TEACHING GIFTED STUDENTS IN REGULAR CLASSROOMS

ADAPTING INSTRUCTION TO MEET HIGH LEVEL NEEDS[1]

Dona J. Matthews

Giftedness is a concept fraught with controversy and suspicion, and for some good reasons. A model of conceptualizing school-related high level development is proposed here that obviates some of its more problematic aspects, while retaining a commitment to meeting the special educational needs of gifted students. Implications for identification, placement, and programming are discussed that are consistent with this model. The emphasis is on assisting classroom teachers in addressing the mismatch between individual students' subject-specific advancement and the education that is typically provided in regular classroom curriculum delivery practices.

The Challenges of Educating Gifted Children

Teachers in most schools are faced with handling a remarkable diversity not only in their students' learning needs, but also in their social/emotional needs, and often even in their physical needs. Immediate attention must be provided to children who have come to school without breakfast, to those who are showing signs of emotional distress, and then, of course, to those who have problems with reading and other basic academic skills. The teacher's day is not long enough to do it all well; to take care of all of these urgent special needs; to teach what needs to be taught to the rest of the class; to handle the disruptions (both welcome and not) that inevitably and unpredictably occur; to manage the normal time demands and record-keeping, and next day's lesson-preparations, much less to consider whether there might also be students whose needs are so far advanced that they are not learning much in their lessons.

But the fact remains that, just as there are almost always students who, for a wide range of reasons, have problems mastering their schoolwork, there are also students who have special needs on the other end of the

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spectrum. In some schools, those students are labelled "gifted" and offered special classes, a programming option that can create as many problems as it solves. It has been argued that the elitism charges that are often made against such classes have a valid foundation when the identification procedures are perceived as arbitrary and/or when the programming that is offered is not tied directly to demonstrated educational needs (Feldhusen, 1995; Hoge, 1988, 1989; Keating, 1991; Lupart & McKeough, 1991).

An obvious example of arbitrary gifted identification practices that are not tied clearly and directly to educational needs, is the use of intelligence test cutoff scores which, in addition to having serious problems of culture bias, offer little or nothing to classroom teachers by way of programming implications. Intelligence testing can have some utility in assessing gifted educational needs, particularly in those cases where they are otherwise difficult to assess. Then, individually-administered intelligence tests can assist in understanding the nature of a student's cognitive and psychological functioning, mostly because of the opportunity for an experienced clinician to observe the student's test-taking behaviour and responses to many and varied complex tasks, in a carefully-regulated setting, with well-defined normative information. This, of course, has nothing to do with the widespread use of global intelligence test cutoff scores for gifted identification.

Adapting Instruction to Meet Gifted Needs: Relevant Theoretical Positions

Multiple Intelligence Theory

Gardner (1983) popularized a notion of intelligence as multiple rather than unitary. He argued that the conception of intelligence as some kind of general attribute of a person is misleading, and that it makes more sense to think of intelligence as a profile of competences. Gardner's theory of Multiple Intelligences (MI theory)--like Thurstone's (1938) and Spearman's (1932) theories in number, but not in assigned content--includes seven domains, each of which is labelled an "Intelligence": Logical-mathematical, Linguistic, Interpersonal, Intrapersonal, Visual-Spatial, Musical, and Bodily-Kinesthetic.

MI theory emerges from Gardner's search for an empirically grounded set of faculties that, viewed collectively, offer a reasonably complete picture of the kinds of abilities valued by human cultures. It is based on eight "signs" of an intelligence that are used heuristically, and weighed somewhat subjectively. The designated Intelligences can be seen to satisfy present requirements--a consideration of developmental advancement for school-related purposes--insofar as they define domains as coherent sets of content knowledge that can form viable educational subject areas. There are many working in the gifted education field suggesting that educators consider gifted-level development as occurring by domain, consistently with this approach (Feldhusen, 1995; Horowitz, 1987; Keating, 1991; Stanley & Benbow, 1986).

