

Doing the Math: How Prepared are College-Bound Students with Disabilities?

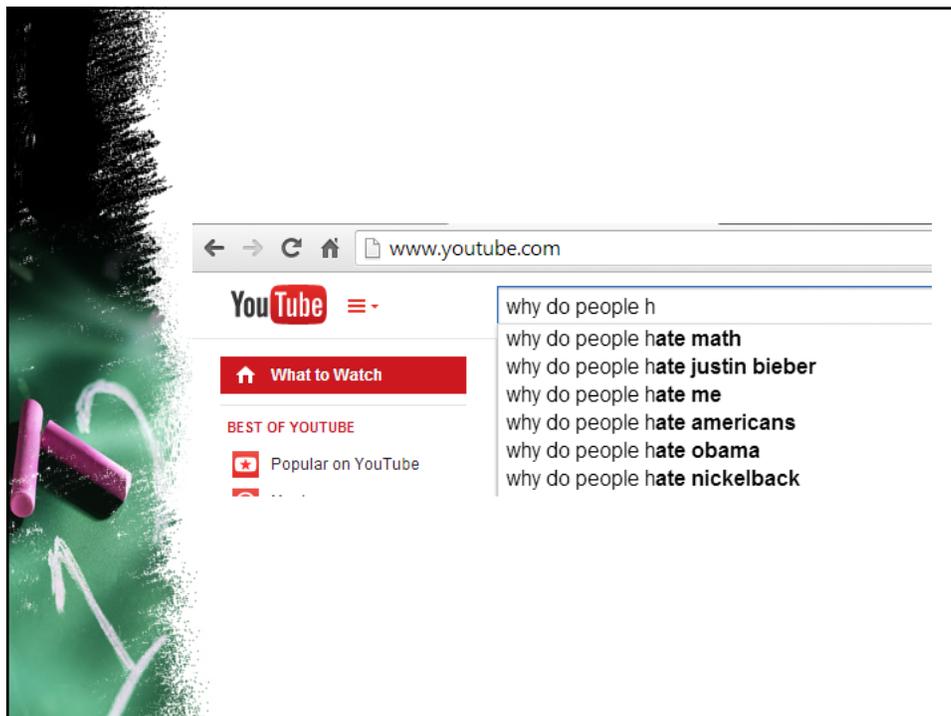
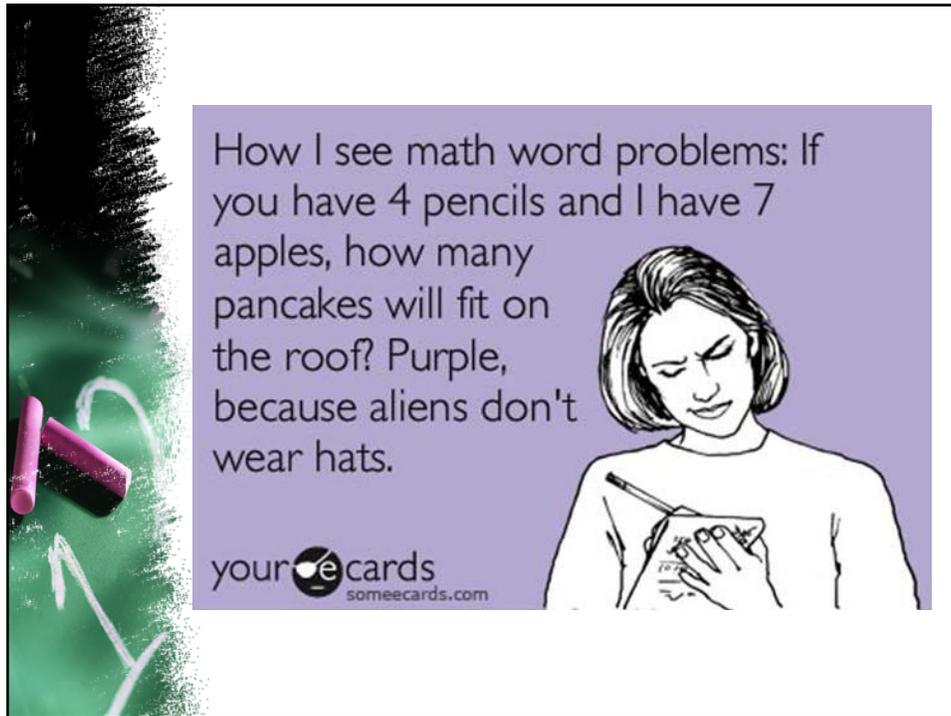
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USEAM
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Parents Don't Remember Enough Colors To Help With Kindergartner's Homework

BEDFORD, NY—Parents of 5-year-old Haylee Risser reportedly sat around their dinner table stumped Monday night, unable to recall enough colors to help their daughter with a homework assignment from her first day of kindergarten. "I definitely remember red and yellow, but when she started getting into that brown and green stuff, that's where I'm lost," said Deborah Risser, 36, who admitted that shoelaces and days of the week were always more her forte. "It's one of those things they drill into you in kindergarten, and then you never use it again. When the heck am I going to need to know purple, anyway?" At the suggestion of her increasingly frustrated husband, Risser picked up the phone to call her older brother, who sources confirmed is "great at colors."

