

Gifted and Talented Education: A Review of Relevant Literature

Educating the gifted can create certain difficulties for schools, particularly with regard to how they decide who is gifted and, once identified, how those children can best be served. Educating the gifted has begun to pose more of a problem for districts since the advent of No Child Left Behind (NCLB). Since Adequate Yearly Progress (AYP) demands that all students make progress toward improvement, those who are very far behind the norm may receive the lion's share of academic attention, while those who are already topping out and therefore make little or no AYP may receive far less. At the same time, the movement away from tracking has pushed for an inclusive classroom: one in which students of all abilities reside and must be educated, but this is sometimes to the detriment of certain groups. A review of pertinent research articles taken from educational journals and publications offers some insight to the most pressing issues facing districts regarding gifted and talented (GT) education: What is the best method for assessing and identifying gifted and talented learners? Once identified, what does research indicate are the best practices for meeting their needs? What might be the long term impact of the servicing choices districts make?

Identification: A Case for Multiple Measures

Identifying gifted learners would appear to be rather straightforward in theory: test scores and classroom attitudes, ability to reason and assimilate information all seem self-evident. But in practice, identified gifted populations in districts have been disproportionately white and lacking in both minority and low socio-economic students, indicating that methods of identification may be better at measuring socio-economic levels rather than identifying actual gifted potential. Other processes focus disproportionately on "academic leaders," or students who are high achieving and successful in the classroom, but some of the established characteristics of giftedness actually may manifest in boredom leading to misbehavior or may even be misdiagnosed as another condition entirely. In this model, the underachiever and misbehaviorer may be omitted, to their further detriment. Research indicates some steps districts can take to ensure that they are appropriately considering all students and identifying those who need focused attention and accelerated coursework.

Familiarity with the Characteristics of Giftedness

Characteristic of gifted learners as compared to regular learners established by research are a starting point for educators. These characteristics include:

1. Greater processing speed for both simple and complex tasks. The flow of information is faster from intake to output.
2. More thorough problem solvers who use a wider array of strategies to solve problems.
3. Employ more metacognitive strategies and are better at assessing their ability to learn something or complete a learning task.
4. Able to sustain attention to a problem.
5. Superior memory and more efficient retrieval.
6. Advanced ability for abstraction and generalization during learning.

7. Can learn with less direct instruction – in other words, they can to some extent teach themselves. (Kettler, 2014)

It is noteworthy that some of these characteristics, coupled with a lack of appropriate acceleration and differentiation, might lead to disruptive behavior or disengagement/withdrawal in the regular classroom (Valpied, 2005). The ability to process information more quickly than regular students means a student may arrive at a conclusion or understanding long before the rest of the class or even before the teacher is finished explaining the issue. Faced with lag time while the rest of the class catches up, s/he may look for other activities to occupy that time, some of which may be disruptive. Likewise, a gifted child who wants to spend more time on a problem may become frustrated when forced to leave it and move to another activity. While this in no way exonerates all misbehaviors, it does highlight the importance of not excluding behaviorally-challenged children from the possible pool of gifted learners. It may even indicate the necessity of more closely examining the root of misbehavior. A further characteristic, examined in some intriguing recent research, is that of the Need for Cognition (NCF), which is a tendency among gifted learners to “engage in and enjoy effortful, cognitive endeavors” (Meier, Vogel & Preckel, 2014 p. 39). This is a student who seeks out challenging cognitive work and who may even be mildly distressed by work s/he perceives as too easy. Because NCF is a strong predictor of attendance in gifted programs, it should be explored as a means of identifying students for gifted instruction. Positive academic self-concept and a high interest in math are also cited as predictors of attendance in gifted classes and indicates that these, too, should be explored as identifiers of giftedness (Meier et. al, 2014).