Cognitive Science and Domain-Specificity

On the basis of strong evidence, Glaser (1984, 1985; Rabinowitz and Glaser, 1985) concluded that reasoning and thinking skills are dependent on familiarity with content; that they are developed not context-free, but in the process of acquiring knowledge and skills. He suggested that an understanding of highly competent performance must take into account the interactive nature of domain-specific knowledge-based processes and general cognitive strategies, citing, for example, an expert-novice study showing that the ability to ask questions is dependent upon existing knowledge in the domain.

The field of memory research provides strong support for the domain-specificity position. For example, Chi (1978, 1981, 1985), based on her studies with child and adult chess experts, concluded that domain-specific knowledge is a significant influence on memory: "A great deal of evidence has already been accumulated in developmental research to show that domain knowledge per se can affect developmental performance; whether this is accomplished through the application of specific rules (acquired as a consequence of developing domain knowledge) or general rules is yet unclear" (Chi, 1985, pp. 54-55).

Gifted Education and Domain-Specificity

In discussing the need for theory-driven research in gifted education, and considering the relevant research in cognitive science, Jackson and Butterfield (1986) suggested devoting more teaching time with gifted students to the transmission of domain-specific knowledge, and less to metacognitive skills. Similar positions have been advocated by Feldman (1991), Glaser (1985), and Keating (1980, 1988, 1991), that the development of creative and critical thinking abilities depends on the acquisition of domain-specific knowledge bases; that one cannot develop creative or critical habits of mind without having domain-specific content knowledge with which to work.

Investigators of the developmental patterns of exceptionally high achievers have concluded that such achievement occurs by domain (Bloom, 1985; Feldman, 1986; Gottfried, Gottfried, Bathurst, & Guerin, 1994; Howe, 1990). This is consistent with the findings of the Study of Mathematically Precocious Youth (Benbow, 1988; Benbow & Stanley, 1983), and with the work done by Bamberger (1982, 1986) with musically gifted students.

In a study of 343 students identified as gifted on the basis of global scores on academic aptitude and achievement tests, and participating in a full-time gifted programme in grades 6, 7 and 8, it was concluded that learning is more usefully conceptualized somewhat separately by at least three domains (Logical/Mathematical, Linguistic, and Social/Emotional), than as occurring more uniformly across domains (Keating, 1991; Matthews & Keating, 1995; Matthews, in press). Factor and correlational analyses of students' scores on several measures in the three domains converged in defining relatively autonomous domains, and illustrated that those who were working at a gifted level on measures in one domain were very often not working at gifted levels in the other domains. There was almost as much diversity by subject area in the self-contained gifted classrooms as within regular classrooms, with scores in the identified-gifted classrooms ranging from one standard deviation below the mean to four standard deviations above the normative mean in each domain.

Giftedness as Developmental Advancement

Gallagher and Courtright (1986) observed that the term *gifted* is used interchangeably to refer to two markedly different constructs. Under the first use of the term, giftedness describes exceptionally high performance in a variety of mental processes, such as memory, reasoning, and association, and includes the top scorers on intelligence and other psychometric tests. The second use of the term is tied to educational practice, specifically the need to accommodate those students whose academic abilities are considerably more advanced than those of their age-mates. The first, giftedness as a generally superior quality of mental functioning, has an aura of mystery and can never be fully or uncontentiously quantified. The second, giftedness as subject-specific academic mastery that is not matched by regular age-level school programming, is relatively straightforward to understand, assess, and communicate; it simply describes the nature of an academic misfit between individuals and certain school settings.

The prevalent educational practice is to graft together and confuse these two constructs, with a focus on finding "the gifted child" using the first (mysterious) sense of the gifted construct, for placement in a gifted academic programme, which usually implies the second meaning of the term (academic mastery) (cf., Clark, 1983; Coleman, 1985; Janos, Fung, & Robinson, 1985; Renzulli, 1978, 1988).

