was observed which was reflective of a specific cognitive level. Cognitive levels observed included knowledge, comprehension, application, analysis, synthesis, and evaluation. There were two identical cognitive level observation forms, one for biological science activities and one for physical science activities. The inter-rater agreement when using this form was 90 percent. According to Sattler (1988) an agreement of above 80 percent is considered satisfactory for observation forms.

During the pilot study three observers tested the observation forms. Forms were revised and retested. Inter-rater reliability on the final forms was established based on the percentage of agreement of two observers using the observation forms. Each observer recorded information while independently viewing videotape of the same child. Observation forms were completed for each girl. In addition, notes were kept on specific
examples of the girl's work with the materials including descriptive words used, comparisons made, objects sequenced, etc.

Parent Interview
Questions for the parent interview were developed to elicit information about gifted kindergarten girls' interests outside of school. The questions were structured so that no specific references were made to science until late in the interview. This allowed parents opportunities to provide unbiased information about their daughter's interests. Pilot interviews were conducted to determine if questions elicited useful information from parents.

Procedure
Each family interview was conducted before videotaping of each girl. Interviews were audiotaped and notes were taken. Each girl was videotaped individually to ensure that peer pressure was not an issue. Videotaping took place at her elementary school in five separate sessions. Each session presented one physical science topic paired with one biological science topic. Five sessions providing both biological and physical science activities were presented to each gifted kindergarten girl.

Each session was set up in the same manner for each girl. Materials were arranged on a large table or tables, or on the floor if no tables were available. All materials for each activity were the same for each girl. Each session lasted 30 minutes. The girls were told that they would be taking part in activities with the researcher as part of their Gifted and Talented program and that they would be videotaped.

At the beginning of the first session each girl was asked if she knew what scientists do. A discussion followed about how scientists study things and that they figure things out by trying to see what they can do with materials. Each girl was told that she would work like a scientist by trying things out with the materials provided. She could do whatever she wanted with the materials and use as many or as few of the things available as she wanted to use.

At the beginning of each session, the researcher went through the available materials. Often the girl started exploring the materials before the introduction was finished. If this did not happen, the girl was asked where she would like to begin. Each girl worked at her own pace and moved from one activity to the next as she felt she wanted to move. When three to five minutes remained in the session the girls were told that time was nearly up and were asked if there was anything else they would like to try. This gave the girls an opportunity to try any materials they had not yet used if they wished.
Materials
Some of the criteria for the selection of the activities were based on The Explorer's Pass: A Report on Case Studies of Girls and Math, Science and Technology (Girls Incorporated, 1991) and from a list of elements that make science activities interesting generated in a previous study of gifted girls and science (Fowler, 1991). Other criteria were based on the researcher's experience as a pre-kindergarten, kindergarten teacher, and teacher of the gifted. It was determined that the activities should:

1. Include a variety of topics from biology and physical science covering as many areas in each of the sciences as possible
2. Include a variety of familiar and unfamiliar objects
3. Include both messy and neat activities
4. Be safe
5. Not cause a fearful response
6. Be able to be manipulated by one child without specific instructions from the researcher
7. Allow problem solving behavior and use of higher order thinking skills
8. Be portable

All sessions included petri dishes, trays, bowls, magnifiers, blank paper and markers, measuring tape and balance scale, and appropriate books for each topic.

Activities included:
Session 1: Biological Science Activity: Backyard Critters (i.e. isopods, insects, etc.) Physical Science Activity: Magnets.


Two pilot studies enabled the investigator to determine the nature of the science activities, the usefulness of the observation forms, and the appropriateness of the parent interview questions. The pilot studies also allowed the researcher the opportunity to practice the skills needed to conduct the study and to make improvements in the techniques to be used.

Data Collection and Recording
All sessions with the girls were videotaped and coded using the observation forms for time on task, science process skills used, and cognitive levels used. All parent interviews were audio taped and notes were taken at the interview. Data pertaining to science was compiled. A summary of data for each individual gifted girl was developed giving a description of the girl's interactions with each set of paired biological and physical science materials and information from the parent interview. The data summary for each individual was analyzed and compiled.

Group Analysis
Calculating the total time spent on biological science and the total time spent on physical science derived the group data for time. Then the percent of time spent on biological science and the percent of time spent on physical science was calculated for each girl. The average number of science process skills used in the biological science activities and the average number of science process skills used in physical science activities were calculated. The average number of cognitive skills used in the biological science activities and in the physical science activities was calculated. Interview data was tallied and compiled for the group comparing total number of biological experiences and total number of physical science experiences.

Findings and Conclusions
Several key analytical themes emerged from the analysis of the data. These themes related to the girls' time on task as well as interactions with the materials using the science process skills, cognitive levels used in the activities, and parent generated information on science interests seen at home.

