Choosing Between Alternative Models for Educating Jeffco's GT Elementary Students

A Summary of Relevant Research Prepared for the Jefferson County Board of Education and Jeffco GT Parents

March 2013

Jefferson County Association for Gifted Children

Agenda

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Background

- In grades 1 through 6, Jeffco has approximately 4,500 students identified as gifted (i.e., with an Advanced Learning Plan).
- Today, about 33% of these students are educated in GT Center Schools, while the others are educated in neighborhood schools
  - At Center Schools, classes composed of only GT students are taught at one grade level ahead (i.e., accelerated), by GT qualified teachers, who in some cases use different curricula than are found in neighborhood school classrooms
  - None of these conditions consistently apply to GT students' experience at neighborhood schools
- Currently, about 250 GT students are on the waiting list for GT Center Schools
- To address this problem, and to improve the quality of GT instruction, the District has proposed to introduce "Cluster Grouping" at neighborhood schools
  - Cluster grouping places all GT students in a given grade in the same classroom, but mixed with other students
- In essence, the decision problem facing the Jeffco Board of Education is whether to expand the number of GT Center Schools, and/or initiate Cluster Grouping, or do nothing and leave the current system intact
- JAGC has prepared this summary of relevant research to complement research provided by District staff, with the goal of helping the Board to make a transparent, high quality, evidence-based decision on this critical issue for the Jeffco GT community

Framing the Decision Problem

- The the decision problem facing the Board is one that is very familiar to parents and voters who work in the private sector, as it involves underlying issues of effectiveness and efficiency, and how best to combine them to maximize value subject to a budget constraint
- The effectiveness issue is which of two broad approaches to GT education has the highest likelihood of delivering superior median academic growth
  - Acceleration
    - *Having a student work at a grade level above his or her peers in all subjects*
      - By using the "grade ahead" curriculum, as is done in our Center Schools
      - Or by moving the student up a grade
    - *Having a student take a single subject with the next grade higher*
  - Differentiated Instruction that is customized to the needs of students with different abilities
    - *Delivered to groups of students with similar needs*
    - *Or delivered to each student individually (e.g., via blended learning models that combine computer-based and teacher instruction)*

Framing the Decision Problem (cont'd)

- The efficiency issue is which of three different organizational forms has the lowest cost, in terms of incremental cash spending (e.g., on curriculum, average teacher compensation, professional development costs, etc.), and in terms of the amount of teacher time required to implement either an acceleration of differentiated instruction strategy
  - Center Schools, which contain class rooms composed of only GT students, are staffed with GT certified teachers, and may use a different curriculum
  - Cluster Grouping at neighborhood schools where GT students are clustered together, but are still in a classroom with students of other abilities, with teachers who are probably not GT certified
  - Traditional neighborhood schools, where GT students are spread evenly between mixed ability classrooms, and taught by teachers who are almost certainly not GT certified
- The final aspect of the decision problem is how the District and the Board propose to track and communicate the results of the decision that is made, including the ongoing validation of assumptions, the comparison of actual to forecast educational results and cash/time costs, and the conditions under which the Board would expect to see District staff adapt of the original decision
- Thoroughly and transparently evaluating these decision issues is an key aspect of being good stewards of the additional funding provided by Jeffco taxpayers under initiative 3A

Acceleration vs. Differentiated Instruction: Research Findings

- Acceleration can be implemented using a number of different approaches
  - Grade skipping, including starting kindergarten early
  - Staying in the same grade, but using the curriculum for a higher grade
  - Taking one course (e.g., math) with students in a higher grade
- There is a substantial body of research that supports the effectiveness of acceleration
  - The most comprehensive review of the evidence on acceleration is contained in the two volume report from the Templeton Foundation, A Nation Deceived: How Schools Hold Back America's Brightest Students, by Colangelo, Assouline, and Gross
  - The authors conclude that "acceleration is the most effective curriculum intervention for gifted children"; "gifted children tend to be socially and emotionally more mature than their age-mates. For many bright students, acceleration provides a better personal maturity match with classmates"; "The Iowa Acceleration Scale is a proven, effective instrument for helping schools make decisions about whole-grade acceleration"; and "Many educators have been largely negative about the practice of acceleration, despite abundant research evidence for its success and viability."

