THE

INTERNATIONAL ENCYCLOPEDIA OF EDUCATION

SECOND EDITION

Volume 5

Editors-in-Chief

TORSTEN HUSÉN
University of Stockholm, Sweden

T. NEVILLE POSTLETHWAITE
University of Hamburg, Germany

PERGAMON

CONTENTS

Identification and Programming of the Gifted and Talented

Within the literature on giftedness there are two important areas of interest: the identification of talented children, and provision of programs to meet their special educational needs. Provision of special programs for the gifted depends on a thorough and detailed identification procedure. As this entry will show, there are different conceptions of giftedness which lead to different approaches. This entry pre-

sents giftedness as a multidimensional concept which needs a multilevel identification procedure.

Through observation of individual differences in achievement and in the solving of challenging tasks, it can be conjectured that giftedness originates from differences in individual competency. While such an explanatory hypothesis is plausible, it is a matter of debate as to whether giftedness is determined more by cognitive, motivational, or sociocultural factors. Some even suggest that the use of the concept of giftedness should be completely discarded and that more behavioral concepts such as high performance or excellence be employed instead. Others equate giftedness in general with performance criteria. As will be demonstrated, this solution has not done justice to important functions of giftedness diagnostics and gifted education.

1. Interdependence Between Theory and Method

A distinction should be made between descriptive and explanatory concepts of diagnosis and education of the gifted. Using descriptive concepts, giftedness is seen as talent in mathematics, technical subjects, linguistic, music, sports, and other areas. This talent may be displayed in multiple or single forms of talent. In the Terman tradition giftedness was considered isomorphic with general high intelligence (g-factor in the Spearman sense). In the 1990s, however, the view of differential or multidimensional concepts of giftedness predominates (Sternberg and Davidson 1986). Thus the Harvard Project Zero (Gardner 1989), Project Spectrum (Feldman et al. 1989, Ramos-Ford and Gardner 1991) or the Munich Longitudinal Study of Giftedness (Heller and Hany 1986, Heller et al. 1990) and other studies (cf. Subotnik and Arnold 1993) are based on a taxonomy of multiple talents or giftedness concepts. Three examples are presented here.

(a) Gardner's Theory of Multiple Intelligences consists of seven intellectual domains as relatively independent human cognitive competences: linguistic talent, logical–mathematical talent, spatial intelligence, musical intelligence, bodily–kinesthetic intelligence, and inter- versus intrapersonal intelligences (see Gardner 1985, Ramos-Ford and Gardner 1991).

(b) Gagné's Differential Giftedness Talent Model. This has three major components: (i) four giftedness or aptitude domains (intellectual, creative, socioaffective, sensorimotor); (ii) five fields of talent (academic, technical, artistic, interpersonal, athletic); and (iii) so-called catalysts with two general types: intrapersonal catalysts (e.g., motivation, curiosity, autonomy, perseverance), versus environmental catalysts (e.g., family or parents, siblings, peers, teachers or school) (see Gagné 1993).

(c) The Munich Giftedness Model. This comprises five talent domains: (i) intellectual ability, (ii) creativity, (iii) social competence, (iv) artistic/musical ability, (v) psychomotor ability, and several performance areas (i.e., languages, mathematics, sciences, technology, handicraft, social relationships, arts, music, and sports) (Heller and Hany 1986, Heller 1991). The description and analysis of the interrelationship of potential for talents and actual performance, in which cognitive and noncognitive personality preconditions, situational or social contextual conditions concerned, are based on a multifactorial causal model of giftedness and talent. It includes moderator variables in the sense of Gagné's catalysts.

"High ability or giftedness is thus defined as the individual (e.g., cognitive, motivational) and social resources for outstanding achievement in one or more domains such as mathematics, languages, or artistic tasks which involve difficult theoretical or practical aspects" (Heller 1989 p. 141). Sternberg has postulated (six) cognitive, affective–conative, and environmental resources for a multivariate concept of creativity in his Investment Theory (Sternberg and Lubart 1991 p. 3).