Bloom (1985) reported on a retrospective study of talent development that used as subjects 120 of the highest achievers in the United States, in three different achievement domains (artistic, athletic, and cognitive). One of the strongest findings emerging from this research was the emphasis on the developmental role of personal interaction. A critically important part of the mastery process in every case was the mediation of learning by social interaction. Talent, Bloom stated, was only identified after, and not before, significant effort had been invested in the domain of future achievement. Giftedness in the case of these exceptionally high achievers was described as occurring developmentally, with appropriate socially-mediated experiences, and not as an innate quality of the individual that had always been present. Individuals' exceptional real-world potential, one can conclude from this study of very high achievers in a number of

domains, is not something that can be meaningfully understood independently of, or prior to, high achievement.

In their discussion of the two models of giftedness contrasted above, superior quality of mind/brain versus academic advancement, Gallagher and Courtright (1986) suggested that the major problem associated with viewing giftedness as academic advancement is that it excludes the culturally disadvantaged and different, because of their lower likelihood of high achievement. However, if students whose home environments are culturally different or economically disadvantaged are not achieving at advanced academic levels, then offering them the opportunity to participate in gifted programmes is of questionable benefit. If--keeping in mind the importance of grounding gifted education in domain-specific content mastery--the programme is adequately differentiated, then it will presume higher levels of domain-specific knowledge and competence, rendering it frustrating and confidence-eroding for those who have not mastered previous levels. If gifted programmes are used as means of achieving equity for students from disadvantaged backgrounds, such programmes either cease to address the needs of developmentally advanced students, or they work to exacerbate feelings of inferiority and inequity in students selected not because of their gifted-level needs, but because of their cultural, racial, gender, or economic status.

Educators concerned with the provision of services to gifted students often encounter charges of elitism, and experience hostility from those parents and educators not involved in gifted education themselves. If giftedness is defined as an identified mismatch between a student's developmental level and the programming that is normally offered, and used only to prescribe more appropriate (that is, more difficult) programming, it becomes much less troublesome. Harder and/or faster schoolwork is not usually seen as a prize to be envied. This forms a striking contrast to the situation frequently encountered when the rewards for making the (mysterious) gifted identification cutoff include special out-of-school trips, extra computers, smaller classes, more enthusiastic teachers, better responsiveness to self-directed learning, and/or more discourse, all of which have been demonstrated as beneficial for all children. Surely resentment and charges of elitism are predictable and perhaps justified in such situations.

Keating (1991) points out that the developmental model of giftedness can provide a shared perspective for educational agendas that have traditionally competed for scarce resources. When the explicit objective is to match instruction to developmental needs, then those concerned with gifted education align themselves, instead of competing with, educators addressing needs related to learning disabilities and developmental diversity generally. In addition to its being consistent with what is known about how gifted-level ability develops, this approach has obvious political benefits, leading to more harmonious and collaborative school environments where the special needs of all children are more likely to be well met.

Adapting Instruction in the Regular Classroom

Classroom-Based Assessment of Developmental Advancement by Domain

Proposed here is a model of giftedness as developmental advancement that--in a particular context--requires educational programming adaptation. Contingent on this model, and consistent with the adaptive education model (Shinn,1989; Wang & Walberg, 1985), advanced students should be identified not as globally gifted (i.e., generally better and faster students than others), but as requiring special education in a particular subject area at a particular point in time, something which can almost always be delivered in the context of a regular classroom, at least as a central home base. Such identification should be based on a demonstrated mismatch between the individual's competence and the regular curriculum being provided in that subject area.

Defining or identifying intelligence/giftedness on the basis of general intellectual ability, as measured by intelligence and aptitude tests, has been strongly criticized as being empirically and conceptually inadequate for many reasons (Frederiksen, 1986; Gould, 1981; Keating & MacLean, 1987; Sternberg, 1985). To summarize these criticisms, intelligence tests sample too small a segment of what is important to human functioning and elevate this as "intelligence." They do this in a test-specific environment, where better test takers will achieve better scores, regardless of competence on any real-world criteria of interest. Perhaps most problematic of all, argue the critics, the scores, averaged over several separate subdomains, are very often used as if they were stable

measures of innate general ability, although they take into account neither intra-individual variations in abilities by domain, nor inter-individual maturational-timing or cultural differences.