Kitano’s (1990) research into “psychological intensities” sheds further light on characteristics which often go hand in hand with intellectual giftedness, but which may be interpreted negatively. She found a relationship between intellectual precocity and the following characteristics:

- Liking to do things different from the group
- Impatience with peers
- Preoccupation with abstract ideas
- Preference for independent work
- Persistence
- Enthusiasm
- Vigorous in pursuit of problem solving
- Approaches learning situations seriously
- Need for recognition

Kitano also found a trend in the data for those with higher emotional sensitivity (reaction either positively or negatively to emotional outbursts from others or to stressors) to be associated with higher levels of originality, though this is hard to measure using traditional means. All of these characteristics can be “flipped,” or made to be either positive or negative, depending on how they are perceived by the observer. Liking to do things differently from the group can make a child either original (good) or a non-conformist (not so good). Impatience with peers can be interpreted as a sign of immaturity (bad) or of advanced intellect (good). Preferring to work alone may look like an excellent understanding of one’s academic needs or like poor socialization and immaturity. A need for recognition can be perceived as clingy and immature (bad) or conscientious fact checking (good). Vigorous pursuit of problem solving is good until the student refuses to leave a science project while the rest of the class is going to music. Further research indicates that some GT characteristics can be misinterpreted as ADHD or other similar

disorders. Interestingly, a research has demonstrated that some of these intensities which may bring a child into conflict with his/her environment are ameliorated when that child is placed in a learning situation with his/her intellectual peers, particularly those characteristics which on a cursory basis appear to be issues of socialization and maturity (Valpied, 2005).

Valpied's (2005) research into institutional interpretation and response to some of the characteristics of giftedness demonstrated that on occasion, parents, rather than the schools themselves, pushed for a child's inclusion in a gifted program. While this would not hold true for every case, in Valpied's research, the schools interpreted the students' daydreaming and frustration with tasks as mere average ability, rather than recognizing the child's need for more complex tasks. In nearly all cases, the teacher had interpreted the gifted characteristics as things which in fact negated giftedness – things such as disorganization, lack of productivity, and antisocial behavior. Disorganization, in particular, is common to gifted children, but is often seen as a negating factor. Lack of productivity, too, which may occur because a child sees no value in completing a task that is of no interest or that holds no meaning, is often cited as a negating factor (Valpied, 2005.) It is not difficult to extrapolate from this research ways in which other factors might prevent children from being assessed for gifted intervention – factors such as English language proficiency, poverty of experience, timidity, or behavior issues.

Instruments for Assessing and Identifying Students for Gifted Instruction

Test scores are often the primary basis for inclusion in gifted programming, but Joseph Renzulli (2011), a national expert in gifted education and the director of the National Research Center on the Gifted and Talented cautions against the use of state and national norms when identifying making decisions regarding gifted and talented inclusion. Using local norms helps to ameliorate the still-low representation of low-income and minority students in gifted programming.

While test scores are limiting enough, sometimes only certain portions of test scores are examined to determine inclusion. Those portions are likely to be verbal reasoning or ability and logic/math ability, either because this is all the state/national/local exams test or because this is the traditional bias of gifted instruction and IQ tests. Reliance solely on these two areas for inclusion in gifted instruction may undervalue students whose giftedness lies in less traditional areas. Some evidence exists for the use of a Multiple Intelligences (MI) approach to gifted identification, primarily because it proposes a range of approaches rather than a single avenue of identification. Preliminary data indicated that an MI approach to identification results in less bias (more low-income students identified). Further evidence indicated that even adding just one additional intelligence type to gifted assessments increased the diversity of the identified population (Fasko, 2001). However, this method and philosophy do pose further issues for districts, namely how to structure instruments to assess the various intelligences, and how to administer and score them while controlling for bias.

An intriguing piece of older research offers interesting insight in to the problem of identifying gifted students. In this study, which was seeking ways of nurturing potential in students who might be gifted but had not been identified as such by traditional means and did not have the verbal skills to provide sufficient clues to their potential, the researchers used a battery of identifiers designed to identify children with the *potential* to be identified as gifted if their latent talents were nurtured. The battery included, among other things, the Cartoon Conservation Scale (tests Piagetian development using

