



UNIVERSITY of  
DENVER

MORGRIDGE COLLEGE OF EDUCATION  
Gifted Education

## Making a Case: Advocating for Math Acceleration

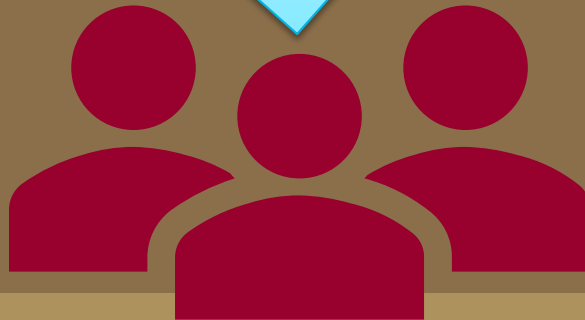
Joi Lin, M.S. & Molly Isaacs-McLeod, J.D., LL. M. | January 31, 2019  
10<sup>th</sup> Anniversary Gifted Education Conference  
Celebrating Gifted Education: Reflecting on Our Past – Impacting Our Future  
Denver, Colorado, USA

# Why accelerate a student in math?

**Lack of  
Challenge**

**Ready for  
More!**

**Boredom**



# Some students want to GO!

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God is taking you slow [Image]. 2018. Faith Hill Church. <https://www.faithhillchurch.org/god-is-taking-you-slow>

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# Our Students are Ready for More

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From a three-state analysis of NWEA MAP, Smarter Balance, and state testing data, Makel et al. (2016) found:

**11-30%** of 3<sup>rd</sup>-8<sup>th</sup> grade students were at least one grade level above in math

In 2016-2017, Colorado had 905,019 students (Colorado Department of Education [CDE], 2018). So we can approximate that between 99,552 (11%) – 271,505 (30%) of Colorado's students are more than one grade level above in math.

**Our students deserve to learn at their true level of ability and performance. How can we meet their needs?**

# What is acceleration?

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In *A Nation Deceived: How schools hold back America's brightest students*, Colangelo et al. state:

“Acceleration is an intervention that moves students through an educational program at **rates faster, or at younger ages, than typical.**”

It means **matching the level, complexity, and pace** of the curriculum to the **readiness and motivation** of the student”

(2004, p. xi)



## Two Large **Categories**

- Content-based
- Grade-based
- Shortens the overall length of time a student is in the K-12 school system

(Institute for Research Policy on Acceleration [IRPA], 2009)  
Report includes sample acceleration policy language

# Forms of Acceleration

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## Forms of content-based acceleration

- Extracurricular Programs
- Curriculum Compacting
- AP / IB
- Single-Subject Acceleration
- Dual Enrollment
- Distance / Online Learning
- Credit by Exam or Experience
- Mentoring

## Forms of grade-based acceleration

- Early Entrance / Early Access
- Combined Classes
- Continuous Progress
- Self-Paced Instruction
- Telescoping Curriculum
- Whole-grade Acceleration
- (3+ Radical Acceleration)
- Early graduation
- Acceleration in College

(IRPA, 2009)

# Why Might Teachers, Schools, or Families Resist Math Accelerations?

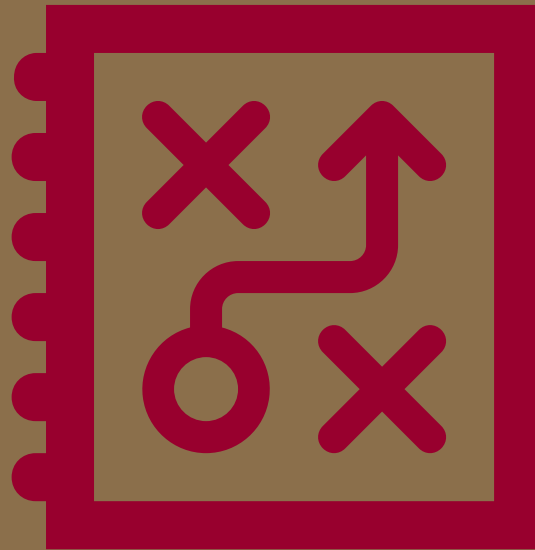
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# Effects of Different Types of Math Acceleration

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“Effect Size (ES) is an estimate of the effect of a specified strategy upon a target population... The comparison group is assumed to have made [one year’s growth], while the treatment group has made [one year’s growth plus the ES]” (Rogers, 2009, p. 281).