Students, for example, whose current educational needs are markedly domain-specific, can easily be missed when screening or identification consists of grade- or age-appropriate testing that yields an average of scores across several areas. This includes children like one who is ready for grade 9 mathematics, but who is in grade 5 by virtue of her age. Although she might achieve the requisite global intelligence test score, it is also possible that her interests and abilities are math-specific and that, in spite of clearly needing special programming in mathematics, she would not score highly enough overall to meet the general cutoff criterion for inclusion in gifted programming.

If the model outlined here--giftedness as developmental advancement by domain--is applied to gifted education, our practice of identifying "the gifted child" is radically reconceptualized. Instead of searching out an inner, unseen essence of a person, like exceptionally high intelligence or creativity, we would instead be assessing, by subject area, a student's zone of proximal development (Vygotsky, 1930/1978). A primary educational goal (as with all children) would be an understanding of students' zones of declarative and procedural knowledge that are both challenging enough to be interesting, and familiar enough to be mastered.

The major goal of gifted assessment would be to find those students whose domain-specific mastery exceeds grade-level programming to the extent that little is being learned by subject-specific grade-level classroom participation. These students would be differentiated from those for whom classroom material is being mastered very quickly and thoroughly. A given classroom's top achievers (who are most likely to be identified as "gifted" by teachers without experience in this area) are quite frequently in the latter category, and need little or nothing in the way of special programming. If a student's educational needs can be well met without modification, there is no problem. It is only those for whom little is happening of educational value who need to be considered for instructional adaptations.

Intelligence-fair assessment is naturalistic, contextually-embedded, regular, and ongoing, as well as sensitive to individual differences and

developmental levels (Gardner, 1988, 1991, 1993). Identifying special educational needs, then, ought to be an ongoing process, by subject area, a process clearly integrated with programming and curriculum. Gardner (1991) offers many examples of successful domain-specific programming that is integrated with assessment, such as Pittsburgh's Art PROPEL, and various computer programs in mathematics and physics. With this kind of integrated assessment and programming, there is a natural match between a student's developmental level and education, and no need for labelling as gifted. This approach--assessment integrated into the classroom, and seen as part of the learning process--is described by Hargreaves and Earl (1990) as "one of the greatest practical and conceptual leaps to be made in assessment reform" (p. 139).

This assessment model gives individual attention to students' learning, on an ongoing in-classrooom basis. It is consistent with Vygotsky's research findings (1930/1978), showing the educational benefits of assessing each student's zone of proximal development in each subject area, and offering guidance, learning opportunities, and discourse with that in mind. In order to conduct such assessment, teachers (or their assessment consultants) need to be deeply and broadly familiar with the domain being assessed; they must understand the content and procedures across several years of curriculum in order to assess mastery and readiness that transcend the current year's programming.

An assessment strategy consistent with this approach is the use of process folios, students' personal records of their work, described in some detail by a number of writers (Blumenfeld, Soloway, Marx, Krajcik, Guzdial, & Palincsar, 1991; Hargreaves & Earl, 1990; Purves, 1993; Wright & Borland, 1993). These can be compiled, as detailed by Gardner (1991) in three main sections: (1) all public records, examination results, certificates, etc. achieved by the student, (2) the skills, knowledge, and attitudes attained, as documented through performance-based assessment, and (3) a personal description of achievements and experiences. These portfolios can be used to accomplish many goals for students, including the opportunity for reflection; an enhanced sense of ownership, or responsibility for educational experiences and achievements; more rounded evidence of competence and success; and the content and context for an ongoing mentorship or close contact with a teacher. Most relevant to present purposes, process folios provide a way of integrating

assessment into the learning process, and of giving coherence and context to a reporting system.