pictures), Diagnostic Thinking Tasks (examines how students think/cognitive ability), Draw a Person (helps assess cognitive development), a Rating of Student Potential (to be completed by teachers) and a Student Interview and Peer Survey. The peer survey asked other students questions such as “Who is really funny? Who makes up stories? Who usually knows the answers? Who is good at building things?” In essence, the children’s peers identified their potential. The fascinating result of this battery was a pool of children that closely paralleled the ethnic makeup of the schools involved in the study without any manipulation of the selection process to achieve that result (Johnson, Starnes, Gregory & Blaylock, 1985). Approximately 40% of the students identified and involved in the nurturance program were later identified as GT via traditional identifiers and enfolded into the GT program. While this research is old, it does shed light on ways of identifying potential when potential has not fully manifested itself in achievement or when potential may be obscured by a lack of English skills, poverty, or some other mitigating factor. The use of the student survey is of particular interest, since it highlights the possibility that ability in math or other academic areas may be readily identified by other students even in Limited English Proficient situations.

Just as giftedness can take many forms, gifted children may look very different from one another. Issues of poverty or language may mask giftedness, as may perceived “antisocial” behaviors or even misbehavior. Districts must be careful not to exclude children based on misconceptions about giftedness and how it manifests itself.

Teaching the Gifted and Talented: Options and Best Practice

Options

Some of the deepest controversy in gifted education centers around which method of education is best, both in terms of academic effectiveness in given areas of study and social and emotional growth. A number of options exist for districts such as acceleration, enrichment, pull out programs, and grouping. Each provides a different avenue for students and instructors, and each has certain caveats and concerns to be considered.

Acceleration

Acceleration can take several forms:

- **Accelerated Study:** Students have early entrance/early exit options. This lends itself well to standards based instruction: if the student can demonstrate and document mastery s/he has the opportunity to move forward. Students move up the grades at their own pace regardless of age.
- **Content Acceleration:** Similar to accelerated study, but allows the student to move forward in content only, not in grade level. In other words, a third grader might be allowed to do fourth grade work while remaining in third grade. Currently, math is usually the only content area that enjoys this freedom. One problem inherent in this option is the perception that students shouldn’t progress too far beyond their peers, so the content acceleration is capped at some

point, usually 6-12 months ahead at the elementary level. On the secondary level, content acceleration takes the form of honors classes, AP courses, International Baccalaureate courses, or dual-enrollment programs.

- Grade Level Acceleration: Students showing more than 2 years advancement in all subjects are allowed to skip grades. Determined after careful consideration of individual students.
- Telecommunication Options: Essentially provides advanced coursework via available technology. (VanTassel-Baska, 2005)

Acceleration is the most effective strategy for gifted students (Gallagher, Smith & Merrotsy, 2011), but is also the most controversial of the options available, primarily because of concerns that students who are allowed to advance will suffer social and emotional issues as a result of not being with their same-age peers. However, the students themselves regard acceleration as positive and many report being happier when allowed to advance. Research shows that their psychological and emotional needs were unaffected, which suggests a link between those needs and academic needs, rather than the two existing in a zero-sum relationship as has previously been supposed. (Kim, 2006) It is important to note that acceleration alone is not enough to ensure success. Success is still dependent on the quality of the teachers and their willingness to differentiate and also dependent to some extent on the parents and their dedication and involvement (Kim, 2006).

Enrichment

Enrichment is the practice of going deeper in a particular content area when a student demonstrates mastery of concepts or advanced understanding. Enrichment can be a powerful tool because it accommodates both student interest and real world application. This is one of the easiest modes of education to incorporate into the classroom because it can be planned for and included in the regular curriculum. For example, a teacher could introduce new learning for 4 days, then have a day in which students who mastered the learning participate in enrichment activities while those who didn't are given additional help. Like acceleration, it is reliant on quality teaching and effective differentiation (as opposed to more practice of the same concepts) for success. Enrichment can be combined with content acceleration which accommodates both student interest and acceleration of the linear curriculum in specific subjects (Kim, 2006).