Time on Task
Based on the data collected through observation of videotapes of the girls participating in science activities, the gifted kindergarten girls in this study spent about the same amount of time participating in biological activities as physical science activities. The girls spent 55 percent of the total time on biological science activities and 45 percent of the total time on physical science activities. Information for time on task was compiled from the Observation Form for Time on Task. Overall the girls spent a total of 1673.5 minutes interacting with the
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science materials. Of this total, the 14 girls spent 920.0 minutes interacting with the biological science materials and 753.5 minutes interacting with the physical science materials. Half of the girls spent 50 percent or more of their time on biological activities and half spent 50 percent or more of their time on physical science activities. No girls spent the total time participating in only biological activities or only physical science activities. Individual girls varied in amount of time spent on each type of activity. The percent of time participating in biological activities for individual girls ranged from 79 percent to 29 percent, and the percent of time spent on physical science activities ranged from 71 percent to 21 percent for individual girls. Overall seven girls spent between 45 and 69 percent of the time working with the biological science materials and eight girls spent between 45 and 69 percent of the time working with the physical science materials. Three girls spent 70 percent or more of their time working with the biological science activities. One girl spent more than 70 percent of the time on physical science. One girl spent less than 30 percent of her time working with the biological science activities, and two girls spent less than 30 percent of the total time working on the physical science activities.

Summary Table of Percent of Time Spent on Biological and Physical Science Activities

<table>
<thead>
<tr>
<th>% of time</th>
<th>79-70</th>
<th>69-60</th>
<th>59-50</th>
<th>49-40</th>
<th>39-30</th>
<th>29-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of girls participating in biological activities</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Number of girls participating in physical science activities</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Overall, the data from this investigation displays that girls spent similar amounts of time on the biological and physical science activities. Research shows that children spend more time on activities in which they have more interest (Hidi, 1990; Under, 1976; Renninger, 1990). Therefore, it is concluded that based on time on task, gifted kindergarten girls are equally interested in biological and physical science activities (see Summary Table).

Interactions with materials: Using the Science Process Skills

The girls used similar numbers of science process skills on biological and physical science activities with an average of 6.6 process skills used in the biological activities and 6.0 science process skills used in the physical science activity (out of a possible 10 science process skills). Individual girl's use of the materials gives us some information on how to elicit the science process skills. The biological and physical science activities that were the least structured tended to elicit the fewest science process skills. These activities presented materials (magnets and pond animals), but no structured activities such as specific teacher-made games. The only activity to elicit all 10 of the science process skills was the sea shell activity which included a number of teacher-made games developed especially to elicit skills not often engaged in by the girls spontaneously (sequencing and classifying). Tools for measuring were part of the materials for all activities, but the girls seemed especially
interested in using the balance scale with the seashells.

Research suggests that the number of ways a child uses equipment is an indicator of interest (Under, 1976; Renninger, 1990). Overall the gifted kindergarten girls in this study seemed equally interested in the biological and physical science activities based on the number of science process skills used in interactions with each of the types of science materials.

**Cognitive Levels**

The average number of cognitive skills used in the biological activity was 4.09 and in the physical science activity was 4.14 (out of a possible six). The girls used similar levels of cognitive skills in both the biological and physical science activities. All six cognitive levels were used in the sea shell activity and the isopod activity in the biological sciences, and in the ramps, pendulum, and chemistry activities in the physical sciences.

Research indicates that interest plays a major role in mental activities, determining the course of mental activities and increasing challenge for higher levels of cognitive representations (Hidi, 1990; Renninger, 1990). Overall, since the gifted girls in this study exhibited similar levels of cognitive skills in both biological and physical science activities, it is likely these two sciences are of similar interest to the girls.

**Parent Interviews**

The information from parent interviews was compiled for each child and tallied for all girls. Parents reported many more biological than physical science related opportunities for girls to develop science interests. Areas of interest reported included reading material and TV programs, family outings, girl's questions, toys, parental interests or hobbies shared with girls, topics about which girls were curious, environmental interests, experiments, special "burning" interests, science interests pursued during free play, and school interests.

Parents reported more interest in biological books, magazines, and television programs than those related to physical science. Only one parent reported a daughter that liked magazines or television programs related to physical science. This was the television program, *Inspector Gadget*.

Only two families out of 14 encouraged participation in physical science-related family outings. These two mentioned interactive museum activities related to physical science. All parents mentioned activities related to biological science such as trips to a local nature center or community gardens. Five girls asked questions related to physical science such as,
"Why can't we put wet clothes in the laundry hamper?" Several parents mentioned that their daughters were interested in "how things work."

Nine out of fourteen girls enjoyed physical science-related toys such as Lego, Brio, Lincoln Logs, blocks, Tinker Toys, and marble ramps.

Only one parent mentioned sharing an interest with his daughter related to physical science. This father was interested in architecture. Eleven parents shared biological-related interests with their daughters such as gardening, birding, and fishing.

Eleven girls were interested in biological topics such as insects, various animals, birth, skeletons, health, and the body. Seven girls indicated to their parents an interest in physical science topics such as chemistry, visible changes in matter, and evaporation. Eight girls showed curiosity about biological concepts such as parts of the body, living things found in the yard (such as spiders, toads, and snakes), babies, health, birth, and growing things.

All fourteen girls expressed an interest in the environment from recycling and litter control to endangered species and pollution. This interest may be due to having studied these topics in school.

Five girls liked to experiment with biological materials. They did things like collecting plants and comparing leaves, making "brew" or "medicine" with various plant parts, making potpourri, and building "nature boxes" with shells, leaves, sticks, and flowers. Ten girls liked to experiment with physical science. They did things like take things apart and make "machine" from junk; construct buildings from toilet paper rolls and egg cartons; mix things together from the kitchen; cook; hammer; make games, toys, and puppets from "junk"; and freeze different things to see what would happen.