The definition of giftedness and talent will also be determined by methodological problems, such as the choice of measurement instruments and the decision strategy in the field of the diagnosis of giftedness and talent. These could illuminate the interdependence between subject matter and methodology (see Heller 1989, Feldhusen 1992)

Explanatory concepts regarding giftedness and talent are hardly less problematic. These concepts differ from one another in the significance they attach to personality and/or sociocultural determinants in the structure of giftedness (e.g., Renzulli and Reis 1991a, Gagné 1993, Tannenbaum 1986). The development of giftedness can be examined using a process analysis approach, rather than a status diagnosis (or product analysis). Sternberg's Triarchic Theory of Human Intelligence and Sternberg's Triarchic Abilities Test (Sternberg 1991) are models of research in this field.

The cognitive component approach is based on information theory assumptions. Starting from experiments on analogous thinking, Sternberg developed his Triarchic Intelligence Theory with three subtheories: (a) contextual, (b) two-faceted, and (c) componential theories. The contextual subtheory views intelligence as culture specific; i.e., intelligence is defined in the sociocultural context as "environmental adaptation, selection, and shaping" (Sternberg 1986 p. 223). The two-faceted subtheory attempts to resolve the apparent contradiction between the assumptions in learning theory and thought theory. Thinking is especially necessary in problem-solving when the knowledge and infor-

mation base is inadequate; e.g., when the problem is new to the individual. In addition to insight, transfer from previous learning is necessary to solve such problems. Differentiation is made in the componential subtheory of intellectual giftedness between (a) metacomponents as "specific realizations of control processes," (b) performance components "used in the execution of various strategies for task performance," (c) knowledge-acquisition components (selective encoding, selective combination, selective comparison) "used in gaining . . . declarative and procedural . . . knowledge" (Sternberg 1986 p. 225).

Three kinds of giftedness are organized according to these "loci of information processing": analytic, synthetic, and practical abilities (Sternberg 1991 p. 45). The Sternberg Triarchic Abilities Test provides seven subscores: for analytic, synthetic, automatization, and practical abilities, as well as verbal, quantitative, and figural processing. "The test is being devised at nine levels ranging from kindergarten to adult, and in two forms. I view one special use of the test as for identifying gifted individuals. The advantage to the use of a test such as this one is that intellectual giftedness is defined much more broadly than would be the case if one used only a single IQ score" (Sternberg 1991 p. 51).

Renzulli differentiated between "schoolhouse" and "creative-productive giftedness." This differentiation is both problematic and interesting, especially with respect to the trait- versus cognitive–psychological approach to the diagnosis of giftedness. The prominence of both forms of giftedness imply the following questions relevant for diagnosis: (a) What is the relationship between school achievement and creativity? A loose general relationship is assumed but is unclear (cf. Siegler and Kotovsky 1986 p. 420). (b) What is the relationship between the creativity in childhood and adulthood? The relevant research also provides no clear answer. Thus Tannenbaum (1986) surmised that true creative performance is only possible in adulthood. Feldhusen (1986) pointed out that there is no clear proof regarding the validity of creativity tests given during childhood as predictors of an adult's creative production. The available results could mean that the tests are not useful for diagnosis or that there is no systematic relationship between creativity in childhood and adulthood. (c) What is the relationship between school achievement and aptitude in adulthood? Critics of the psychometric skill orientation refer to low predictor–criterion correlations. However, relatively close relationships on the basis of psychometric foundations have been shown (Siegler and Kotovsky 1986). Some preliminary conclusions may be offered.

(a) The replacement global measures, such as IQ, by differential constructs of giftedness and talent is overdue. Even though a vast international consensus prevails in theoretical discussions about this, the practice of giftedness identification is still repeatedly oriented toward a single predictor (IQ score).