## Equation for Effect Size

$$\frac{\text{Achievement Gain treatment group} - \text{Achievement Gain comparison group}}{\text{Standard Deviation pooled treatment + comparison groups}}$$

ES = -.50 → only a half-year’s growth

ES = .50 → one-and-a-half-year’s growth

ES = 1.0 → one-and-one-year’s growth → (two year’s growth)

ES  $\geq$  .30 is “considered to make a distinct difference in academic learning” (Rogers, 2009, p. 282).

# Effects of Grouping (Rogers, 2009)



<b>ES</b>	<b>Type</b>	<b>Description</b>
0.15	Regrouping	(Gr. 3-8) Low-ability effects in math and reading
0.33	Full-time Ability Grouping	(Gr. 7-12) Self-contained/magnet/special school/full-time GT program
0.34	Within-class grouping	(Gr. 2-8) Effect in math, science
0.44	Cluster Grouping	(Gr. 3-8) Math or language arts performance clusters
0.45	Pull-out	(Gr. 1-8) Yearlong resource room pullout a bit each week
0.46	Cross-graded classes	All abilities, effect for math; students go to the grade-level they are actually at across the school
0.49	Full-time Ability Grouping	(Gr. K-6) Self-contained/magnet/special school/full-time GT program
0.79	Regrouping	(Gr. 3-8) High-ability effects in math and reading
1.06	Full-time Ability Grouping	(Gr. 7-12) Residential High School

# Effects of Grade or Subject Acc. (Rogers, 2009)



<b>ES</b>	<b>Type</b>	<b>Description</b>
0.22	Dual Enrollment	(Gr. 7-12 Academic effect) Takes (regular paced) college courses
0.30	Early Access	(Academic effect) Begins Kindergarten or 1st gr. early
0.34	Talent Search Participation	(General academic effect) Student takes a national exam and takes program coursework
0.34	Grade Skipping	(Gr. 1-12 Socialization effect) Skips a grade level
0.37	Grade Skipping	(Gr. 1-12 Academic effect) Skips a grade level
0.40	Grade Telescoping	(Gr. 3-8 Academic Effect) Cohort moves through multiple years of curriculum faster (3 years work in 2 years time)

# Effects of Grade or Subject Acc. Cont. (Rogers, 2009)



ES	Type	Description
0.42	Grade Skipping	(Gr. 3-12 Self-esteem effect) Skips a grade level
0.45	Summer college programs	(Academic effect) 3-6 week accelerated programs on college campuses
0.46	Dual Enrollment	(Gr. 7-12 Self-esteem effect)
0.59	Credit by Examination	(Academic effect) Students are preassessed and can test-out and move on rather than repeating coursework
0.62	Advanced Placement	(HS Academic Efficacy) With AP-trained teachers, students can earn college credit (IB 0.54)
1.56	Saturday college programs	(Academic effect) Yearlong accelerated courses on college campuses

# Effects of Flexible Progress (Rogers, 2009)



ES	Type	Description
0.38	Nongraded classes	(Gr. 1-8) Academic Effect
0.71	Mentoring	(HS) yearlong academic effect “works one-to-one with a content expert over yearlong study of specific study area” (p. 284)
0.74	Online computer coursework	Academic effect with tutor supervision and feedback
0.83	Compacted Curriculum	Preassessed and skips mastered material in math and science (0.20 for LA and SS)
2.00	Mentoring	Daily tutoring of a child with high levels of talent

# Socialization & Self-Esteem Effects (Rogers, 2009)



ES	Type	Description
-0.24	Early entrance to school	Socialization Effect
0.10	Early entrance to school	Self-efficacy Effect
0.10	Advanced Placement	(Gr. 9-12) Self-efficacy (0.03 for IB)
0.16	Mentorship	Self-efficacy
0.17	Compacted Curriculum	Self-efficacy
0.29	Early Admission to College	Self-Esteem Effect
0.34	Grade Skipping	(Gr. 1-12) Socialization Effect
0.36	Summer college programs	Self-efficacy
0.40	Online computer coursework	Self-efficacy
0.42	Grade Skipping	(Gr. 3-12) Self-Esteem Effect
0.46	Concurrent/Dual Enrollment	(Gr. 7-12) Self-Esteem Effect

# Impacts of Math Accelerations

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# Twice-Exceptional Learners

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2e students are entitled to accommodation in advance level classes

Learning differences do not cancel out their right to be accelerated- this applies to extended time, use of a calculator, etc.