Five girls indicated special "burning" interests related to biological science. These included exploring nature, catching bugs, collecting shells, gardening, and visiting the Nature Center. They also were interested in dinosaurs, dolphins, sea animals, and rabbits. Only one girl was reported to have a special interest related to physical science and that was using a magnifier to look at all kinds of objects from a dog's nose to tree bark.

One girl showed an interest in biological science through her play exploring natural areas such as the creek near her home. Two girls exhibited an interest in physical science through their play. According to parent interviews, one liked to design homes for her toy animals and one liked to build innovative constructions with Legos.
Four parents said that girls reported interest in biological topics from school. These topics included bugs, albino animals, planting seeds, and native habitats. One of these girls also had indicated interest in experiments that had been conducted at school with cooking, freezing and melting, and clouds. One parent reported that their daughter's only science interests were those topics studied at school. This may indicate a need to be sure and include science and especially physical science in the gifted curriculum.

Overall, the girls were included in many science-related activities at home, at school, and at play. Overwhelmingly, however, the science to which they were most often exposed was biological science. Few had opportunities to engage in physical science-related interests.

Parents mentioned a total of 101 biology-related experiences in which girls were engaged outside of school and only 37 experiences related to physical science. While this may indicate that these gifted girls showed less interest in physical science outside of school, it may instead indicate that these gifted girls were being exposed by the parents to nearly three times as many biological experiences as physical science ones. It was hoped that information from the parent interview would yield insight into any science interests which the girls exhibited outside of school, but in fact, it more likely provides information on the kinds of science experiences that the parents offered the girls.

Blurton (1983, cited in Van Tassel-Baska, 1988) in reviewing the literature on the early background of famous scientists found that the majority of studies showed a childhood interest in the sciences by the age of five years. If this is true, is it any wonder that few women go into physical science-related careers when so few are exposed to the physical sciences before entering school. Since parent encouragement has been shown to be related to precocity and gender (Raymond, 1989), this lack of exposure in the home may present a strong message to the child that physical science is not for girls and may contribute to the lost potential of gifted girls.

**Summary of Conclusions**

Based on the data from observing gifted kindergarten girls taking part in paired biological and physical science activities, it is possible to conclude that gifted girls exhibit similar levels of interest in both biological and physical science when they enter school. Any loss of girls from the sciences is not due to an initial lack of interest. While these gifted girls often started their sessions with the biological activities with which they were more familiar, they tended to spend nearly as much time on physical science activities. They also tended to use similar numbers of science process skills and cognitive levels in biological science and in physical science activities. However, in parent interviews it was found that these gifted girls did not receive as much exposure to physical science activities outside of school as they did to
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biological activities. Findings suggest that these gifted kindergarten girls were equally interested in biological and physical science activities despite the fact that out-of-school science experiences based on activities provided by parents were nearly three times as likely to be in the area of biological science as in physical science.

Recommendations

Overcoming gender bias, bringing more science into the gifted curriculum, providing more exposure to science at home, and building on individual interests are some of the ingredients necessary for development of the abilities of gifted females in science. Because kindergarten is one of three critical periods in the development of gifted girls (Silverman, 1991), the earlier girls are provided opportunities to take part in science, the more likely it is that they will continue to develop their interests in science. Gifted girls are the future source of much of our country's scientific workforce, but many girls opt out of the sciences by junior high school. It is important that we maintain any interest in the sciences exhibited at an early age in order to allow girls to maximize their potential, maintain more options for intellectual development, and, eventually, have more choices in career selection. Parent's, teacher's, and pupil's attitudes are significant factors in shaping a girl's ideas about her future (Hearn, 1992). For these reasons, it is important that parents, teachers, and pupils all be made aware of gender bias and how to overcome it. This means learning that science, including physical science, is for everyone.

Recommendations based on this study include encouraging girls to spend more time on science activities by providing more opportunities both at home and at school for girls to interact with science materials. Because of girls' lack of experiences with physical science activities, it is especially important that parents and schools provide materials and time for girls to take part in physical science.

It is uncommon for school districts to provide science instruction as part of their program for gifted kindergarten students. Neither of the school districts included in this study provided science as a main part of their gifted and talented (G/T) programs. One district provided services in the area of language arts. The other provided a program based on creative thinking, which would be a good base from which to launch science learning, but little science was being included in the program.

With early identification of gifted girls, schools have an opportunity to enrich these girls' learning experiences with exposure to more science, both biological and physical, as a part of their gifted programs. These science activities would provide an excellent vehicle for developing problem-solving skills and using higher cognitive levels. Teachers should
Perspectives in Gifted Education: Young Gifted Children

provide a wide assortment of experiences including both structured tasks to elicit specific skills and open-ended activities in which students have opportunities to explore the materials and find and solve their own problems. Teachers need to be supportive facilitators, but not intrusive dictators of problems to be solved. Design technology has been suggested (Fowler, 1991) as an appropriate vehicle for exposing gifted girls to more physical science problem solving.