Pull-Out Programs

In a pull-out program, gifted students are taken out of the regular classroom by a specialized teacher and given advanced and/or enriched instruction in particular subject areas. It has the advantage of allowing gifted students to work with their intellectual peers where their precocity will not seem out of place or weird. Since teachers typically work with only a small portion of the total student body, the number of students is usually low, increasing opportunity for more targeted differentiation. Research indicates that pull-out programs for enrichment have resulted in increased achievement in critical and creative thinking, especially if the pull-out was an extension of the regular curriculum (Rogers, 1993). One disadvantage of this type of program is that classroom teachers sometimes require gifted students to make up work they missed while participating in the pull-out, resulting in the child having to do twice

as much work. Another disadvantage is that pull-out programs require additional staff and are more costly. Because of this, they are sometimes among the first to be eliminated in times of economic crisis (Brulles & Winebrenner, 2012). Occasionally programs of this nature may be perceived as elitist, particularly if districts are not careful to control for bias in the inclusion process. This type of program is used more frequently at the elementary level.

Grouping

Grouping goes by several names: clustering, flexible grouping, ability grouping, etc. Essentially, it means students with similar intellectual ability are grouped together within the regular classroom to work on accelerated content or enrichment. Grouping is not the same as tracking, which funnels all students of a particular ability range into a single class and tends to be inflexible with regard to movement between tracks. Current research regards grouping within classes as one of the non-negotiable options for serving GT students even to the point that within-class grouping should be used in classes composed entirely of GT learners (VanTassel-Baska, 2005). As a strategy for educating gifted learners, ability grouping in math can produce academic gains a month greater than those of GT students who are not ability-grouped, even without adjusting the curriculum (Kim, 2006). Ability grouping has the added advantage of enabling appropriate pacing for GT students and producing greater achievement and more positive attitudes (Kim, 2006); it facilitates diagnosis of the student's level and prescription of necessary interventions and enrichment to advance progress; and it increases the likelihood that teachers will actually differentiate instruction and curriculum, which research has demonstrated they will do with more fidelity for a group of GT students and less fidelity if only one or two are present in their class (Brulles and Winebrenner, 2012). Since teachers spend about 84% of class time in the heterogeneous classroom doing whole-class activities (Van-Tassel-Baska, 2005) ensuring that differentiation occurs is an important consideration. Additionally, gifted students themselves are more likely to take advantage of differentiated learning opportunities if there are others working at advanced levels. They may also attempt more challenges and be more comfortable and confident learning with their intellectual peers (Brulles & Winebrenner, 2012). Cluster grouping (in which GT students are all placed in one or two classes rather than spread evenly across all classes) within the heterogeneous classroom has produced large gains in academic achievement across subjects, whether students are grouped for acceleration or enrichment (Rogers, 1993). Interestingly, while ability grouping is widely used in reading, more evidence exists for its efficaciousness in math where it has produced significant academic gains for elementary students (Rogers, 1993). The extreme end of grouping is to place all gifted students full time in classes designed expressly for them. However, this is usually unpopular, not because it doesn't work but because it is seen as limiting appropriate socialization, promoting elitism, and possibly damaging other students' academic self-concept (Gallagher et al., 2011).

The One Grouping that Doesn't Work

It has long been asserted that mixed-ability learning groups are benefitted by the inclusion of gifted students. In such groups, gifted, high achieving, average, below average and far below average students are combined to, in theory, maximize learning for all involved, but especially for average, below average and far below average students, who will, it is supposed, benefit from the example of the high achievers

and gifted students in the group. While this presents a charming picture of the inclusive and egalitarian ideal, the actuality deviates substantially. Probably the most surprising revelation is that non-GT learners did *not* show improvement in academic achievement when placed in mixed ability learning groups with GT learners (Kim, 2006). Gifted learners are often not effective as academic role models in part because their reasoning is intuitive and leapfrogs over connecting concepts, rather than being linear (Brulles & Winebrenner, 2012). Additionally, inclusion of GT learners in mixed groups resulted in a decrease in non-GT students' academic self-concept – in other words, they saw themselves as poor learners in the presence of GT learners (Brulles & Winebrenner, 2012).