Part of a developmentally relevant classroom-based assessment process is the infrequent but regular (perhaps yearly) use of above-grade (out-of-level) content-based achievement testing in all subject areas (Cohn, 1988; Keating, 1991). Broad-based, psychometrically sound instruments, such as the *Stanford Test of Academic Skills,* (3rd ed.) (1989), which tap into reasoning skills and minimize penalties due to lack of familiarity with specific content details, can be particularly useful in identifying domain-specific developmental advancement. By using such tests at above-grade levels, ceiling effects, which otherwise obscure high level individual differences, are minimized (Keating, 1991); there is a starting point identified in the process of matching a student's course of study to his developmental level.

A mismatch requiring special education is then identified for those students scoring extremely well. When, for example, a student scores above the 90th percentile on a test designed for two grades above her own, it suggests that her developmental needs will not be met by standard grade-level instruction in that domain. This approach is of most use in the traditional academic domains of language and mathematics, where standardized tests have been most systematically developed. In other subject areas, dynamic assessment approaches, including process folios, can assist in observing students' special abilities and in informing teachers in their curriculum decisions, with regard both to content and process (Bolig & Day, 1993; Gardner, 1991; Kornhaber, Krechevsky, & Gardner, 1990; Purves, 1993).

Implications for Programming: Working Toward Creating a Wide Range of Options

There are many ways to meet students' diverse giftedness needs. The wider the range of options available, the more likely a teacher, parent, or school is to find an appropriate match for a particular student (Cohn, 1988; Cox, Kelly, & Brinson, 1988; Keating, 1991; Kornhaber et al., 1990). From a perusal of the giftedness literature, some low-cost programming options to consider are these:

1. Single-subject enrichment, whereby students with high level needs in a given domain are offered enriched learning experiences in that domain (Cohn, 1988; Cox et al., 1988; Renzulli, 1988).

2. Cross-grade and cross-panel expertise and resource access, using all available school-based resources (teachers, classes, materials, students) at all levels (pre-school through university) for meeting individual students' diverse domain-specific needs (Cohn, 1988; Cox et al., 1988; Lupart & McKeough, 1991).

3. Single-subject acceleration, whereby students with higher instructional levels are placed in the grade level appropriate to their mastery, in the appropriate subject area(s) (Cohn, 1988; Keating, 1991; Stanley & Benbow, 1986).

4. Early admission and acceleration, whereby generally advanced students are placed in classrooms better matched to their mastery levels (Callahan & Hunsaker, 1992; Cohn, 1988; Feldhusen, 1992; Shore, 1991).

5. Fast-pacing and curriculum compacting (Cohn, 1988; Cox et al., 1988; Keating, 1991; Lupart & McKeough, 1991; Renzulli, 1988; Stanley & Benbow, 1986; VanTassel-Baska, 1995).

6. Project-based learning, whereby high level students are assisted in developing meaningful projects on which they can be helped to work in some depth over time (Blumenfeld et al., 1991; Kornhaber et al., 1990; Wright & Borland, 1993).

7. Guided independent study (which can include project-based learning), allowing students with particular interests to explore their interests somewhat independently of normal classroom constraints, but making sure that sufficient and appropriate guidance is provided (Bloom, 1985; Howe, 1990; Kornhaber et al., 1990).

8. Career exploration built into curriculum, such that students with exceptional ability are helped to explore a wide range of appropriate and unconventional career possibilities (Jacobs & Weisz, 1994; Shore, 1991).

9. Special classes in subject areas for top-level students, selected across large populations (Cohn, 1988; Cox et al., 1988; Goldstein, Stocking, & Godfrey, in press; Keating, 1991).

10. Mentors from the community and/or educational system (Kornhaber, et al., 1990; Pleiss & Feldhusen, 1995; VanTassel-Baska, 1995; Wright & Borland, 1992).

11. Apprenticeships; opportunities to work in areas related to interests, with experts in those areas (Bloom, 1985; Howe, 1990; Kornhaber et al., 1990).

12. Special camps, clubs, contests, and fairs, at local, regional, national, and international levels (Cohn, 1988; Cox et al., 1988; Goldstein et al., in press).