Elementary school is the critical place to change curriculum and instruction, as well as classroom interactions and socialization factors (Kahle, 1992). Young gifted children are unusually alert to and observant of their surroundings, naturally inquisitive, and have a relatively long attention span. If materials and encouragement are available to them, they will become independent problem solvers (Wolfe, 1989).

As an adjunct to school science activities, suggestions for simple equipment and activities could be sent home to encourage parents to work with their daughters in developing their science interests. This is especially important in the physical sciences since most parents offer little enrichment in this area. Parents can also provide guidance for their daughters in using the science process skills by acting as role models, providing materials, and working alongside them as they make use of science processes to solve everyday problems.

Perhaps if girls were given more opportunities to take part in science activities in gifted programs and were encouraged to participate in science activities at home, girls' interest could be developed and maintained over time. In this way gifted girls could be provided the background and support necessary to keep them interested in the physical sciences as well as the biological sciences and prevent the loss of their potential. It is further recommended that more research be conducted on young girls' exposure to physical science in the home in order to determine more fully the importance of parent involvement, parents as role models, and parent education regarding gender stereotypes.

It is strongly recommended that gifted girls, their teachers, and their parents all be fully informed of the gender biases in the normal classroom and of the biases perpetuated by socialization in general (American Association of University Women, 1992; Sadker, 1992). There is a need for education about gender bias, stereotypes, and how to overcome these social pressures. Information could be provided through teacher training, student research on lives of women scientists, and parent education. Support groups for parents of the gifted, PTA meetings, and newsletters offer means for communicating with parents and educating them as to ways they can help their daughters develop their interest in science and overcome the gender biases and stereotypes they face in society today.
Gifted Girls: Lost Potential

Finally, more research into the science interests of young gifted girls is needed. This research should identify strategies for changing curriculum and instructional practices and should form a strong base for planning teacher training, including training on gender bias, to better meet the needs of young gifted girls. Teachers also may need training in giving guidance to help parents in providing for gifted girls' science interests.

The present study shows that interest in both biological and physical science exists when gifted girls enter school, but there is little support for these girls’ science interests. We need to learn how we can help teachers and parents provide support for girls' interests. Providing more science experiences for young girls may help to build their knowledge base, especially in the physical sciences. A better knowledge base may help prevent the loss of girls' willingness to take risks, loss of confidence, and, by junior high school, loss of interest in science (Rand and Gibb, 1989). Perhaps by providing girls with knowledge and support, we can prevent loss of the potential these young gifted girls now represent.

References


Perspectives in Gifted Education: Young Gifted Children


Gifted Girls: Lost Potential


Learn From Me
When Schools Fail to Meet the Needs of Intellectually Gifted Boys
Cheryl Wright
University of Utah
with
Christina and Michael Moerer
Salt Lake City, Utah

They just wanted to be a happy family living in an ordinary house leading a quiet and honorable existence. They thought all parents viewed their children as extraordinary. The director of the university preschool that their child attended confirmed their suspicions, that their son, Eric, was intellectually gifted. The very word “gifted” struck them as elitist and could potentially set them on the pathway to be one of those pushy parents. They didn’t want Eric to develop a self-image of being different. They wanted him to be “normal” and balanced. They confidently informed the director that they knew Eric was bright and they were sending him to the academically accelerated parochial school where his older brother was thriving. The director was concerned that they would encounter challenges in educating Eric, regardless of their school choice. She noted that some teachers might have difficulty meeting his needs in a regular classroom and that when bright children are bored they may act out or be disruptive in class. Additionally, Eric’s unique way of thinking about things might not always be valued by his teachers.

Ten years later, months after their son’s totally unexpected, shocking death by suicide, they called to discuss this tragedy with the director. Their story is an attempt to educate others about the special needs of intellectually gifted children who may suffer severe social-emotional struggles. Eric’s suicide note pleaded, “Learn from me.” His life and untimely death is a story that needs to be told with compassion and understanding for the desperate, irreversible act that Eric took. It needs to be examined in a way that others can learn from this tragic experience. The hope is that through sharing Eric’s life it might help improve the lives of other struggling exceptionally intellectually gifted children and their families.

Early Indicators of Advanced Intellectual Ability
Typical intellectual characteristics of young gifted children can include a large vocabulary at an early age, early reading ability, longer attention span, persistent and intense interest, highly developed curiosity and limitless supply of questions, interest in experimenting and doing things differently, ability to retain a great deal of information, and a sense of humor.
Learn From Me

(Webb, Meckstroth, & Tolan, 1982). Winner (1996) describes three atypical characteristics in referring to the term gifted children, all of which Eric exhibited: 1) Precocity, which is earlier-than-average development, 2) An insistence on marching to their own drummer, which means that these children need minimum help to master certain developmental domains, and they often times teach themselves, and 3) A rage to master, which can be described as an intrinsic motivation to make sense of a domain through intense and obsessive interests. The following is an account of Eric’s early advanced development in these areas.

Eric’s parents described him as a challenging and enjoyable infant. He slept very little and required a lot of stimulation to keep him content. He rolled himself around on the floor at about four months of age in a purposeful attempt to reach items of interest. He walked easily and independently at nine months. He climbed out of his crib at age 18 months, marking the end of naps. Eric was adventurous and fearless. They had three emergency room visits before the age of two from climbing on unstable objects and exploring behaviors other children his age would never consider. As a small toddler, he climbed the chain link fence at a baseball backstop in a park. As other parents watched in amazement, his parents pleaded with Eric to climb down from a height beyond their outstretched grasps. He looked down at them, laughed gleefully and eventually complied. Climbing to dangerous heights seemed to repeatedly attract him.