Research also indicates that gifted learners made no academic gains when placed in mixed-ability group settings (Kim, 2006; Rogers, 1993). And it is not an enormous leap to conclude that the comfort GT learners feel in the presence of their intellectual peers translates to discomfort when isolated as the lone GT learner in a mixed ability grouping. Additionally, there is a tendency for teachers to use GT learners as peer tutors instead of differentiating for GT learning, regardless of the student's readiness for such a task (Bernal, 2003). Not surprisingly, GT learners often resent being placed in that role (Brulles & Winebrenner, 2012).

One of the reasons that mixed-ability grouping doesn't work as well as might be hoped is that the inclusive classroom can contain a range of abilities, the sheer breadth of which makes differentiation difficult for the teacher (Brulles & Winebrenner, 2012). This has led some to suggest that the range of abilities be limited in the classroom so that the teacher with GT students does not also have the far below average students. Not, as may be supposed, to track them, but to reduce the total range of abilities in any given classroom (Brulles & Winebrenner, 2012). Additionally, Brulles and Winebrenner advocate for separating the GT learner from the high achieving learner, because high achieving learners out of the presence of GT learners will often 'step up to the plate', as it were, and emerge as academic leaders. Thus, in their estimation, the most effective classroom would have gifted *or* high achieving students, and below average *or* far below average. The one thing all the research agrees on is that grouping, done correctly, produces academic gains for gifted learners *and* non-gifted.

The general consensus of the research is that all these modes of gifted instruction should be utilized as needed and in combination for the greatest academic effect. Gifted learners should have as many options as it is possible for a district to offer in order to ensure that all students' needs are met. And like all other forms of education, gifted education is not a one-size-fits-all proposition.

Best Practices

While the logistics of gifted learning can be carried out in a variety of ways, research points to a number of best practices in the gifted classroom. Many of these practices have made their way into regular instruction as a result of the push for inclusionism in the wake of NCLB. Many of these practices are good pedagogy for any student; but they are critical for the gifted learner (VanTassel-Baska & Brown, 2007). These practices include:

- Using advanced curricula in core areas at an accelerated rate;

- Grouping GT learners by subject area for advanced curricular work based on students' level of learning within the subject;
- Embedding multiple higher-order thinking models and skills within core subject area teaching to enhance learning;
- Using inquiry as a central strategy to promote GT learning in multiple modalities; and
- Using student-centered learning opportunities that are issue/problem-based and relevant to the students' world (VanTassel-Baska & Brown, 2007).

Appropriately differentiated curriculum is another critical practice for gifted students, and in VanTassel-Baska's (2005) estimation must be exemplary for the subject matter. Curriculum must be linked to GT learner characteristics, standards-based, and relevant to real world practices. The curriculum must be sufficiently advanced and complex for the best learners in the group, but it must also provide depth and creativity to stimulate open-ended response and high-level choices. Resources must also be differentiated to accommodate student interest and provide challenging ideas and conceptual depth.

Instructional Differentiation is another non-negotiable, whereby teachers use approaches that are inquiry-based, open-ended, and employ flexible grouping practices. In particular, problem-based learning, which allows gifted learners to encounter real-world problems to explore at the highest levels of their ability. Teachers involved in this type of instruction must be well versed in high-level questioning skills and facilitating discussion at a high level to assist students in defining and solving issues. They must also be capable of differentiating products (projects, presentations, assessments) to measure learning in ways that depart from the standard paper-and-pencil exam (VanTassel-Baska, 2005).

The need for Quality Teachers and Supportive Principals

One area in which districts sometimes fail to plan well for their GT populations is in the quality of the teachers assigned to those students. Since these are the front-line individuals, it is critical that they be both willing and well suited for the task of educating the gifted child. Likewise, principals who are uninformed about the efficacy of GT education modes or of gifted learner characteristics, may also serve as roadblocks to success.