(b) Good intellectual and creative potential must at least be components in any conceptualization of what is being called academic giftedness. Guilford's threshold hypothesis concerning the relationship of intelligence and creativity has not yet been convincingly refuted. This means that exceptional creative production is very improbable without above average intellectual abilities; however, the reverse is conceivable (i.e., high intelligence in combination with moderate characteristics of creativity).

(c) The popular question of whether the hypothetical construct of giftedness can be better viewed as a static disposition (trait) or as a dynamic (achievement) process only seems to be a problem in theory rather than in reality. Aside from the fact that such a differentiation is hardly more than a division of the topic, methodologically, it does not seem functional. Viewed closely, all process diagnostic procedures (e.g., learning tests) yield solely intermittent results which permit only indirect conclusions about the interim events in pretest–treatment–posttest design or in time-sequence analyses.

2. *Functions of Identification*

Two main functions of identification considered here are: (a) talent searches as a means to nurture gifted and talented children and adolescents, and (b) diagnosis of giftedness and talent as an aid in prevention and intervention.

The search for talents for particular support programs is legitimized through (a) the right of every individual to recieve optimal nurturance of talents and development and, (b) the societal demands on each individual, as well as on the gifted, to make an appropriate contribution to society. Identification procedures, however, should serve first the developmental needs of the individual. Furthermore, a comprehensive, differential evaluation of supportive measurements should be an indispensable component of every talent search (Buchanan and Feldhusen 1991).

Individual diagnosis can provide information about the prevention of problems in individual behavior and performance, social conflicts, education, and (general) social difficulties insofar as giftedness can (directly or indirectly) be responsible for them. It has been adequately demonstrated that a continual lack of challenge to a child (due to failure to recognize giftedness), pressure to conform (e.g., based on the fear of negative labeling effects), insecurity of adults in connection with their dealing

with gifted children and youth, and feelings of threat or envy could lead to behavior problems and conflicts between gifted individuals and their social environment.

When problems exist, continuous ignorance of gifted individuals is more to blame than "evil" intentions. If estimations are correct, and the number of unidentified gifted individuals is approximately 50 percent, then it is easy to judge which ommissions (at least in relation to an individually appropriate nurturance of development) are caused by not adequately diagnosing giftedness and developmental level. Underserved gifted students can be found in the female population, in minority groups, and among the handicapped. Identification procedures are incomplete: "We know that current identification procedures present major difficulties when attempting to identify gifted disadvantaged and culturally diverse children" (Frasier 1991 p. 235). In addition advocacy for special programs is increasing. According to Renzulli and Reis (1991b), this requires "flexible identification procedures and that we pay serious attention to including traditionally underrepresented groups of individuals whose potentials are manifested in ways other than test scores" (p. 182).

A paper by George (1992) on identification is followed by provision of programs, strategies for teaching, and enrichment. The Office of Talent Identification and Development at the Johns Hopkins University focuses its research and programming on three "Ds": discovery, description, and development.

Even when one considers methodological shortcomings in the available research on problems in psychosocial adaptation, it is impossible to overlook the numerous situations that concern the development of giftedness and corresponding socialization educational problems.

3. Methodological Problems of Identification

Questions regarding methodology include criteria, sources of diagnostic information, specific sources of error, diagnostic decision strategies, effectiveness and economy of the selection strategy, and whether to use static diagnostic information or dynamic process data (Heller 1989, Feldhusen 1992).

The selection of criteria depends on the concept of giftedness and talent used and the aims of identification and the educational program. Diagnostic sources of information include life data, questionnaire data, and test data (in the sense of Cattell). Accordingly, measurement methods include behavioral observations (real life and work situations), checklists (with operationalized behavioral characteristics of giftedness and talent) of nomination procedures, i.e., teacher, parent, self- and peer-nominations, the latter especially to find creativity and leadership potential (Gagné 1989, 1991), and diagnostic interviews as well as standardized tests. In school and educational counseling settings, biographical analyses or something similar often are useful supplements. For the identification of gifted youth, an adequate set of observation instruments are required, with well-delineated scale and test quality characteristics (objectivity, reliability, validity).