While his spoken language development seemed somewhat delayed, when he did start speaking, it was in full sentences. He taught himself to read at a very early age. When he was older they debated whether he was really reading at age four or had just memorized books. Eric insisted that he was reading. They knew for certain that he was reading when he entered kindergarten. His kindergarten teacher remembers Eric’s choice to read during free time and she had a picture of him lying on the classroom floor reading a book while other children played around him. Later, his reading developed into an obvious passion, perhaps a form of escape. He loved to go to the library with his parents. They would limit the large number of books that he wanted to check out. He would begin reading a book in his stack in the car on the way back from the library. He was so absorbed he often wouldn’t emerge from the car until he had finished the first book. His choice of books followed whatever focused interest he had at the time including humor, baseball, biographies, and adventure stories. He always begged them to buy him books and frequently the reward he would select for achieving certain goals was a trip to the local bookstore where he was allowed to purchase a book for his collection.

Over the years, it was apparent that Eric developed very concentrated interests, a telling characteristic of gifted children. Unfortunately, few children his own age understood or
shared those interests. This seemed to set the stage for Eric to be somewhat emotionally disengaged from peers his own age. His parents called them phases when he became intensely interested in a topic or activity. An early phase was dot to dot pages. He devoured dot to dot books in minutes when he was four and five, delighting in connecting the numbers. At an early age, he would play computer games for hours, letting the computer win, so he could figure out the computer’s strategy. Once he did, he would often not play the game again. The best example of an early, intensely focused interest was baseball card trivia that began in second grade. He talked incessantly about baseball statistics, searching out people who were capable of bantering with him on the subject. He had an insatiable appetite for acquiring baseball cards. He would open a new pack and immediately begin memorizing the statistics on the back.

In third grade, his teacher challenged him to read the sports information in the morning paper. That year, Eric discovered the joys of reading the morning paper and he immediately expanded beyond the sports section. The editorial page was his favorite. He would tell his parents why he agreed or disagreed with the viewpoint being expressed. That was the first indication of what would be an enduring tendency to debate.

A hallmark characteristic of intellectually creative children is their divergent thinking (Torrance, 1980). Eric took piano lessons for one year during second grade. For the recital the teacher asked each child to select a piece of music to play. Having difficulty choosing one, Eric was advised by the instructor to take a simple tune and play variations of it. The day of the recital came and Eric announced he was playing variations on Yankee Doodle. He sat down and played it though once, then stood up and played it with his back facing the piano, then stooped under the piano and played it from underneath. It was his last recital.

Torrance (1980) identified characteristics of the intellectually creative child that might be viewed negatively, and therefore, irritate parents and teachers. These include: stubbornness, uncooperativeness, non-participation in certain activities, low interest in details and indifference to some common conventions and courtesies, disorganization in things others think are important, and a demanding, emotional temperament.

During the early years of school, Eric encountered teachers who were flexible, supportive, and tolerant of his behavior. The difficult transition period came later during junior high when some teachers had trouble dealing with Eric’s different and sometimes challenging behavior.
The Turbulent Junior and High School Years

The gifted characteristics cited in this paper, precocity, insistence to marching to their own drummer, and a rage to master can lead to problem behavior in traditional school environments. Traditional educational environments focus on all children learning the same things, at the same rate. Conformity is often the goal, and there is little tolerance of marching to your own drummer. There often is a dominant adult driven curriculum where a topic a child is motivated to master or learn does not fit into the curriculum. These types of learning environments can create problems for gifted children, as they did for Eric.

For example, Eric's drive to search for meaning or logic often led to the identification of illogical rules or rituals in society. When Eric pointed out these discrepancies, teachers often labeled him a "smart aleck" or troublemaker. These encounters frequently became the content of humor or debate in the classroom. The very act of constantly screening information for meaning and logic is often a source of great frustration (for both the child and those around him/her). It may at times lead to a type of existential crisis for which the child is emotionally not equipped to handle. In Eric's case, during his teen years, religion presented many challenges in both logic and consistency, especially since he attended a parochial school.

Another issue was Eric's need for fairness. An intellectually gifted child's need to emphasize truth; equity and fair play can result in them tackling issues, which seem beyond their age and their emotional ability to handle. Issues such as racial discrimination, labeling (such as good kid—bad kid, a referee making a bad call) often elicited a substantial protest from Eric. While many times correct, his lack of life experience and social maturity limited his effectiveness in addressing these problems. This was particularly true when Eric would openly debate his teachers regarding these issues in front of other students.