Acceleration vs. Differentiated Instruction: Research Findings (cont'd)

- A 2011 study further added to the evidence supporting acceleration. In "The Effects of Acceleration on High Ability Learners: A Meta-Analysis", Steenbergen-Hu and Moon found the acceleration has a strongly positive impact on academic achievement, and a slightly positive social-emotional impact
- This latter finding was in line with the conclusion reached by Maureen Neihart in "The Socioaffective Impact of Acceleration and Ability Grouping: Recommendations for Best Practice".
  - She noted the "well documented resistance to the use of acceleration and peer ability grouping for gifted students because of concerns such practices will cause social or emotional harm to students"
  - Neihart concludes that "early school entrance, grade skipping, and early admission to college have socioaffective benefits for gifted students who are selected on the basis of demonstrated academic, social and emotional maturity"
- A 2012 study in Holland reached similar conclusions. In "Social-Emotional Characteristics of Gifted Accelerated and Non-Acclerated Students in the Netherlands", Hoogeveen, van Hell, and Verhoeven found "minimal differences in the social-emotional characteristics of accelerated and non-accelerated gifted students. The few differences we found favored the accelerated students…These results do not support worries expressed by teachers about the acceleration of gifted students."

Acceleration vs. Differentiated Instruction: Research Findings (cont'd)

- Finally, as the U.S. Department of Education follows trends in health care, and puts increasing emphasis on the use of rigorous evidence of program effectiveness (see, for example, Proposed Amendments to Education Department General Administrative Regulations Docket ED-2012-OII-0026), and more specifically, measures of "effect size" (i.e., "how much difference does this make?") rather than just simple statistical significance, the Jeffco Board should consider the most comprehensive meta-analysis ever undertaken of the effect sizes produced by studies of over 100 factors that influence students' educational achievement
- In his widely cited book, Visible Learning: A Synthesis of Over 800 Meta-Analyses Related to Achievement, Professor John Hattie documented and ranked these effect sizes, and found that their average value was .40.
  - An effect size of 1.0 is equal to a .45 correlation between the variable in question and student achievement.
- Based on Hattie's analysis, acceleration had an effect size of .88, compared to .39 for enrichment, .30 for ability grouping of gifted students, and .23 for individualized (differentiated) instruction

Acceleration vs. Differentiated Instruction: Research Findings (cont'd)

- An examination of the research shows that the evidence for the effectiveness of differentiated instruction is much weaker than the evidence for the effectiveness of acceleration
- Differentiated Instruction (DI) has been defined as modifying course content, instructional process, and/or the products used to demonstrate mastery to better align with a student's needs and learning style
- Dr. Carol Ann Tomlinson is the nation's leading proponent of DI. Yet as she observed in the October 2, 2011 *New York Times*, "differentiation is a tool for planning instruction…When used well, it benefits a broad range of learners. When used less well, it is less effective."
- Unfortunately, there is abundant evidence that while DI is attractive in theory, it is very hard to apply in practice because of the additional time demands it places on teachers
- In "Changing the Odds for Student Success: What Matters Most" published in 2010 by Bryan Goodwin of Mid-Continent Research for Education and Learning (MCREL), the author notes that, "to date, no empirical evidence exists to confirm that the total package of differentiated instruction (e.g., conducting ongoing assessments of student abilities, identifying appropriate content based on those abilities, using flexible grouping arrangements, and varying how students can demonstrate proficiency in their learning) has a positive impact on student achievement."
- Goodwin also notes that "some of Tomlinson's own research [e.g., "How Well Are We Addressing Academic Diversity in Middle School?" by Tomlinson, Moon, and Callahan] has found that even in those schools that claimed to be implementing differentiated instruction, few teachers appeared to be opting for differentiation in any form"

Acceleration vs. Differentiated Instruction: Research Findings (cont'd)

- Low levels of differentiated instruction for gifted students were first highlighted in a famous 1993 study by Archambault et al ("Regular Classroom Practices With Gifted Students: Results of a National Survey of Classroom Teachers")
  - In 2002, the findings from this study were replicated in another study by Wesberg and Daoust ("The Results of the Replication of the Classroom Practices Survey in Two States"). Very little had changed in a decade, despite all the research that had been published
- In 2005, Brighton, Hertberg, Moon, Tomlinson, and Callahan published "The Feasibility of High-End Learning in a Diverse Middle School." They concluded that "results suggest that differentiated instruction and assessments are complex endeavors requiring extended time and concentration of effort to master"
- In 2011, Christina Marotta-Garcia published her doctoral thesis on "Teachers Use of a Differentiated Curriculum for Gifted Students." She found "a negative relationship between what teachers reported in surveys [about their use of DI] and what was observed in their classrooms"
- Another dissertation found that while experienced New York City teachers "have a positive impression of differentiated instruction, few believe in its feasibility because of the time and workload involved" ("A Phenomenological Study of Teacher Perceptions of Implementing the Differentiated Instruction Approach" by Gazit Grafi-Sharabi)
- Finally, in the recently published study "High Achieving Students in the Era of NCLB", the Thomas B. Fordham Institute reported the results of an extensive teacher survey, in which 84% of teachers reported that in practice differentiated instruction is difficult to implement. The same survey found 63% of teachers in favor of grade acceleration, 85% in favor of subject acceleration, and 68% in favor of opening more magnet schools for gifted students