Because each of these options has strengths, weaknesses, pitfalls, and optimal applications that have been discussed in considerable detail elsewhere, teachers with little experience working with gifted needs can make best use of an Options List like this when they have some help from gifted or adaptive education specialists, or when they have (through training) become such specialists themselves. Most important, from the standpoint of the domain-specific developmental perspective advocated here, is the recognition that giftedness is not a category of special person, but rather a designation that a mismatch exists between an individual's developmental level in a school subject area, and the educational provisions normally available at that level. The goal of gifted programming then becomes attempting to effect a better development/curriculum match, taking into account as many aspects as possible of each student's emotional and cognitive development, as well as important practical constraints such as resource availability and access.

By putting into place some strategies for assessing students' gifted-level needs, and having available some options for addressing such needs, even when informal and somewhat haphazard, educators can go a long

way to making school a better place for the highly exceptional students who can otherwise suffer terrible boredom in the regular classroom; boredom that can have serious behavioural, intellectual, and psychological consequences. When implemented with thoughtfulness and flexibility, this approach to curriculum adaptation can be effective in addressing developmental mismatches, while obviating some of the problems associated with more formal approaches to gifted identification and programming.

Conclusion

It has been argued here that giftedness is an exceptionality that is best considered by content domains rather than globally, and that it is most usefully considered a developmental construct with relevance to school programming. When thinking about gifted education, or the needs of a particular gifted child, the most appropriate questions are: Gifted in what context? In what domain? Where is the mismatch and how can it best be addressed? What resources are available in the classroom, in the home, in the school, in the community, and beyond, that might be applicable? The identification and programming procedures that have been recommended here, based on these arguments, are school-based, contextually-relevant, ongoing, and domain-specific. They attempt to move beyond the labelling of giftedness, and toward an adaptive education model where assessment and programming are integrated in the regular classroom, each informing the other, in a continuous spiral fashion.

More specifically, it is proposed that above-grade testing be administered infrequently but regularly (perhaps yearly), with the aim of systematically identifying those students whose competence far exceeds what is being offered in the regular grade-level programme in that area. This, it is suggested, is best combined with ongoing, curriculum-based, dynamic assessment techniques such as process folios. Where instruction and developmental level are seriously mismatched in a particular domain at a particular time, then a need for creative and flexible student-responsive programme modification has been identified.

References

Bamberger, J. (1982). Growing up prodigies: The mid-life crisis. In D. H. Feldman (Ed.), *Developmental approaches to giftedness and creativity* (pp. 61-77). San Francisco: Jossey-Bass.

Bamberger, J. (1986). Cognitive issues in the development of musically gifted children. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 388-413). New York: Cambridge University Press.

Benbow, C. P. (1988). Sex differences in mathematical reasoning ability in intellectually talented preadolescents: Their nature, effects and possible causes. *Behavioral and Brain Sciences, 11,* 169-232.

Benbow, C. P., & Stanley, J. C. (Eds.). (1983). *Academic Precocity: Aspects of its development.* Baltimore: Johns Hopkins University Press.

Bloom, B. S. (Ed.). (1985). *Developing talent in young people.* New York: Ballantine.

Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist, 26* (3 & 4), 369-398.

Bolig, E. E., & Day, J. D. (1993). Dynamic assessment and giftedness: The promise of assessing training responsiveness. *Roeper Review, 16* (2), 110-113.

Callahan, C. N., & Hunsaker, S. L. (1992). To accelerate or not to accelerate: Evaluation gives the answer. *Gifted Child Today, 15*(2), 50-56.

Chi, M. T. H. (1978). Knowledge structures and memory development. In R. S. Siegler (Ed.), *Children's thinking: What develops?* (pp. 73-96). Hillsdale, NJ: Erlbaum.

Chi, M. T. H. (1981). Knowledge development and memory performance. In M. Friedman, J. P. Das, & N. O'Connor (Eds.), *Intelligence and learning* (pp. 221-231). New York: Plenum.