No description of Eric would fail to mention his sense of humor. He had developed an exceptional sense of humor from grade school. His boredom in junior high school led to him being identified as a class clown because of his disruptive humor. His first trip to the principal's office resulted from Eric's doing a stand up comedy imitation of one of his teachers. He had the ability to see the humor in almost anything and delighted in making other people laugh. At family holiday parties he stayed with the adults rather than joining his younger cousins in activities. He and his uncle, who had an equally sharp wit, entertained the family together. Eric delighted in the company of his bright, eccentric and extremely witty uncle. Eric became legendary among his peers for his ability to entertain them. It was a hallmark of his popularity with his peers, but often the disdain of his teachers.
Perspectives in Gifted Education: Young Gifted Children

School Factors That Contribute to Emotional Difficulties

Eric was his sophomore class president, starting point guard on the high school varsity basketball team, and very popular, yet he had difficulty in school. Often times there is a lack of fit between gifted children and schools. The following school characteristics can create emotional and behavioral problems for many children and in particular gifted children. These include: a lack of respect for children, inflexibility and rigidity, external evaluations, and unrewarding curriculum (George, 1997). It should be noted that boys in particular may have more difficulty adjusting to these dimensions of school because boys tend to be less conforming, more energetic, and more independent (Pollack, 1998).

Gifted students who dropped out of school reported conflicts with teachers beginning in junior high school, and that their academic work was too easy, boring, and repetitive (Seeley, 1988). These students also reported their teachers were indifferent or hostile and teacher/counselor attitudes gave them the message to “shape up or ship out.” They also reported that assignments were often seen as busywork, there was little experiential learning, and they expressed a desire for more respect and responsibility from their teachers. Eric’s school experiences incorporated all these risk factors.

Lack of Respect for Children. Eric never quite fit into school and in high school was viewed as a “problem” kid. Eric encountered many problems in classes where the teacher did not have good classroom management skills. He would take control from the teacher entertaining his peers with his humor. Other teachers continually engaged in power struggles with Eric over what was right and wrong. In high school, he challenged his teachers and this was not acceptable behavior. He once wrote a letter to the school expressing his views about how schools (and teachers) should not label kids as good and bad. Unfortunately, Eric’s views were dismissed and the administration was quite defensive about his view of their school environment. The principal responded that his assertions were just not true. Rather than look at areas for improvement within the school, the school reinforced Eric’s view that he was a bad kid. The following day, a teacher told Eric that students like him didn’t belong in their school. It is quite telling that Eric ended his life the Friday before his junior year of high school would begin.

Inflexibility and Rigidity. Eric was often intolerant of others who exhibited “phoniness” or “hypocrisy.” This would produce struggles related to his understanding of his own feelings and those of others. It often produced frustration and debate over rules (which are, in fact, often applied inconsistently). One of Eric’s most common conflicts with teachers in high school was over the inconsistency of rules and stated goals. For example, when Eric was sophomore class president, during one of the first meetings over which he presided, the
issue regarding what kind of lunch to sell as a fundraiser arose. Eric had understood the concept of student government as a means of letting students practice their decision-making skills. When the teacher suggested they choose a lunch other than the one they wanted, Eric got in a debate around “if you wanted us to do that lunch, why did you ask us to choose?” Unfortunately, choosing to challenge a teacher in front of a class did not win over the teacher’s respect and in fact reinforced the staff’s view of Eric as rebellious.

External Evaluation. Gifted students are characterized as developing an inner locus of control at an early age (Clark, 1983). This can lead to a rejection of external validation such as grades. Eric’s grades did not reflect his potential. Schools also rely heavily on grades to evaluate a student’s intellectual ability. When Eric planned to enroll in an advanced placement class, the teacher remarked to his parents that she would have to see if Eric was smart enough to take the class. Eric would often “dumb down” to fit into the image of the average kid, particularly in front of his peers. On the other hand, he often received disbelieving and sarcastic remarks from teachers suggesting that he would have to prove he was as smart as he thought he was.

Unrewarding Curriculum. While having internal motivation is often viewed as a desirable attribute, when the child’s current interest and motivation is different than a parent’s or teacher’s request, the child becomes labeled as “strong willed” and defiant. In structured settings, such as school, this can lead to frustration on both the child and teacher’s part.

The eagerness to acquire information and search for meaning often leads to frustration with periods of inactivity which are all too frequent in structured school settings. Many times gifted children may be seen as hyperactive (Schetky, 1981). Gifted children high in psychomotor energy are very active, with few of the symptoms of hyperactivity (little control over attention). Eric exhibited a “high energy level” mostly as a young child. Gifted children are capable of intense concentration and focus when they are personally interested and motivated. Aimless activity can occur when there is insufficient mental stimulation. One teacher came to Eric’s home to talk to his parents because Eric had made borders around all the pages in his workbook and the teacher interpreted this as a demonstration of great disrespect. From middle school on, the terms bored, lazy, and disruptive were attached to Eric. His activity, when bored, became less large motor and more doodling and drawing (in books and on assignment sheets) and compulsively tearing the edges of papers. On the contrary, he never lost his interest in reading at home, where he read the newspaper daily and usually was involved in a book.
Work Too Easy or Lacking in Purpose. Like many gifted children, Eric was able to retain facts and details almost automatically. This characteristic, like many others, may be utilized more or less depending on the child's interests. This trademark attribute of gifted children may be a valuable asset, but it can make the child impatient. This may be exhibited in class as boredom and an extreme dislike of repetitive practice drills.

Gifted children are more likely to challenge what they perceive as busy work and are less likely to do work they are not personally motivated to do. Eric often neglected his homework assignments because he stated that he already knew the material. Hence, a homework memorization assignment would not be completed while information he was motivated to learn could be recited in great detail.