Ceiling effects may have to be dealt with when normed tests do not adequately differentiate in the top region of the scale. An additional problem is the bandwidth-fidelity dilemma. That is, achieving simultaneously the necessary variety of content (or construct) validity and an adequate precision (reliability) may be difficult. The bandwidth-fidelity dilemma is generally approached using a sequential diagnosis approach. Early in this process, a general screening takes place in which a wider range of factors is included at the expense of exact measurement. The screening can include checklists, often in combination with rating scales. Parents and educators nominate a certain number of children who fit the listed talent characteristics. In the next step, more precise test procedures are employed for the determination of the individual talent dimensions. In the ideal case, this would include status and process diagnostic approaches. Finally, individual conditions and relevant criteria are collected; e.g., training programs and their success. In the final selection, the analyst must be aware of the well-known regression phenomena (the statistical tendency of extreme samples to regress toward the average of the population).

Such selection decisions generally include risks. The risk of type I or alpha error consists of a person being identified as gifted when he or she is, in fact, not gifted. The risk of type II or beta error is manifested when a person who is gifted is not identified as such. The first type of error can be reduced by increasing, the second by decreasing the decision value (cut-off point), such as the IQ value. (It is impossible to reduce risk of both types of errors at the same time.) Generally, it is in the individual's best interests when type II errors are reduced.

The quality of a selection strategy is related to its effectiveness and economy. Effectiveness can be defined here as a percentage of the highly gifted already determined in the screening. The economy is determined by the percentage of the really gifted in the screened group. This criterion is thus a measure of the differentation ability of the entire identification process. It is desirable to have a high effectiveness and a high economy. Finally, there should be examination of the alternatives of status and process diagnostics in the identification of the gifted. Status diagnostics are aimed at measuring trait characteristics such as intellectual and creative abilities, motives, and interests or product-oriented characteristics such as learning and memory performance.

For this purpose, process diagnostic approaches should at least supplement the above. These have the advantage of measuring those thought processes, learning styles, and coping styles that are characteristic of the gifted. This type of instrument is to be found, for example, in the Test of Number Series and Analogies (TZRA) or the Test of Spatial Arrangement (TRE). These scales were developed within the framework of the Munich Longitudinal Study of Giftedness. They serve to measure simultaneously divergent–convergent problem-solving processes as they are characteristic of the gifted according to Sternberg's component model (Facaoaru in press, Hany 1992).

In contrast, the employment of traditional intelligence tests often leads to ceiling effects; e.g., as in the Wechsler Intelligence Tests (WISC-R or WAIS) and Raven's Progressive Matrices (CPM, SPM). The main problem with most formal tests is that they do not differentiate well in the upper region critical to giftedness diagnoses. The best solution seems to be modern differential ability tests with adequately difficult test items in the upper regions of the scale. Thus, in a Dutch study (Mönks et al. 1986), the Intelligenzstrukturtest (IST), a German intelligence test, was successfully employed. There is also the German version of the Cognitive Abilities Test (CAT—KFT 1–3 and KFT 4–13+), which was used in the Munich Giftedness Study (Heller 1991, Hany 1992).

Competitions play an important role in the discovery of giftedness. Despite their unquestionable motivating function, this form of selection can only be used in a limited way. The limitation usually comes from the nomination procedure which determines who may participate in a given competition.

In conclusion, it appears that a combination of formal and informal status and process diagnostic procedures as well as various sources of information should be used in identification. Successive decision strategies regarding the final selection is to be preferred aiming at the reduction of risk of type II errors. Informing parents, teachers, educators, and counselors about behavior characteristics typical of giftedness, as well as providing gifted youth with appropriate developmental help, are the prerequisites for a successful identification process.

