



Executive Summary: Middle Grade Math

Understanding educator effectiveness and student ownership in eighth grade math
April 2019

The Challenge

In January 2019, Youth Initiative of Adams County (ACYI) and Girl Effect deployed Technologically Enabled Girl Ambassadors (TEGAs) to help inform and improve outcomes related to middle grade math (MGM), on behalf of the MGM Collaborative Action Network (CAN). The MGM CAN utilized voice and perspective to realize students experiences of the classroom and understand what extent they own their learning outcomes.

TEGA is a mobile-based, peer-to-peer research methodology which uses smartphone technology to empower adolescent girls to capture girls', boys' and communities' realities in real time. The partnership between ACYI, through its national network StriveTogether, and Girl Effect established a network of 12 TEGAs in Adams County to elevate authentic youth voices and provide rich, qualitative data to inform the CAN's work. Our 12 TEGAs received training to become qualified Market Research Society (MRS) digital interviewers.

To obtain a greater understanding of how youth engage in eighth grade math, TEGA conducted interviews with eighth grade math students across four Adams County school districts represented in this CAN: Westminster Public Schools, 27J Schools, Adams 12 Five Star Schools, and Adams County School District 14. The study achieved a sample that

represented a range of students, including 40 students who were receiving a 'C' grade or lower, and 32 students with 'C' grade or higher.

The specific objectives of this study were to:

- Understand how eighth grade math students learn;
- Recognize eighth grade math students' involvement in the learning process; and
- Identify which strategies are most effective for eighth grade math students.

This executive summary identifies the key findings from this research in three thematic sections:

The learning environment



Ways of learning



Student ownership & efficacy



The Learning Environment

The classroom environment plays a central role to student ability. The noise level, classroom layout and seating, and pace of the teaching material contribute to the success of a classroom.

Students said the challenges in their classrooms mainly stem from noise and distractions. Students often describe their classes as chaotic, noisy, disruptive, and loud. Students spoke about peers in class who don't listen, talk over teachers and mess around making math class difficult.

“When I'm in math class I feel distracted because of everybody, like, keeps talking and interrupting the teacher. And so, it's kind of hard to focus on the work.”

- Girl, 27J (Excelling)

Extra supports in the classroom were frequently mentioned as a way that educators could, should, and currently do manage the classroom. Many students find that having extra educators in the room helps with supporting a large class size and kids who need help the most.

Students feel the layout of the classroom requires careful consideration and an intentional seating arrangement. Many suggest that pairs are better than pods.

Like classroom layout, pace is also paramount. Several struggling students asked for teachers to go slower, stating that they accommodate middle range students but don't end up helping those who are struggling.

“They always go at the kids who – the kids who kind-of-understands pace, instead of going to the kids who don't understand. So, they're not really helping the kids who don't understand.”

- Girl, Adams 12 (Struggling)

It is important to note that any behavior change will still be influenced by how conducive the learning environment is to their ability to pay attention. Equally as important, are positive relationships in the classroom, both with the teachers and with peers. This is highly beneficial to creating an environment conducive to learning.

Ways of Learning

Students ranked five ways of learning as their preferred methods: working in pairs, note-taking, one-on-one teacher help, practice and review, and Chromebook or tablets.

Working in pairs is preferred over group work because,

- (1) It is faster to ask a peer than wait for the teacher to come help you;
- (2) More trust can be built between the pairs than in groups; and
- (3) Groups can get rowdy and out of hand and it is easier to stay on task in pairs.

While pairs are preferred, peer work in general is seen as a positive because school is a social environment, and many see learning as a social activity. The majority of students see each other as a resource and want to work with others. It is important to note that students think friends should be separated to limit distractions and that developing trust between buddies is vital to success.

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feel peer work is a highly preferred teaching method

Students cite the importance of being able to refer to notes when they are doing homework or when they forget how to do something during class. Note-taking is key to increasing a sense of self-efficacy and decreasing their need for direct help from others.

Students believe note-taking should be required and requested guidance from their teachers on best practices in note-taking.

“It really helps me because if I'm really stuck on something, instead of having to ask someone or ask the teacher, I can just go in my notebook or binder, or wherever it's at, and just look at it.”

- Girl, Adams 14 (Struggling)

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feel 1:1 time with their teacher is a highly preferred teaching method

One-on-one time with teachers was seen as very beneficial by many students. They say that one-on-one time can limit distractions from other students, increase a student's ability to focus and allows the student to verify their grasp of the material. It also gives space to ask specific, clarifying questions to correct mistakes.

Although one-on-one is desired, availability of the teacher is a barrier. Sometimes students' questions go unanswered because the teacher is unable get to them when moving around the classroom. Both struggling and excelling students requested more personalized learning.

“Cause if you're, like, raising your hand, and there's, like, five people raising their hand, the teacher's going to go to someone else. And then you're, like, uh, forget it, you know, just put your hand down. But if do, like, one-on-one, it would be pretty easy.”