Dominance of Criticism. Often schools focus on the negative behavior of children and fail to see their potential and talent. This can be particularly difficult for gifted children who are extremely sensitive to criticism. They can mask their sensitivity through abilities such as humor. Webb, et al. (1982) describes gifted children as "Emotionally intense with extra emotional antennae" (p.18). They notice body language that conflicts with an individual's words or actions. They may often feel conflict between their need to be accepted and their need to "do things my way." Eric wanted to be liked by a teacher yet couldn't resist pointing out an inconsistency or debate a specific bit of knowledge or a conclusion.

The school environment is one in which children spend a great deal of time. When children are labeled as "problems" or "troublemakers" they can internalize these labels. The feedback they get from significant adults, particularly teachers, influences their self-image. They start to view themselves as bad and unworthy. This negative self-reflection can lead to depressive episodes.

Childhood and Adolescent Depression
School and personal problems, in combination, can lead to severe depression. It is estimated that 15-20% of children experiences depression at sometime during their adolescent years. Some estimate that there are between three and six million depressed children and adolescents in the United States (Shamoo & Patros, 1990). The majority go undiagnosed and untreated. One reason is that depression in children and adolescents many not look like depression in adults. Young adults vary in their expressions of depression. The stereotypic expression of depression is displayed with sad mood, unhappiness, and lack of energy. Yet, another is described as "masked depression" and can be displayed through acting out behavior (Shamoo & Patros, 1990). Eric displayed masked depression, which is more difficult to diagnose and can often be misinterpreted as normal rebellious adolescent behaviors.
Learn From Me

Boys are also trained by society to cover up their sadness and emotions and it becomes even more difficult to know when boys are in emotional distress (Pollack, 1998).

Suicide is the second leading cause of death in adolescents and young adults; it is estimated that 5,000 to 7,000 young adults take their lives each year and there are 400,000 attempts (Strip, Swassing, & Kidder, 1991). In Utah, for example, it is the leading cause of death in boys ages 15 to 21 years (Grey, 1998). These statistics are staggering and if a health epidemic claimed as many young lives it would be declared a national emergency.

It is speculated that intellectually gifted children experience more depression and students who committed suicide in high school and college were often high achievers (Kerr, 1991). Being gifted due to scoring in the upper one percent on standardized measures may reflect how bright one is but it can also indicate how different one is. Just as different from "normal" as someone scoring in the lowest one percent. Being intellectually gifted can be as much a diagnosis as a gift. Like components of a person's personality, different attributes of being gifted may vary in dominance over time and/or by activity. By themselves, these attributes may not represent a significant problem or vulnerability, however, in combination they may lead to problem patterns. In our society, and thus in our schools, being smart is desirable, but not as valued as being compliant and conforming. The following are the problem patterns that were most pronounced in Eric's life: social isolation, masking emotions through humor, and strong independence.

Eric was somewhat socially isolated from his peers. Eric employed an approach of being socially popular as demonstrated by being elected class president, but he had no close friends and spent much time alone reading. He also chose to keep almost all feelings hidden. He exhibited an extreme sensitivity to rejection and therefore often avoided situations where rejection was possible. He also tended to "assume rejection" in situations where none was intended. He really struggled with the breakup with his first girlfriend. He would vacillate between intellectualizing that it was for the best and experiencing extreme emotional pain.

Eric masked his emotional pain through humor. Humor is the ability to take a life situation to its logical extreme and hence point out how silly the action or rule really is or to use words in unusual ways. To make humor work one must have a large body of knowledge, an excellent command of words, and the ability to make quick and unusual connections between words and events. Since humor often brings acceptance in social situations, it is little wonder that gifted individuals are often noted for their sense of humor. One problem many children have with humor is its inappropriate or damaging use. Humor can be used to
express one's own views, thoughts, and feelings in a safe manner. Eric used humor as a primary means to engage people and as a way to hide his inner emotional turmoil. He was known by his family, friends, co-workers, and teachers for the quality. "Eric could always make you laugh and put a smile on your face," was a comment noted by many who knew him. It was also a characteristic that put him in conflict with many of his teachers. His timing was often aimed more at making students laugh rather than to reinforce a point that the teacher was trying to make. His ability to memorize and mimic lines from movies was extraordinary; his commentary following political news stories was astonishing. However, he hid his emotional struggles and depression. "How could anyone so funny be so depressed?" was the perplexing question asked by many after Eric's death.

To complicate his humor mask, Eric like many gifted children learned early to do things on his own. Gifted children may resist parental or teacher suggestions or involvement, thus reducing the practice of social skills and increasing their isolation from most support systems. This characteristic may in fact be more pronounced in young boys who are taught in our culture to be independent, tough, strong and macho. Being smart and sensitive are not typical parts of the boy culture (Pollack, 1998). This stereotypic behavior can lead to dangerous emotional development and management for young men. The attitude of "I can do this alone" can become "I must do this alone." Young men can become very skilled at hiding emotional issues. Eric's suicide note revealed issues including "no one understands me," "I see the world different than everyone," and "I didn't tell anyone about my depression."