4. Identification Before School Age?

From a developmental viewpoint, the discovery of giftedness should take place as early as possible. The newborn child is an active learner from the very beginning. He or she depends greatly on the responsiveness and stimulation of the caregiver. The caregiver contributes in a substantial way to development of the competence motivation, that is an organism's capacity to interact effectively with its environment. Under favorable conditions a child can develop in an optimal way. Parents wish to know whether their child is gifted and what to do about its education. Intellectually gifted children often start reading and calculating before kindergarten but in the literature there is no evidence concerning the relationship between precocious reading and giftedness (Jackson 1988). In addition, there is no guarantee that children will attain eminence given early detection and appropriate education. It is a widespread misconception that identification of giftedness at a certain point in a child's life means that he or she will continue to produce outstanding achievement over the years. "The many other kinds of intervening variables that affect long-term productivity are far too complicated to make such long-range predictions" (Renzulli 1990 p. 325).

5. Appropriate Program Services

Most theorists and researchers agree that multiple measures should be used to identify gifted children. Discovery of cognitive as well as personality and social characteristics of the gifted child is a necessary step in setting up instructional programs, but the reality is that multiple data sources are rarely used to specify appropriate provisions. A great variety of program and service options are used to meet the special needs of gifted and talented children (see Heller et al. 1993).

Program services can be clustered by acceleration and enrichment and by homogenous and heterogenous grouping. Acceleration means that instruction is provided at a level and pace in accordance with the child's level of ability so the child works at a higher level and/or faster pace than class- or agemates. It can also mean early entrance to elementary school or college and grade skipping. In China, for example, programs exist for radical acceleration. Able students can skip two years out of six in elementary school and another two out of six years of secondary education. Therefore a student can advance four scholastic years and enter college or university at the age of 14 years. This kind of radical acceleration has many opponents who argue that it may have an adverse effect on the student's socio-emotional development and that it can lead in later years to severe adjustment problems. So far, research has shown that acceleration as such does not create adjustment problems or emotional disturbance (Daurio 1979). Moreover, follow-up indicates that accelerated students show a consistent pattern of healthy personality development compared with a control group of capable nonaccelerants (Cornell et al. 1991 p. 135).

A well-known and widely applied extracurricular accelerative program is the study of Mathematically Precocious Youth (SMPY), which started in 1971 at the Johns Hopkins University in the United States. This program was started and has since been directed

by J Stanley. He has demonstrated that "SMPYers" are healthy and develop well without damage to their personality (Stanley 1991). Many case studies support this. Stanley therefore raises the question: "Why do many gifted-child specialists consider acceleration of a specifically gifted youth's progress through a particular school subject irrelevant or undersirable?" (Stanley 1991 p. 40). Daurio (1979), after reviewing 182 books and articles, came to the following conclusion: "No studies have shown enrichment to provide superior results over accelerative methods. Enrichment at best may only defer boredom until a later time. . . Most resistance to acceleration stems from concerns about the socioemotional development of the accelerated student. When the facts are studied, however, we find that such adjustment problems generally are minimal and short-lived" (p. 53). The controversial discussion between proponents and opponents has been essentially the same throughout the 1970s and 1980s. Nevertheless, research is needed. Longitudinal research permits matching gifted children with nongifted children and controls to come to a better understanding of whether or not acceleration has a stressful effect on the personality of the gifted. It also could provide information about whether adjustment problems in a gifted population are higher (or maybe even lower) than in an average population.

Enrichment means greater breadth and greater depth. The gifted student studies subjects that are usually not offered in the regular curriculum and/or the gifted student gives deeper attention to regular subjects. Enrichment should be challenging and prohibit boredom and loss of school motivation. Often it happens that enrichment programs are not meaningful for the student and they prohibit him or her from following their own level and pace of ability. Schools do not always have the opportunity to offer the appropriate programs that meet the particular needs of gifted children. Gifted students often gain more from source other than the school. Gallagher (1991) put it in this way: "There are at least three other variables that would seem to have more influence on student outcome than the school: (a) the student's own abilities and aptitudes, (b) the attitude of the family to education, and (c) the cultural milieu in which the student lives" (p. 18).