Acceleration in math can often “unlock” the door to accommodation for gifted learners in additional areas of study



## **“Too much too early”**

As gifted as a child may be in math, an elementary-school-aged brain is not quite ready for more abstract math and will need to develop further before advanced algebra and trig. Rushing may make the student lose a love of math (Stanley et al., 1990, p. 3)

## **A Shaky Foundation**

Rushing straight to algebra may skip over critical foundational concepts such as “the structure of the number system, arithmetical problem solving, or even Piagetian formal operative thinking” (Stanley et al., 1990, p. 2)

# Impacts of Radical Acceleration

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Radical acceleration might be a very good fit for the more exceptionally (~IQ 160-179) and profoundly (~IQ 180+) gifted and includes a combination of accelerations that result in high school **graduation 3 or more years ahead** of age peers (Gross, 2004).

When these students are NOT radically accelerated, “many experience negative affective outcomes, including lowered self-esteem, anxiety, and social isolation” (Gross, 2004, p. 87).

“...all 17 radical accelerants report that their **social and emotional well-being significantly improved and warm friendships were formed** with their older classmates” (Gross, 2004, p. 89).

“Young people seeking ...radical acceleration [must be screened carefully] for **intellectual and academic readiness, social readiness, and emotional maturity**” (Gross, 2004, p. 92).

# Social Impact

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“ Gifted children tend to be socially and emotionally more mature than their age-mates; therefore, for many bright students, acceleration provides a better personal maturity match” (Assouline et al., 2015, p. 3).

“While the popular perception is that a child who skips a grade will be socially stunted, fifty years of research shows that moving bright students ahead often makes them happy” (Assouline et al., 2015, p. 9).

“ Numerous studies have investigated the peer dimension of acceleration and generally reported not only no harm but also small to moderate social–emotional benefits of academic acceleration” (Steenbergen-Hu et al., 2016, p. 853)

# Reflecting on Math Accelerations

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Sharing our stories



# Joi's Story as a Math Teacher

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## Teaching Advanced Maths

- Sometimes, the school would have me teach a grade level ahead, or two years in one. But I was always locked to the existing curriculum.
- One grade level ahead... is still just as slow
- FASTER was more fun for me and for high-ability students

## Grade Skippers

- Student whose mother-in-the-know advocated and achieved a complete grade skip... such paperwork and... "resistance"
- Students who were accelerated... at the time, I knew next to nothing about giftedness and didn't realize how g they were

## Schools – Public, Private, and Homeschool – Take action!

- If we don't, we increase inequities and perhaps encourage bright flight or dropouts or extreme disengagement

# Joi's Story as a Student



**Such Gratitude to teachers for advocating for me.**

## **Elementary**

- Skipped 1<sup>st</sup> grade one week into school. DIDN'T UNDERSTAND the offer and refused a skip to 3<sup>rd</sup> -- only skipped 2<sup>nd</sup> math and reading → wish people had had a conversation with me
- Mom had a 5<sup>th</sup> grade math textbook I read for fun one summer

## **Middle**

- Invited to take a proficiency exam at the end of 6<sup>th</sup> grade and skipped 7<sup>th</sup> grade math
- Missed one question: The day I learned about complex numbers.

## **High**

- School creatively scheduled me allowing learning opportunities that were a better fit to my true level of learning

**All to say: It's POSSIBLE to creatively accelerate a student when teachers, school leaders, and families work together to meet a student's true(r) level of learning**

# Molly's Story as an Advocate

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Importance of **laying the ground work** for desired progression: Balance between meeting your student they are now and determining your end game first!