Research out of Australia demonstrates that teachers, even though well informed about gifted characteristics, still bought into the myth that acceleration will cause lasting social/emotional harm to students even while they themselves were engaged in the acceleration. Neither understanding of social and emotional development nor of the characteristics of giftedness changed the likelihood that a teacher would accept the myth of the stunted psyche, and in fact half of the teachers of the gifted involved in the study were opposed to at least some forms of acceleration (Gallagher et al., 2011). While this pertained almost exclusively to acceleration, the same research showed that principals were more likely to object to certain forms of ability grouping in the interest of egalitarianism (students) or fairness (teachers). All this suggests that staff development may need to shift its focus from child development issues to issues of efficacy for GT learners, especially since development issues appear to be well understood while efficacy measures do not. Likewise, it underscores the pivotal nature of

principals, who can be facilitators and educational leaders who promote achievement, or who can hinder achievement gains by failing to adequately support or implement measures for gifted instruction.

The current model of inclusionism leads to classrooms which are egalitarian on the surface, but have difficulty serving all students' needs. Bernal (2011) asserts that GT students are particularly ill-served because in his estimation, scattering GT students among several classrooms requires that all teachers be trained in GT instruction and not all teachers are suited, or even inclined, toward such instruction. This assumption that any teacher can teach the gifted is a practice which he calls "professionally naïve" (p. 184). An examination of VanTassel-Baska's (2005) list of the non-negotiable qualities for those who would teach gifted learners lends support to this assertion. In her estimation, teachers of the gifted should be:

- Lifelong learners
- Open to new experiences
- Able to apply new experiences in the classroom
- Passionate about at least one area of knowledge
- Able to communicate that passion to students
- Deeply knowledgeable about at least one subject area with the ability to use that knowledge at a high level
- Good thinkers, able to manipulate ideas at the highest levels of cognitions (analysis, synthesis, evaluation) within and across subject areas (this implies that they were good students themselves)
- Capable of processing information in a simultaneity mode, meaning they can address multiple objectives at the same time while recognizing how students might manipulate different higher level skills in the same task demand and then easily align lower level tasks within those that require higher level skills/concepts.

Succinctly put: "Teacher-directed differentiation for gifted students has no meaning if teachers cannot perform these types of tasks and evidence these skills." (p. 96).

Mathematics research points to the importance of interactive approaches for gifted learners, although the argument could be made that all learners would benefit from these approaches. Research indicates that discussion (more interactive) in mathematics courses was directly correlated with increased achievement. Conversely, a less interactive approach (lecture) was directly correlated with a decrease in achievement (Matthews & Farmer, 2008). Hence, a teacher who merely talks at the students and assigns tasks with little or no interaction or discussion with the concepts and materials would directly hinder student achievement.

Research among potentially gifted low-income and minority students indicated that teachers who carefully planned hands-on lessons and found ways to maximize students' ability to express themselves in non-traditional ways saw gains in achievement that led to identification as GT for a high proportion of students. While not strictly related to gifted instruction, the implications of a hands-on curriculum, thoughtfully implemented by an interactive teacher with a view to maximizing student learning and potential are hard to ignore (Johnson et al., 1985).

Teaching the gifted is, if anything, more cognitively challenging, even at the primary level. It is not a job to which those who have otherwise washed out of the traditional classroom should be relegated, or a

job one is given by virtue of tenure in a position. It is manifestly not a job to which everyone is suited and careful attention must be paid to the vetting and selection of teachers who aspire to this role.

The Danger of Ignoring Gifted Students' Needs

While accelerating and enriching the gifted child does not pose any threat to the child's social and emotional development, *not* accelerating him or her does have a direct effect on things like academic self-concept and attitude.

Kim's (2011) research into gifted primary math students indicated that ability grouping produced more positive attitudes among GT learners, while VanTassel-Baska's (2005) research shows that content acceleration produced positive outcomes in enhanced learning, motivation and extra-curricular engagement. The benefits were felt both in and out of the classroom.

In fact, all types of acceleration and enrichment programs produce varying levels of academic gains for gifted learners over those who were not accelerated. Enrichment programs in particular resulted in increased likelihood of college attendance and improved achievement in critical thinking and creative thinking. Ability grouping within elementary classes is specifically tied to academic gains in math. Cross-grade grouping (non-graded classroom) is linked to positive academic gains in reading and math for students of all ability levels, and large academic gains for GT students allowed to work at their own pace in all subjects (Rogers, 1993).