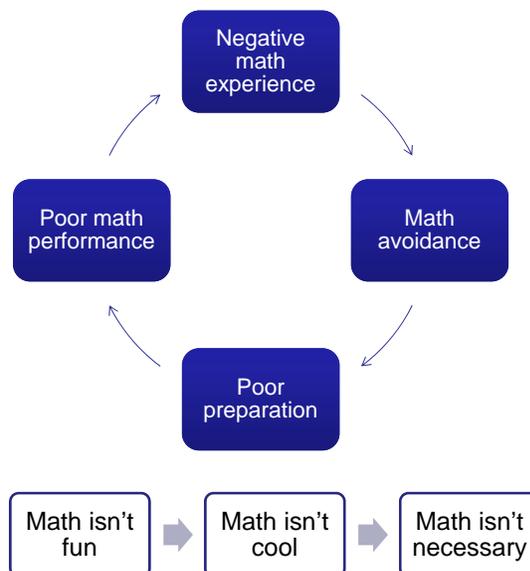
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What's with the math stigma?

- Tons of Hollywood movies take shots at math
- "I'm not very good at math." "Hey, me neither!" "Cool!" *high fives and fistbumps*
- "My Dad said I don't need math and don't have to do it."
- "I want to be a fashion designer or do marketing... I will need to know commission, but I won't ever need this mean, median, and mode crap!"
- "911, what's your emergency." "I need help with my math." (mom told 4-year-old son to call someone for help with subtracting homework)

Math Anxiety Cycle





The First Point

- Perceptions about math matter!
 - *Social perceptions about math*
 - *Cultural perceptions about math*
 - *Perceptions about what math is required for different jobs*
 - *Perceptions about what constitutes math readiness for college*
 - *Math anxiety at any age*
 - *Perceptions about math standards*
 - *Adult perceptions are passed to younger generations*



The Second Point

- Teacher perceptions are even more important
 - *Perceptions about student ability*
 - *Perceptions about the importance of certain math concepts*
 - *Perceptions about constraints on their ability to teach*
 - *Perceptions about their own math abilities and fears*
- All these affect what a teacher covers in their class, and how they teach it!

**SPED Math Teachers
don't always like math
and aren't always good at it**



Math Preparedness

- Research that shows that students with disabilities are behind in math achievement when compared to their non-disabled peers. This leaves them unprepared for college, career, and independent living.
 - Usually assessed through standardized test scores, grades, and other forms of student data.
- I wanted to assess math preparedness of students with disabilities based on the perceptions of those who are responsible for preparing them
 - King, A. (2013). *Perceptions by high school teachers of mathematical readiness of students with disabilities transitioning to college (Masters thesis)*. <http://digitalcommons.usu.edu/etd/1981>



The Survey

- Surveyed teachers of 11th and 12th grade students with mild/moderate disabilities who had IEP goals to attend college.
- I asked for permission from directors to include all such teacher across the state, but not all district and charter schools chose to participate.
- There had been 47 participants by the time the survey closed.

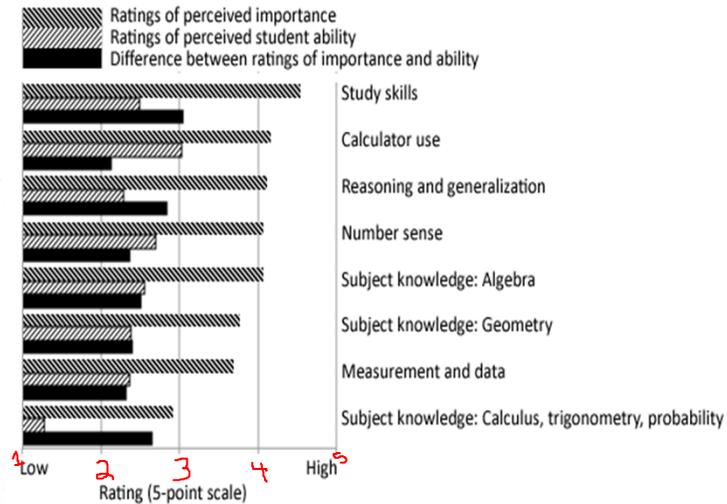
College-Bound

- Teachers were asked to base their perceptions on students with mild/moderate disabilities who had goals to attend college. For the purposes of this survey, “college” was defined as either two- or four-year post-secondary institutions.
- SPED law requires post-secondary education planning for every student with an IEP (not just those that we think would make it in college).
- Many more students with disabilities enroll in college a few years down the road, even if nobody planned for them to do it!