- Boy, 27J (Struggling)

Review is an important aspect of learning math. Students wish it happened more often because it validates their comprehension of the material. Reviewing can confirm their understanding and improve their perceived self-efficacy and confidence in their math abilities, especially for students who are unsure of their grasp of the material.

“We learn stuff in 6th and 7th and then summer comes around, we forget all of it and then, when we come back, they expect us to know it. So, if they would go briefly over it that would help.”

- Boy, 27J (Struggling)

Technology is perceived as both positive and negative, but students clearly delineate when it is most helpful.

According to students, technology should be used for: tracking individual progress gamification of learning, applying learned material, a reward or incentive, instant help when an answer was wrong and to apply concepts to the real world.

Technology should not be used for independent time because without oversight, students become distracted and visit other websites. Students mentioned technology is not a substitute for teachers.

Students were split regarding taking notes using the computer, therefore technology enabled note-taking should be used in a case-by-case basis.

Student Ownership & Efficacy

Students are motivated to learn. However, factors such as the words teachers use to describe the material, the perception of the ability of their peers and opportunities to ask questions of their teachers affect their ability to really take ownership in the classroom.

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Students can identify what they are doing well, are doing poorly or could do better

Students take ownership over their education and ability. The vast majority are motivated to learn and engage in their learning process; however, they sometimes lack the confidence to put their ownership into practice.

Perceptions of peer ability and classroom social environment determine how students react towards students of a different ability level. This is because many students identify their ability based on perception of others' ability.

This social environment plays out in one of three ways for each student:

- (1) They are more advanced than their peers in their classroom – this results in negative feelings towards class.
- (2) They are behind or doing worse than other peers in their class – this results in negative feelings towards self or towards the teacher for not providing the support they need.
- (3) Other students have different ways of understanding the material and there is an equal exchange of knowledge and learning based on sharing skills, tools and ways of learning – this results in cooperative and collaborative learning.

Verbiage that entices students to make an effort has a specific connotation. There is a difference when teachers describe upcoming lessons as challenging vs. hard. Students use the term 'hard' when displaying reduced confidence and is sometimes linked to a teacher telling them that the material will be too hard, or too difficult and thereby affecting their sense of self-efficacy. Conversely, students use the term challenging when displaying increased confidence.

“Because it challenges me, before I wasn't really challenged in my math classes. And now that I get to go to that math class, I actually get challenged and learning, and, um, it's not boring anymore.”

- Girl, 27J (Excelling)

Part of student ownership is asking questions in class. As such, youth state that teachers should be open and available to questions from students to ask for help. Furthermore, feelings of being 'bad at math' have more to do with their ability to apply themselves or put in the appropriate effort and less to do with their comprehension of the material.

[TEGA] Why do you think you aren't that good at math?

[GIRL] "I don't know, it's just I'm not really good at paying attention, at least when people are yelling over the teacher, or the teacher is always yelling at other kids and lecturing us, and so on. I don't really learn a lot from that. And when I do try to learn, I don't – I'm not good at doing it. So, I try – try to do as best as possible"

-Girl, Adams 14 (Struggling)

Finally, perceived relevance of eighth grade math is low. Many say that although they will use math in their personal finances, they do not believe eighth grade math will apply to their future.

Only a small number were able to describe the importance of slope or an equation in helping them with careers in aviation or construction.

Yet, students often feel most engaged in class when math is made relevant to their lives, interests, and futures.

[TEGA] Can you tell me the best things your math teacher has done to make you interested in their class and the topics?

[BOY] "It was recently but we have this - If we put money in this company's thing, like Nike, and we put 500 and we get 1% of that company, we could - What's it called? We actually - if he could actually show us - if we were to get like 10% of this company, like Adidas or something like that, and he would go and say, ""You make this much money. You lost this much money,"" I think that's pretty cool and we do that like every week. He does those examples."

-Boy, 27J (Struggling)

Youth Inspired Ways to Improve the Student Experience in Classrooms

- 1** **Maintain control of the classroom** – control phone use in class, maintain strict control of distractions, clearly state when conversation is and isn't allowed, and intentionally plan seating in pairs (not groups) based on test scores and student ability.
- 2** **Require everyone to take notes** – either digital or handwritten and teach students the most effective way to structure their notes.
- 3** **Bring in extra support staff** – divide the class up by skill level and utilize one teacher to instruct and one to support those who require the most help. Additionally, leverage varying instructional methods to cater to different learner types (e.g. visual, audible, etc.).
- 4** **Constructively utilize tech** – record lessons on video so that students can reference an archive, gamify the review process, and allow students to work collaboratively to practice.
- 5** **Build reviews into the curriculum** – be strategic about building in relevancy to previous and future lessons, ensure all students are aware of specific skills needed to complete the lesson.

Next Steps

The CAN is utilizing findings from these TEGA interviews for their collective work. For more information contact Jody Nowicki at jody.nowicki@acyi.org.