**Intervention**

Many people assume that being gifted is a privilege while in fact it might be a developmental burden. Giftedness involves emotional as well as cognitive dimensions. Gifted children not only think differently from their peers, but they may also feel very different (Silverman, 1993). Being different can cause intense emotional pain. Negative emotions can also be more severe because of the intensity with which gifted children experience life. One very important aspect of intervention is parent and professional education regarding the special needs and characteristics of intellectually gifted children.

In school, there are numerous problems that can be associated with certain advanced cognitive characteristics (Clark, 1983). Intellectually gifted children are put at risk when they become bored with the school curriculum or develop poor interpersonal relationships with adults or peers. Teachers consider them "sassy," "smart aleck" or "show offs." It is also of concern when they are seen as disruptive or disrespectful and have difficulty in conforming to group tasks and they dominate discussions with information or questions. Teachers may see this dominance as disrespectful. They may also be viewed as stubborn, willful, and
uncooperative. Many of these children may deal with their rejection from teachers by being rebellious. Gifted children are unusually vulnerable to criticism from others and can use humor as a critical attack. This is how Eric coped. Because of their unusual vulnerability, discouragement and frustration can lead to high levels of self-criticism. Gifted children have a heightened potential for depressive symptoms due to their unique characteristics.

There is also an important educational mission in informing professionals who work with children about depression and how it might be expressed in early childhood and adolescents. There are many prevailing myths about childhood depression (Haggerty, Sherrod, Garmezy, & Rutter, 1994). Many professions believe that childhood depression is rare, does not exist at all, or that it can be viewed as developmentally normal (such as adolescent rebellion in Eric’s case). Diagnosing depression in boys can be difficult because boys often mask the behaviors that are typically associated with depression such as sulking, crying and withdrawing (Pollack, 1998). Pollack also notes that there is a narrow model of depression that is influenced by the way women exhibit depression. When dealing with depression in boys, professionals need to also look for acting out behavior or problems with disobedience and physical problems such as headaches or stomachaches. Eric’s childhood depression dates at least back to stomach pains in sixth grade. The lack of knowledge about the existence and dangers of childhood depression by the particular professionals with which Eric’s parents consulted contributed to disaster.

It is also important to note that some depressions have a genetic component. Eric’s great grandfather and uncle experienced severe depression. Unfortunately, most of this family depression history was part of a family denial of mental illness that was not discussed. Depression is too often viewed as a family dysfunction and one not to be revealed to others. New research supports a biological origin of some depressions and families with a depression history need to be particularly aware of warning signs such as acting out behavior.

Most importantly, school climates need to change to accommodate the special needs of gifted children. Schools are mandated by law to meet the needs of children functioning well below the normal range of development, but no mandate assures us that children far above the normal range of intellectual development receive special services. Eric is an excellent example of the extreme needs of this population.

All schools need faculty with background in gifted education. The summer before Eric’s death, the school he attended hired a new counselor and she met with Eric and his parents. She explained that she had reviewed his test scores and she had experience working with gifted children. She assured Eric that this year all discipline problems he encountered would
come through her and she would be working with his teachers. She also told him that if he had any problems he could come directly to her. After the meeting, Eric shared with his parents that he liked her but that he questioned whether she could really make things different at school. Unfortunately, this promising intervention came too late.

Silverman (1993) has outlined what school counseling programs based on the needs of gifted children should include: identifying their strengths and weaknesses (Kerr, 1991), self-acceptance and recognition of their limitations (Culross, 1982), commitment to nurturing their abilities (VanTassel-Baska, 1991), development of internal focus of control (Perrone, 1986), conflict resolution skills (Betts, 1986), problem-solving skills (Cultures, 1982), knowledge of stress reduction techniques (Genshaft & Broyles, 1991) and the ability to be assertive rather than aggressive (Blackburn & Erickson, 1986).

Teachers should be aware of the unique social and emotional needs of the gifted and sensitive to their affective issues (VanTassel-Baska, 1993). They should be trained in effective intervention techniques for this special needs group. They should be knowledgeable of strategies to handle the demanding psychosocial issues gifted learners present in their classes. The curriculum must include demanding and meaningful learning experiences for these children that will assist them in their intellectual and emotional development.

Eric’s parents sought help because they thought Eric’s behavior was not in the “normal” range. Two counselors and his life long pediatrician resisted labeling him as depressed. There were several missed interventions resulting from good intentions to treat Eric as “normal” and not to over-react. One counselor and the pediatrician referred the parents to counseling because of what they thought was over concern. A family history of depression in combination with certain personal characteristics (e.g., giftedness) and a poor environmental fit (e.g., home and school) should raise alarm from professionals.

In conclusion, although suicide involves complex motivations and perplexing choices, there are some school environment characteristics that may in fact contribute to emotional difficulties, particularly for intellectually bright children. Eric thought we could learn from his experiences in improving schools.

“Learn from me” is a plea by one individual to have others understand a life that was filled with inner turbulence and emotional strife. Eric’s plea is also a lesson for all that interact with children and young adults in educational settings. We must examine more closely the synchronization among the full spectrum of needs of gifted children, parental expectations and obligations, and more importantly, the ability of school systems to accommodate these
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individuals. These children who show great intellectual promise are also in need of strong emotional guidance to help them successfully advance through their developmental challenges. "Learn form me" illuminates an important task of education; to listen and be willing to nurture all our children.

References