Chi, M. T. H. (1985). Changing conceptions of sources of memory development. *Human Development, 28,* 50-56.

Clark, B. (1983). *Growing up gifted.* Columbus, OH: Merrill.

Cohn, S. J. (1988). Assessing the gifted child and adolescent. In C. J. Kestenbaum & D. T. Williams (Eds.), *Handbook of clinical assessment of children and adolescents* (pp. 355-376). New York: New York University Press.

Coleman, L. J. (1985). *Schooling the gifted.* Menlo Park, CA: Addison-Wesley.

Cox, J. R., Kelly, J., & Brinson, P. (1988). The pyramid project: Implementing the Richardson Study recommendations. *Roeper Review, 11,* 37-43.

Feldhusen, J. F. (1992). Early admission and grade advancement for young gifted learners. *Gifted Child Today. 15*(2), 45-49.

Feldhusen, J. F. (1995). Talent development: The new direction in gifted education. *Roeper Review, 18,* 92.

Feldman, D. H. (1986). *Nature's gambit: Child prodigies and the development of human potential.* New York: Basic Books.

Feldman, D. H. (1991). Why children can't be creative. *Exceptionality Education Canada, 1* (1), 43-51.

Frederiksen, N. (1986). Toward a broader conception of human intelligence. *American Psychologist, 41* (4), 445-452.

Gallagher, J. J., & Courtright, R. D. (1986). The educational definition of giftedness and its policy implications. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 93-111). New York: Cambridge University Press.

Gardner, H. (1983). *Frames of mind.* New York: Basic Books.

Gardner, H. (1988). *Assessment in context: The alternative to standardized testing.* Cambridge, MA: Harvard Project Zero.

Gardner, H. (1991). *The unschooled mind: How children think and how schools should teach.* New York: Basic Books.

Gardner, H. (1993). *Creating minds: An anatomy of creativity seen through the lives of Freud, Einstein, Picasso, Stravinsky, Eliot, Graham, and Gandhi.* New York: Basic.

Glaser, R. (1984). Education and thinking: The role of knowledge. *American Psychologist, 39,* 93-104.

Goldstein, D., Stocking, V. B., & Godfrey, J. J. (in press). What we've learned from talent search research. In N. Colangelo & S. G. Assouline (Eds.), *Proceedings of the Third Henry B. and Jocelyn Wallace National Research Symposium on Talent Development* Charleston, WV: Trillium Press.

Glaser, R. (1985). Cognition and adaptive education. In M. C. Wang & H. J. Walberg (Eds.), *Adapting instruction to individual differences* (pp. 82-90). Berkeley, CA: McCutchan.

Gottfried, A.W., Gottfried, A.E., Bathurst, K., & Guerin, D.W. (1994). *Gifted IQ: Early developmental aspects.* New York: Plenum.

Gould, S. J. (1981). *The mismeasure of man.* New York: Norton.

Hargreaves, A., & Earl, L. (1990). *Rights of passage: A review of selected research about schooling in the transition years.* Toronto: Queen's Printer for Ontario.

Hoge, R. D. (1988). Issues in the definition and measurement of the giftedness construct. *Educational Researcher, 17* (7), 12-16.

Hoge, R. D. (1989). An examination of the giftedness construct. *Canadian Journal of Education, 14* (1), 6-17.

Horowitz, F. D. (1987). A developmental view of giftedness. *Gifted Child Quarterly, 31,* (4), 165-168.

Howe, M. J. A. (1990). *The origins of exceptional abilities.* Oxford, England: Basil Blackwell.

Jackson, N. E., & Butterfield, E. C. (1986). A conception of giftedness designed to promote research. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 151-181). New York: Cambridge University Press.

Jacobs, J. E. & Weisz, V. (1994). Gender stereotypes: Implications for gifted education. *Roeper Review, 16,* 152-155.

Janos, P. M., Fung, H. C., & Robinson, N. M. (1985). Self-concept, self-esteem and peer relations among gifted children who feel different. *Gifted Child Quarterly, 29* (2), 78-82.