Neighborhood vs. Cluster Grouped vs. GT Center Schools: Research Findings

- Unfortunately, detailed information about the incremental cash costs of Cluster Grouped and GT Center Schools compared to "traditional" neighborhood schools is not in the public domain
  - JAGC has asked the Jeffco Board to request staff to provide this information, which we view as an essential aspect of good stewardship of taxpayer funds and professional, transparent decision making
- However, even in the absence of public data, as veterans of many budget processes, we can make some reasonable estimates about this issue
  - Many costs associated with Traditional, Cluster Grouped, and Center Schools should be the same (e.g., building capital and operating expense, base teacher compensation, etc.)
    - *Note that there is no incremental compensation for teachers with GT certifications*
  - Both the Cluster and Center schools may have higher professional development costs, assuming their teachers are required to attend GT PD courses
    - *However, if all teachers must attend the same number of PD courses, then these GT PD costs are not incremental*
    - *We also note research that concludes that having teachers who have taken GT PD courses is critical to the academic gains achieved by GT students in Cluster Grouped Schools (see "Total School Cluster Grouping Model: An Investigation of Student Achievement and Teachers' Classroom Practices" by Jillian Gates*
  - Center Schools may have incremental costs for curriculum materials, while Cluster Schools may have incremental costs related to differentiated GT instruction
  - In sum, it doesn't appear that the incremental cash costs of the Cluster and Center models are likely to be significant

Neighborhood vs. Cluster Grouped vs. GT Center Schools: Research Findings (cont'd)

- In contrast to differences in cash costs, the three models are likely to have very different incremental teacher time requirements (above the execution of the Advanced Learning Plan process), depending on the extent to which they emphasize acceleration or differentiated instruction
- Consider this example:

Traditional Grouping: 30 Students each in 3 Classes	Group 1: Gifted	Group 2: High Achieving	Group 3: Average	Group 4: Below Average	Group 5: Far Below Average
Classroom A	2	4	12	8	4
Classroom B	2	4	12	8	4
Classroom C	2	4	12	8	4

Cluster Grouping: 30 Students each in 3 Classes (from Cluster Grouping Handbook)	Group 1: Gifted	Group 2: High Achieving	Group 3: Average	Group 4: Below Average	Group 5: Far Below Average
Classroom A	6	0	12	12	0
Classroom B	0	6	12	6	6
Classroom C	0	6	12	6	6

Center School	Group 1: Gifted	Group 2: High Achieving	Group 3: Average	Group 4: Below Average	Group 5: Far Below Average
Classroom A	30	0	0	0	0

Neighborhood vs. Cluster Grouped vs. GT Center Schools: Research Findings (cont'd)

- If the Traditional School relies heavily on grade or subject acceleration of GT students, the incremental teacher time requirements are minimal (administering Iowa Acceleration Scale, providing social/emotional supports)
  - However, if it primarily relies on differentiated instruction, the incremental teacher time requirements will be substantial
- At the Cluster Grouped School, there are also minimal incremental time requirements if acceleration is heavily used -- however, this seems to go against the logic of Cluster Grouping
  - Hence, while not as high as at the Traditional School (since teachers are differentiating for fewer groups per classroom), a Cluster Grouped School using differentiated instruction still seems to have significant incremental teacher time requirements
- The Center School relies heavily on acceleration, by having all students in a given grade use a one year ahead curriculum
  - Because of this, the incremental teacher time requirements for addressing students cognitive needs appears to be lower at a GT Center School than at the Traditional or Cluster Schools. This leaves more time for Center School teachers to address GT students' critical social/emotional development needs (in contrast to the Cluster Grouped and Traditional Schools, where these seem likely to receive less, if any, teacher time)

Neighborhood vs. Cluster Grouped vs. GT Center Schools: Research Findings (cont'd)