Often it happens that enrichment is used to keep gifted students busy. One practice that has became more popular is cooperative learning. Gifted students are often used as moderators, because the assumption is "they do have it so why shouldn't they give!" This practice is not a fair enrichment for gifted and more able students if enriching material for the gifted child is not included. Enrichment should be accompanied by change or improvement of curriculum content level and, if appropriate, by pacing.

There is a great variety of instructional practices to realize enrichment and/or acceleration. They can be summarized under the headings homogenous and heterogenous grouping. Grouping is an organizational measure and not an improvement of the program. Change of programs is based on instructional improvement: i.e., level and pace of the provided program. Homogenous grouping is by and large ability grouping. For example: Gifted students of a heterogenous classroom are "pulled-out" to study with other very able students in special classes in a different setting for a certain period of the school week. They remain members of the regular classroom and are pulled out for the opportunity to interact with their intellectual peers (see Vaughn et al. 1991 p. 93). Close examination of research indicates that pull-out programs have significant positive effects on achievement, critical thinking, and creativity. There are no indications that self-concepts are affected by the pull-out programs (Vaughn et al. 1991 p. 92).

Ability grouping can be categorized along two lines: (a) between-class grouping: (b) within-class grouping. Between-class grouping may include: ability-grouped class assignment; ability grouping for selected subjects; nongraded plans (flexible grouping by performance level, flexible pacing for individual students); and special classes. Within-class ability grouping includes: mastery learning; regrouping by subject (similar to between-class grouping for individual subject instruction); and individualized instruction.

Ability grouping intends to reduce group heterogeneity. Within-class grouping is actually a heterogenous grouping, because the gifted student remains in his or her regular classroom and the special instruction takes place in that setting. In heterogenous grouping the following forms of programs can be realized: early entrance (elementary school, college); grade skipping; continuous progress curriculum (the student moves ahead at his or her own rate and pace); compacting (the time normally required for a subject or topic is reduced so that the student can gain time for other subjects; see Renzulli's revolving door system); and interest grouping (this can be realized within and between classes).

In addition, there are many forms of extracurricular programs like the SMPY (cf. Stanley 1991). As stated above, there is no general indication as to which program best serves the needs of gifted children. Enrichment and extension of the regular curriculum are valuable for many children and often help the gifted child to remain interested in school matters, but enrichment is seldom followed by acceleration. It is evident that the school has to serve all children; that is, to provide a differentiated curriculum so that the gifted child can learn at his or her level of ability. Again and again public discussion focuses on what is a fair approach in schools. For example, discussion has concentrated on ability

grouping versus cooperative learning. Proponents of cooperative learning have claimed that it is "the most effective means of serving the needs of all students, even the 'gifted'" (Mills and Durden 1992 p. 13). This statement is invalid because there has never been a comparison between cooperative learning and all other instructional practices. What can be concluded is the following: "Used appropriately and optionally, either in combination or alone, cooperative learning and ability grouping are both useful educational practices" (Mills and Durden 1992 p. 14). From a developmental viewpoint it can also be concluded that students model their behavior on that of others who are of similar ability and who are not too different. Research on peer interaction (i.e., interaction with a developmentally similar person) is essential for the development of each child. The gifted child needs another peer for the development of his or her full potential, as other children do.

Explicit programs for the gifted are seldom found in Europe. However, in most countries inherent programs do exist. The school reform movement in the early 1920s in Europe had a considerable impact on the school system. The main complaint had been that schools did not serve the needs of children but that students had to adjust to schools. The reform movement gave the child a central position: schools as educational institutions should contribute to an optimal development of each child. Reformers such as Maria Montessori, Peter Petersen (Jenaplan schools), and Helen Parkhurst (Dalton schools) had a great influence on the then existing systems. Many schools throughout Europe adopted the principles of these school reformers. Ability grouping (within as well as between classes) became an inherent instructional practice in those schools. Level and/or pace of the curriculum became to a great extent individualized. For example, in the Dalton schools students could continue according to their own pace. These inherent programs for serving the gifted were never named gifted programs, however, because they also served slow and normal learners.