Keating, D. P. (1980). Four faces of creativity: The continuing plight of the educationally underserved. *Gifted Child Quarterly, 24* (2), 56-61.

Keating, D. P. (1988). *Adolescents' ability to engage in critical thinking.* National Center on Effective Secondary Schools publication. Madison WI: Wisconsin Center for Education Research, University of Wisconsin-Madison.

Keating, D. P. (1991). Curriculum options for the developmentally advanced: A developmental alternative to gifted education. *Exceptionality Education Canada, 1,* 53-83.

Keating, D. P., & MacLean, D. J. (1987). Cognitive processing, cognitive ability and development: A reconsideration. In P. A. Vernon (Ed.), *Speed of information-processing and intelligence* (pp. 239-270). Norwood, NJ: Ablex.

Kornhaber, M., Krechevsky, M, & Gardner, H. (1990). Engaging intelligence. *Educational Psychologist, 25* (3 & 4), 177-199.

Lupart, J., & McKeough, A. (1991). Toward an integrated model of gifted education. *Exceptionality Education Canada, 1* (1), 1-12.

Matthews, D. J. (in press). Diversity in domains of development: Research findings and their implications for gifted identification and programming. *Roeper Review.*

Matthews, D. J., & Keating, D. P. (1995). Domain specifity and habits of mind: An investigation of patterns of high-level development. *Journal of Early Adolescence, 15,* 319-343.

Pleiss, M. K., & Feldhusen, J. F. (1995). Mentors, role models, and heroes in the lives of gifted children. *Educational Psychologist, 30*(3), 159-169.

Purves, A. C. (1993). Setting standards in the language arts and literature classroom and the implications for portfolio assessment. *Educational Assessment, 1* (3), 175-199.

Rabinowitz, M., & Glaser, R. (1985). Cognitive structure and process in highly competent performance. In F. D. Horowitz & M. O'Brien (Eds.), *The gifted and talented: Developmental perspectives* (pp. 75-98). Washington, DC: American Psychological Association.

Renzulli, J. S. (1978). What makes giftedness? Re-examining a definition. *Phi Delta Kappan, 60,* 180-184, 261.

Renzulli, J.S. (1988). A decade of dialogue on the three-ring conception of giftedness. *Roeper Review, 11* (1), 18-25.

Shinn, M. R. (Ed.). (1989). *Curriculum-based measurement.* New York: The Guilford Press.

Shore, B. M. (1991). Building a solid professional knowledge base in gifted education. *Exceptionality Canada, 1*(1), 85-102.

Spearman, C. (1932). *The abilities of man.* London: MacMillan.

Stanford Test of Academic Skills. (3rd ed.). (1989). Cleveland, OH: Psychological Corporation.

Stanley, J. C., & Benbow, C. P. (1986). Youths who reason exceptionally well mathematically. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 361-387). New York: Cambridge University Press.

Sternberg, R. J. (1985). *Beyond IQ: A triarchic theory of human intelligence.* N.Y.: Cambridge University Press.

Thurstone, L. L. (1938). *Primary mental abilities.* Chicago: University of Chicago.

VanTassel-Baska, J. (1995). The development of talent through curriculum. *Roeper Review, 18,* 98-102.

Vygotsky, L. S. (1978). *Mind in society.* Cambridge, MA: Harvard University Press. (Original work published 1930, 1935 and 1960).

Wang, M. C., & Walberg, H. J. (Eds.). (1985). *Adapting instruction to individual differences* (pp. 82-90). Berkeley, CA: McCutchan.

Wright, L. & Borland, J. H. (1992). A special friend: Adolescent mentors for young, economically disadvantaged, potentially gifted students. *Roeper Review, 14,* 124-129.

Wright, L., & Borland, J. H. (1993). Using early childhood developmental portfolios in the identification and education of young, economically disadvantaged, potentially gifted students. *Roeper Review, 15,* 205-210.