- Last but not least, there is the issue of how the Traditional, Cluster, and Center models are likely to interact with the implementation of SB-191
- Teachers will be evaluated along two dimensions: the extent to which their behavior in five areas aligns with behaviors associated in the research with high student achievement growth, and the actual median growth achieved by their students as measured by TCAP
- Given this set of incentives, teachers will very rationally seek to allocate their time across different student groups in a way that they believe will maximize their students' median growth score
  - At the Traditional School, the small number of GT students per classroom seems guaranteed to reduce the amount of time a teacher will logically allocate to them, as they will have a low impact on the classroom's median growth score
  - At the Cluster School, a different problem is likely to arise: dissension among the teaching staff at the fairness of the Clustering System – e.g., does it give the teacher with the GT students an unfair median growth score advantage?
    - *This could easily lead to pressure on the principal to return to the Traditional model*
    - *Can the Board credibly assure parents and taxpayers that this won't happen?*
  - At the Center School, neither one of these problems is likely to arise
    - *However, principal support for the Center School model is still critical to its success*

Conclusions

- For over 20 years, we have known that Cluster Grouping gifted students together does not automatically result in improved achievement growth
  - In a 1991 study, Karen Rogers concluded that "within class grouping and and regrouping for specific instruction options produce substantial academic gains ***provided*** the instruction is differentiated"
  - In 1992, James Kulik concluded that "programs that make only minor adjustments for ability groups usually have little or no effect on student achievement"
- On the other hand, there is also evidence that when ability grouping is combined with effectively differentiated instruction, the Cluster Grouping approach can produce significant improvements in student achievement
  - See, for example, these studies: "Does Sorting Students Improve Scores?" by Collins and Gan; "The Effects of Clustering and Curriculum on the Development of Gifted Learners' Math Achievement" by Pierce, et al; "Total School Cluster Grouping: An Investigation of Achievement and Identification of Elementary Students" by Marcia Gentry; and "The Effects of Grouping and Curricular Practices on Intermediate Students' Math Achievement" by Carol Tieso
- The Board should very clearly understand that Cluster Grouping's ability to produce substantial achievement growth for Jeffco's gifted students critically depends on the District's ability to successfully implement differentiated instruction in a large number of clustered classrooms and to successfully convince teachers that Cluster Grouping will not hurt their evaluations under SB-191.
  - Based on the available evidence, the probability of either of these happening, let alone both, appears to be low

Conclusions (cont'd)

- In contrast to Differentiated Instruction, the evidence strongly supports the ability of the District to use Acceleration to deliver significant achievement growth for its gifted students
- In terms of different organization models that can be used to implement Acceleration, evidence also supports the proposition that the Center School approach will likely produce superior results:
  - In 1994, an exhaustive study by Delcourt, Loyd, Cornell and Goldberg concluded that, "in terms of achievement, gifted children attending special programs performed better than their gifted peers not in such programs. Specifically, children in special schools and separate class programs…showed substantially higher levels of achievement than both their gifted peers not in such programs and those attending within-class programs"
  - And in 1996, in their article "The Elephant in the Classroom", Page and Keith concluded that "schooling in a homogenous group of students appears to have a positive effect on high ability students' achievement, and even stronger effects on the achievement of high ability minority youth"
- The implementation of Acceleration via the Center School model also appears to provide additional benefits compared to acceleration at Traditional Schools, particularly for students who are gifted in multiple areas
  - More teacher time for addressing GT students' social/emotional development
  - Keeping GT students together as a group, while studying a year-ahead curriculum
    - *Which benefits students who are cognitively, but not socially or emotionally ready for acceleration into a higher grade*
  - Cost effective opportunity to use curricula that are better suited to GT students
  - For the athletically oriented, the chance to study a year ahead while remaining in the same grade, and thus not being forced to start playing interscholastic sports while you are a year younger than other athletes

Conclusions (cont'd)

- We conclude from our evaluation of the research evidence that the grade acceleration at Center Schools approach offers superior value for money to GT students and Jeffco taxpayers for those students who are gifted in multiple areas
- For students gifted in a single area, the evidence strongly supports the use of subject acceleration, provided assessment instruments like the Iowa Acceleration Scale are used to ensure a student is socially and emotionally ready for it
- For students who are not ready for acceleration (or whose parents have other concerns, such as future participation in interscholastic sports), Cluster Grouping is preferable to the Traditional School model, provided that content, process and products are truly differentiated, and that the Board and District leadership can resist potential SB-191 related pressures to return a cluster grouped elementary school to the Traditional Model

Appendix
Jefferson County Association for Gifted Children

The Jefferson County Association for Gifted Children (JAGC) is a non-profit group providing leadership and support to families and educators of approximately 9,000 gifted young people in Jefferson County, Colorado

- Foster public awareness of the needs of gifted children
- Present GT resources and educational opportunities to families, educators and the community
- Encourage advocacy and best practices for gifted and talented students at the local and state level
- Reach and connect the gifted and talented community with opportunities to share experiences and exchange information
- Maintain positive working relationship with Jefferson County School District

www.jeffcogifted.org

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