6. Conclusion

Talent searching and flexible identification procedures to serve all able children are needed. Usually more effort has been invested in the detection of culturally and socially disadvantaged individuals, but minority students can benefit from gifted programs. Follow-up research has indicated that for able minority students not being included in a gifted program can have a devastating effect.

There is also a need for a great variety of programs for various kinds of gifted children and adolescents. Close examination of the literature (Southern et al. 1993) indicates that accelerative and enrichment programs do have positive effects on individuals if the educational and instructional practices meet the needs of the gifted and, even more important, when there is a supportive home and school environment. Moreover, for a healthy psychological development a child needs mutual exchange of experiences and the sharing of joy and problems with a peer: a person similar to him or her. Identification and programming can help the gifted to grow up happier and be better adjusted. They cannot predict later eminence.

See also: Gifted and Talented Learners in Special Populations; Cognitive Development: Individual Differences; Teaching: Aptitude-Treatment Interaction Model; Intelligence, Learning, and Instruction

References

Buchanan N K, Feldhusen J F (eds.) 1991 *Conducting Research and Evaluation in Gifted Education: A Handbook of Methods and Applications*. Teachers College Press, New York

Cornell D G, Callahan C M, Loyd B H 1991 Socioemotional adjustment of adolescent girls enrolled in a residential acceleration program. *Gifted Child Quarterly*. 35(2): 58–66

Daurio S P 1979 Educational enrichment versus acceleration: A review of the literature. In: George W C, Cohn S J, Stanley J C (eds.) 1979 *Educating the Gifted—Acceleration and Enrichment*. Johns Hopkins University Press, Baltimore, Maryland

Facaoaru C in press *Der Test der Zahlenreihen und–analogien (TZRA)*. Huber, Bern

Feldhusen J F 1986 A conception of giftedness. In: Sternberg R J, Davidson J E (eds.) 1986 *Conceptions of Giftedness*. Cambridge University Press, Cambridge

Feldhusen J F 1989 Synthesis of research on gifted youth. *Educ. Leadership*. 46(6): 6–11

Feldhusen J F 1991 Identification of gifted and talented youth. In: Wang M C, Reynolds M C, Walberg H J (eds.) 1991 *Handbook of Special Education*, Vol. 4. Pergamon Press, Oxford

Feldman D H et al. 1989 *Project Spectrum: July 1987-June 1989*, Final Annual Report to the Spencer Foundation. The Spencer Foundation, Chicago, Illinois

Frasier M M 1991 Disadvantaged and culturally diverse gifted students. *Journal for the Education of the Gifted* 14(3): 234–45

Gagné F 1989 Peer nominations as a psychometric instrument: Many questions asked but few answered. *Gifted Child Quarterly* 33(2): 53–58

Gagné F 1991 Constructs and models pertaining to exceptional human abilities. In: Heller K A, Mönks F J, Passow A H (eds.) 1993

Gallagher J J 1991 Educational reform, values, and gifted students. *Gifted Child Quarterly* 35(1): 12–19

Gardner H 1985 *Frames of Mind: Theory of Multiple Intelligences*. Basic Books, New York

Gardner H 1989 Zero-based arts education: An introduction to Arts Propel. *Stud. Art Educ.* 45(2): 71–83

George D 1992 *The Challenge of the Able Child*. David Fulton, London

Hany E A 1992 Identifikation von Hochbegabten im Schulalter. In: Heller K A (ed.) *Hochbegabung im Kindes- und Jugendalter*. Hogrefe, Göttingen

Heller K A 1989 Perspectives on the diagnosis of giftedness. *The German Journal of Psychology*. 13(2): 140–59