Part 1: Student Ability and Math Importance

- Participants were asked to rate *student ability* (1=very poor, 2=poor, 3=adequate, 4=proficient, 5=excellent) and *math skill importance* (1= not at all important, 2=somewhat important, 3=important, 4=very important, 5=absolutely critical) for the following math topics:
 - Algebra
 - Geometry
 - Calculus, trigonometry, and probability
 - Reasoning and generalization
 - Number sense
 - Measurement and data
 - *Appropriate calculator use*
 - *Study skills*

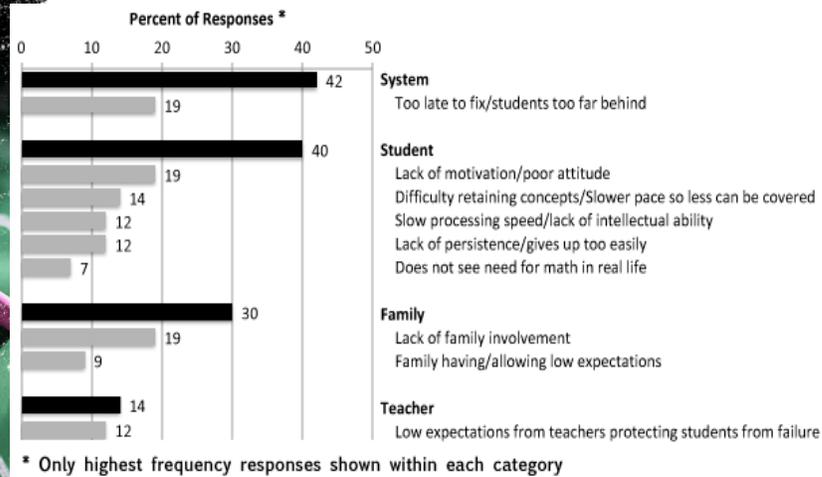
Part 1: Student Ability and Math Importance



Part 2: Barrier to Preparedness

- Participants were asked to list barriers to math preparedness for students with disabilities. Because they were able to note multiple barriers, each response idea was sorted into one of four source categories (system, student, family, or teacher), and then a percentage was calculated on the number of participants that listed that response.

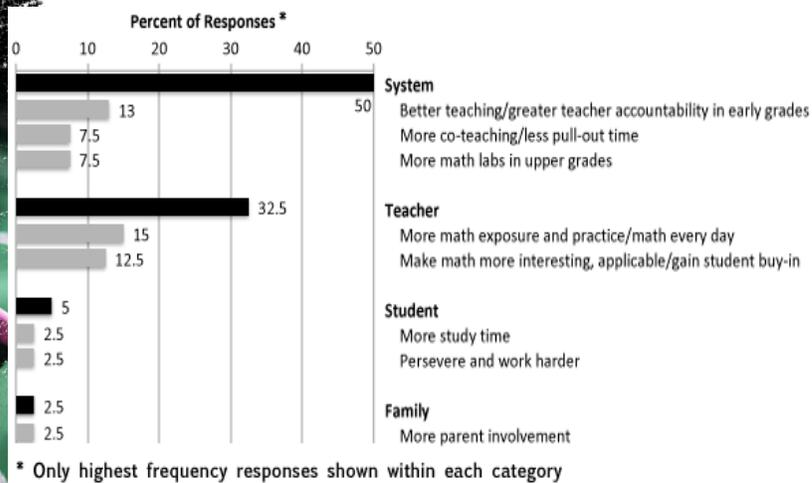
Part 2: Barrier to Preparedness



Part 3: Solutions

- Participants were asked to list potential solutions to overcome barriers to math preparedness for students with disabilities. Because they were able to note multiple solutions, each response idea was sorted into one of four source categories (system, student, family, or teacher), and then a percentage was calculated on the number of participants that listed that response.