Providing children with intellectual peers has far-reaching consequences, both in and out of the classroom. Gifted learners are more likely to take advantage of differentiated learning opportunities if they are with a group of students working at higher levels rather than if they are alone in a class of regular learners. Because they are more comfortable with their intellectual peers, they are more likely to attempt greater intellectual challenges – they will, in effect, learn more. And placing them in a group makes it more likely that they will have the opportunity to learn more, as Brulles and Winebrenner's (2012) research demonstrated with regard to the fidelity of teachers actually differentiating the curriculum for gifted learners. The more GT learners there are in a given classroom, the higher the likelihood that the teacher will differentiate.

Valpied's (2005) work with the interpretation of the characteristics of giftedness showed that addressing giftedness, particularly putting gifted learners with their intellectual peers, ameliorated many of the characteristics that might otherwise bring a GT learner into conflict with his/her environment, further underscoring that socio-emotional needs and academic needs are inextricably linked. This research further showed that *not* providing more accelerated academic work and a peer group of intellectual equals could result in a reluctance to attend school, and eventually in the child's abilities "going underground" (p. 20). The child would, in effect, learn to hide his or her giftedness to appear the same as his or her non-gifted peers, and continually choose away from anything that might reveal advanced intellectual ability. The long-term ramifications of this are not difficult to imagine.

Mathematics deserves special attention within the context of gifted instruction. Math is an instructional area where the *opportunity* to learn directly affects achievement because skill in math is not developed in isolation, but rather by undertaking difficult and challenging problems and understanding complex ideas. While linguistic ability and reasoning may be at least partially developed in isolation once a

student attains a certain level of reading competency, mathematics activities require careful planning to ensure proper sequencing and they require oversight to ensure correctness and assess mastery. Planning, sequencing, oversight, assessment – these are all direct functions of teaching (Ysseldyke, Tardrew, Betts, Thill & Hannigan, 2004). Put simply, in math, where there is no instruction, far less achievement occurs. Children denied the opportunity to advance in math are less likely to take challenging math courses as they move up the grades. Algebra I, for example, serves as a gateway to advanced coursework in math and science both through the remainder of high school and into college (Matthews & Farmer, 2008). Performance in Algebra I is a predictor of participation in advanced instruction in both math and science at the secondary level. Students who take it late or take it and don't do well have set in motion a series of events that will impact their entire academic and even professional lives. Recognizing gifted ability in math and nurturing it is of critical import. Some interesting research examining the efficacy of certain modes of gifted math instruction indicated that giving students an instructional management system to allow them to move through the curriculum at their own pace was productive of more benefit than gifted students who were allowed to “teach themselves” using materials. While the purpose of this study was to examine the efficacy of one particular intervention, the finding of the study can be more widely interpreted: gifted math students who are given focused instruction tailored to their ability level, paced in such a way that they can move through the curriculum at their own [advanced] rate, do better. Additionally, GT students attempted more tests and mastered more math objectives than non-GT kids, but also more than the GT kids left to attempt the materials without focused instruction, practice, and support (Ysseldyke et al., 2004).

Gifted learners are a challenge for districts, but a good one, because the potential for success is great. These are children who, once identified and nurtured, almost invariably do significantly better than non-GT students, and even better than GT students without focused attention, instruction, and differentiation. Unfortunately, these are sometimes the learners who get the least attention because their needs appear less great than those who are far below average. Ignoring the needs of the GT learner, however, can have long-term impact both emotionally and academically, particularly in mathematics. Districts that wish to enhance their gifted programs of instruction would do well to ensure their selection processes are free of bias and open to a wide range of students, especially those whose abilities may be masked in some way. Additionally, districts should ensure that acceleration, ability grouping, and appropriate differentiation of the curriculum are available for the gifted students in their care in whatever combination best fits the individual learner, and that those students are entrusted to teachers who are themselves sufficiently cognitively gifted to meet the challenge of educating children of this level. Districts that attend to these practices will find themselves positioned to maximize achievement for these exceptional children.

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