Heller K A 1991 The nature and development of giftedness: A longitudinal study. *European Journal for High Ability* 2: 174–188

Heller K A, Hany E H 1986 Identification, development and achievement analysis of talented and gifted children in West Germany. In: Heller K A, Feldhusen J F (eds.) 1986 *Identifying and Nurturing the Gifted.* Huber, Toronto

Heller K A, Perleth C, Sierwald W 1990 The Munich longitudinal study of giftedness. In: Bailey S, Braggett E, Robinson M (eds.) 1990 *The Challenge of Excellence.* Barker and Co, Melbourne

Heller K A, Mönks F J, Passow A H (eds.) 1993 *International Handbook of Research and Development of Giftedness and Talent.* Pergammon Press, Oxford

Jackson N E 1988 Precocious reading ability: What does it mean? *Gifted Child Quarterly* 32(1): 200–04

Mills C J, Durden W G 1992 Cooperative learning and ability grouping: An issue of choice. *Gifted Child Quarterly* 36(1): 11–16

Mönks F J, Boxtel H W van, Roelofs J J, Sanders M P M 1986 The identification of gifted children in secondary education and a description of their situation in Holland. In: Heller K A, Feldhusen J F (eds.) 1986 *Identifying and Nurturing the Gifted.* Huber, Toronto,

Ramos-Ford V, Gardner H 1991 Giftedness from a multiple intelligences perspective. In: Colangelo N, Davis G A (eds.) 1991 *Handbook of Gifted Education.* Allyn and Bacon, Boston

Renzulli J S 1990 "Torturing data until they confess": An analysis of the analysis of the three-ring conception of giftedness. *J. Educ. Gifted* 13(4): 309–31

Renzulli J S, Reis S M 1991a The schoolwide enrichment model: A comprehensive plan for the development of creative productivity. In: Colangelo N, Davis G A (eds.) 1991 *Handbook of Gifted Education* Allyn and Bacon, Boston

Renzulli J S, Reis S M 1991b The reform movement and the quiet crisis in gifted education. *Gifted Child Quarterly.* 35(4): 26–35

Siegler R S, Kotovsky K 1986 Two levels of giftedness: Shall ever the twain meet? In: Sternberg R J, Davidson J E (eds.) 1986 *Conceptions of Giftedness.* Cambridge University Press, Cambridge

Southern W T, Jones E D, Stanley J C 1993 Acceleration and enrichment: The context and development of program options. In: Heller K A, Mönks F J, Passow A H (eds.) 1993

Stanley J C 1991 An academic model for educating the mathematically talented. *Gifted Child Quaerterly.* 35(1): 36–42

Sternberg R J 1986 A triarchic theory of intellectual giftedness. In: Sternberg R J, Davidson J E (eds.) 1986 *Conceptions of Giftedness* Cambridge University Press, Cambridge

Sternberg R J 1991 Giftedness according to the triarchic theory. In: Colangelo N, G A Davis (eds.) 1991 *Handbook of Gifted Education* Allyn and Bacon Boston

Sternberg, R J, Davidson J E (eds.) 1986 *Conceptions of Giftedness.* Cambridge University Press, Cambridge

Sternberg R J, Lubart T I 1991 An investment theory of creativity and its development. *Hum. Dev.* 34(1): 1–31

Subotnik R, Arnold R (eds.) 1993 *Beyond Terman: Longitudinal studies in Contemporary Gifted Education.* Ablex, Norwood, New Jersey

Tannenbaum A J 1986 Giftedness: a psychosocial approach. In: Sternberg R J, Davidson J E (eds.) 1986 *Conceptions of Giftedness.* Cambridge University Press, Cambridge

Vaughn V L, Feldhusen J F, Asher J W 1991 Meta-analyses and review of research on pull-out programs in gifted education. *Gifted Child Quarterly* 35(2): 92–98

F. J. Mönks; K. A. Heller