Part 3: Solutions



Overall Results

- Participants were also asked how successful in college students with disabilities had potential to be, and how important it was for them to go to college. These results were averaged and then compared to student ability and math importance data from previous questions

Overall Results

Question	Mean	SD
How successful do you believe students with mild/moderate disabilities can be in college? ^a	3.69	0.82
How important is it for students with mild/moderate disabilities to attend college? ^b	3.29	0.84
Overall Math Ability Score	2.38	0.55
Overall Math Importance Score	3.91	0.62

^a Perceived success measured on a 1-5 scale: 1=not at all successful, 2=rarely successful, 3=somewhat successful, 4=successful, 5=highly successful

^b Perceived importance measured on a 1-5 scale: 1= not at all important, 2=somewhat important, 3=important, 4=very important, 5=absolutely critical

Other Topics Surveyed

- Which concepts they spent the most time teaching
- Which concepts they wished they had more time to teach
- Which were areas of student strength
- Which were areas of student weakness



Discussion and Conclusions

- Participants believe students with mild/moderate disabilities to have potential to be more than “somewhat successful” in college and that is it more than “important” for them to attend college. However, they also perceive them to be less than “adequately” prepared mathematically.



Discussion and Conclusions

- Gaps between importance and ability exist in every construct, with importance always higher.
- Largest differences were in *study skills, reasoning and generalization, and subject knowledge of calculus, trigonometry, and probability.*



Discussion and Conclusions

- Study Skills: highest in importance (4.5), but only fourth highest in student ability (2.5), giving the largest difference score (2.0). Based on comments, participants seemed to feel that students should come with those study skills, or that they should learn them implicitly.



Discussion and Conclusions

- Calculator Use: second highest in importance (4.2), highest ability (3.0) and smallest difference score (1.1), but many teachers commented that students were “dependent” on calculators, even to do basic calculations. Some participants were frustrated that calculators couldn’t be used on college classes.



Discussion and Conclusions

- Reasoning and Generalization: third highest importance (4.1), but second lowest in ability (2.3), giving the second highest difference score (1.8). Additionally, while many participants noted it as an area of student weakness, only 5% said that they spent time teaching it, and only 8% wished they had more time to cover it.



Discussion and Conclusions

- Listed barriers and solutions were sometimes contradictory; i.e., some participants felt that students needed a slower pace, while others felt that students needed a faster pace.



Discussion and Conclusions

- Accountability and locus of control: only 14% listed teacher-caused barriers. Many seemed to be saying “someone else is/was responsible; there’s nothing I can do.” The most popular barrier was that it was too late to help the student by that time, and the second most popular solution was to have better teaching and accountability in earlier grades.



Suggestions

- Plan for students to attend some form of college! If we plan for them not to go, we likely won’t prepare them effectively, and they will be lacking in skills when they do show up later.
- Explicit instruction on a regular basis at all grades about study skills. This is an investment in time that could potentially reduce some of the barriers participants listed.
- More explicit connections about how certain math topics connect to a student’s specific transition goals.



Suggestions

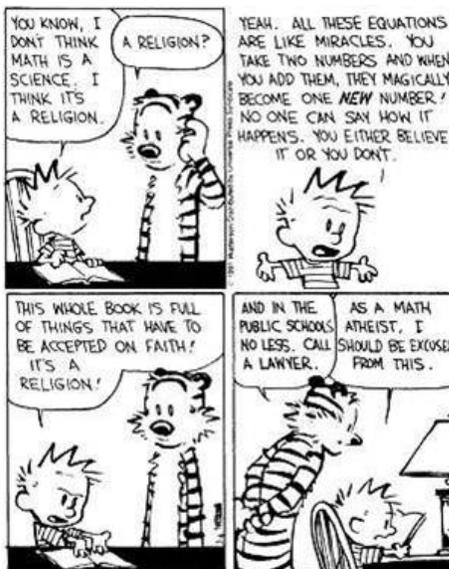
- Greater clarification about appropriate calculator use (accommodation vs. modification), and more explicit instruction for students about how to use them.
- Higher prioritizing on reasoning and generalization. This is a topic that can be imbedded in all other math concepts. Too much of our focus is on procedural, and conceptual is left out. Math is not just a series of steps to follow, it can become a “state of mind” or “way of thinking.” Additionally, calculators typically only help with the procedural aspect.



Suggestions

- Greater communication between high school and college personnel about what math and other skills are required, so that teams can determine priorities and plans for individual students.
- Greater communication among teachers and other stakeholders about the actual cause of barriers and research-based solutions, and more specific implementation plans.
- **Teachers need to feel empowered to effect change! While this isn't the only variable effecting student achievement, it is potentially the most critical and do-able.**

It doesn't take a miracle...



Let's Change the Perceptions and Empower our Teachers!

'We hate math,' say 4 in 10
— a majority of Americans

WASHINGTON — People in this country have a love-hate relationship with math, a favorite school subject for some but just a bad memory for many others, especially women.

In an AP-AOL News poll as students head back to school, almost four in 10 adults surveyed said they hated math in school, a widespread disdain that complicates efforts today

- Email me if you have questions, thoughts, or ideas -- aking@dsdmail.net