## **Establish criteria and goals**

Does school accept outside test results-ACT, SAT, Subject tests, CLEP, etc?  
What outside classes/tutoring will “count” for placement

Is there “boots on the ground” support- **someone capable of teaching high level math?**

## **Options - pros and cons**

For lower levels- subject acceleration- remain in building... or not  
Independent Study  
Online  
Dual Enrollment

**Inquire about age-rules** that limit access to math opportunities



# Discussion about Math Accelerations

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# Small Group Discussion

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In your current school/district system...

- **Which forms of math acceleration do you use already?**
- **How are students identified**
- (Ability? Performance? Both?)

# Whole Group Discussion

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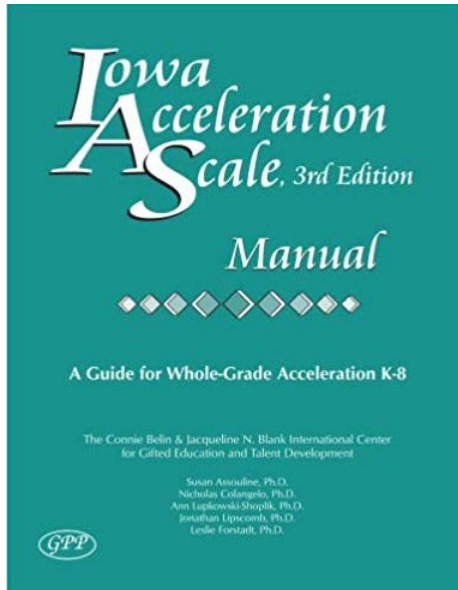
- Which forms of math acceleration would you like to try to better meet student's needs?
- How will you advocate for positive change in your classroom/building/district?
- How will you advocate for students?



# A Resource for School Districts

Assouline et al. wrote the *Iowa Acceleration Scale Manual 3<sup>rd</sup> edition* (2009) to support objective assessment of students for potential whole-grade accelerations.

Purchase a Manual and 10 forms for \$269.95 at [GiftedUnlimitedLLC.com](http://GiftedUnlimitedLLC.com)



“Prior to completing the IAS form, be sure to:

- Have the child tested for ability, aptitude, and achievement
- Schedule the child study team meeting, making sure to include the current teacher, the receiving teacher, and the child’s parents
- Gather any additional school records that will assist the decision-making team”

(IAS Form, 2009, p. 1)

# Some Resources for Mathematically Talented Youth



## **Center for Bright Kids' Western Academic Talent Search** (Denver)

[centerforbrightkids.org](http://centerforbrightkids.org)

Residential Summer Courses

Ages 8-17/Grades 3-12

90<sup>th</sup>%+ on a nationally normed academic achievement test

## **Epsilon Camp** (Colorado Springs)

[epsiloncamp.org](http://epsiloncamp.org)

Residential Summer Math Camp

Ages 7-12

Interest, Maturity, Motor Skills, Ability

## **Hoagies' Gifted Education Page**

[hoagiesgifted.org/math\\_gifted.htm](http://hoagiesgifted.org/math_gifted.htm)

List of Games, Articles, & Resources

## **Duke Talent Identification Program**

[tip.duke.edu](http://tip.duke.edu)

Summer Programs+

Academy Math

Center Math

7th: 510–540

≥ 550

8th: 550–580

≥ 590

9th: 590–620

≥ 630

10th: 630–660

≥ 670

## **University of Minnesota Talented Youth Mathematics Program**

[mathcep.umn.edu](http://mathcep.umn.edu)

Grades 5-7 take the UMTYMP Algebra Qualifying Exam

Grades 7-10 may test directly into Calculus component (must have completed PreCalc+)

# References



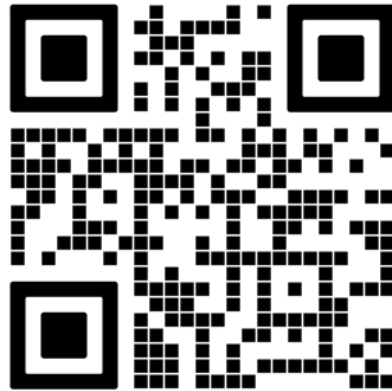
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# Making a Case: Advocating for Math Acceleration

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To view this presentation, visit <http://bit.ly/2020GEC-AMA-JLMIM>



Thank You!

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