Supporting All Students Through Flexible Grouping Practices

A Position Statement from NCSM: Leadership in Mathematics Education

Our Position

NCSM: Leadership in Mathematics Education believes that mathematically inclusive classrooms create equitable and flexible grouping structures to appropriately develop students' mathematical talents. Given the diversity of learners and their needs, students benefit from differentiated support from their teachers as well as from working within flexible peer groups aligned to these needs. For many students, strengths-based flexible grouping practices can be accomplished within the typical classroom setting, and in some situations, students ready for more advanced mathematics should have opportunities to be with mathematically appropriate peer groups. By using responsive, flexible grouping practices, students will have opportunities to develop and advance their individual mathematical talents and contribute to different mathematical learning communities within the classroom. NCSM calls for creating equitable and flexible grouping practices to support all students across grade levels.

Research that Supports Our Position

Tailoring learning environments to meet the needs of diverse learners is well understood to be an effective teaching practice (Tomlinson, 2014). For many, the use of differentiated learning, leveraging tasks with multiple entry points, and using nonroutine problems centered on discourse-rich environments are necessary to create dynamic, creative, and rigorous mathematical learning environments. These sociomathematical environments also support collective mathematical learning in the classroom (Anthony & Hunter, 2017). However, the ways in which teachers purposefully group students also matters and is central to creating differentiated learning experiences for students (Park & Datnow, 2017).

First, it should be made clear that ability grouping, which is creating entire classes or groups of students based on teachers' perceptions of students' capability in mathematics or past test scores, does not effectively support student learning (Deunk et al., 2018; Steenbergen-Hu et al., 2016). Ability grouping has a minimal effect on student learning and further increases inequitable structures (Sullivan, 2015); thus, eliminating structures that interfere with or inhibit access to learning high-quality mathematics is paramount (National Council of Teachers of Mathematics, 2018; NCSM, 2020).

With that said, various forms of in-class grouping are beneficial for supporting all students in learning mathematics. For example, grouping students randomly has shown to create richer student-led learning interactions wherein students are more willing to work together and take greater ownership for their learning (Liljedahl, 2020). Likewise, purposefully using a strengths-based grouping approach (Kobett & Karp, 2020; Leach, 2019) also shows tremendous promise within classrooms. In taking a strengths-based approach, teachers consider what students know and can currently do, based on various formative data, to make intentional decisions about grouping students. Furthermore, grouping based on readiness, not just past achievement, by creating tiered explorations also supports students' learning (Wormeli, 2018). With tiered explorations, teachers vary the cognitive challenge, complexity, or depth of knowledge in the mathematical exploration so students are able to access the mathematics based on their own understanding and not necessarily the teacher's evaluation of a student's understanding. Grouping students in such a way is important to support both historically struggling learners as well as those who tend to be higher achievers. Not all students are ready for the same challenge, but all students can engage in appropriately challenging mathematics through tiered explorations (Bennett, 2012).

Recognizing the specific outcome of a grouping strategy and changing grouping structures to meet these outcomes can be challenging for teachers (Anthony & Hunter, 2017). As such, mathematics leaders must support mathematics teachers in building the understanding that grouping strategies change throughout the weeks, months, and school year. Flexible groups can be based on many factors, including, but not limited to, similar initial understandings, common misconceptions, or similar approaches to engaging with the mathematics, such as creating similar models, making related drawings, or considering a simpler and less complex version of the problem. For example, at the beginning of the school year, the purpose for grouping students may be understanding the sociomathematical norms of the classroom or developing productive mathematical habits of mind and interactions. However, later in the year, the decisions for grouping students may be related to learning specific content through varied task complexity, learning to develop mathematical arguments, or engaging with nonroutine problem-solving experiences.

Flexible grouping should not be a permanent or long-term arrangement as these groups then become fixed groups that restrict access to quality mathematics instruction and learning experiences (Steenbergen-Hu et al., 2016). Nor should students be grouped based on hidden biases. Continual examination of which students are in which groups is essential, and mathematics leaders and educators should carefully examine existing grouping structures to uncover potential hidden biases.

Research Supporting Advanced Mathematical Peer-Based Groups

In rare circumstances when in-class flexible grouping is not sufficient to support the needs of exceptionally talented students, additional consideration should be made. Students who are exceptionally talented in mathematics demonstrate extraordinary aptitude for mathematics beyond what is seen with their age- or grade-level peers. Schools should consider how to match their readiness, motivation, and exceptional talent to learning experiences of appropriate complexity (Southern & Jones, 2015; Steenbergen-Hu et al., 2016). Given the resources available, educators should consider a variety of options to provide the best learning experience for students who are ready to study more advanced mathematics. For these few students, allowing exploration of more advanced mathematics at a different pace than the rest of the class or using flexible, between-class peer-based grouping may be appropriate.

A few exceptionally talented students are often better served when they work with similar peer groups who are studying more advanced mathematics. Both short-term and longitudinal research supports allowing and encouraging exceptionally talented students to learn with their appropriate mathematical peer groups at a pace that is appropriate for their unique needs. While some schools offer "gifted" programs, inequitable identification approaches continue to exist so that students who would benefit from this kind of between-class flexible grouping in mathematics might not be identified in their school's gifted program (Tran et al., 2022). That is, some schools and districts continue to base the identification of exceptionally talented students on teacher recommendations, past grades, and test scores, which may contain hidden or implicit biases. However, not all students are ready for more advanced learning for all mathematical units of study. As such, recognizing when such students are better served within or between classrooms is critical.

To begin, mathematics leaders should implement at the building level, not the district level, an objective and equitable approach to identifying students who would benefit from joining peer groups that examine more advanced mathematics in order to increase equity and participation from broader groups of students (Peters, 2022; Peters & Borland, 2020). Since students who are mathematically talented often think about mathematics in nuanced and complex ways (Leikin et al., 2017), it is important that educators have deep pedagogical content knowledge to help students explore complex mathematics appropriately (Goldin, 2017). And while online learning has promise in some situations to support mathematically talented students, simply providing access to an additional online learning platform has limitations. Issues related to maturity, reading comprehension, and managing one's time and space appropriately can lead to unintentional negative outcomes (Potts & Potts, 2017).

Mathematics leaders should also ensure that students do not skip grade-level standards if they are grouped with their peers studying more advanced mathematics. Standards may be compacted or addressed at a faster pace but should not be ignored. Likewise, mathematics leaders should also ensure that students from all backgrounds have access to peer groups who are ready for more advanced mathematics when competency is demonstrated. This kind of flexible grouping is not just for those who have typically been identified as high achievers by previous teachers or other limiting quantitative measures. Fixed, semipermanent, or long-term grouping arrangements restrict access to learning high-quality mathematics and induce inequities among students.

Recommendations for Implementation

Ultimately, no one structure for grouping students should be used all the time, and the decisions for making the groups should be revisited regularly. Not all students need the same support or are ready for more advanced content all the time or for every unit of study. Likewise, developing or refining structures like flexible grouping may present challenges for teachers, teacher leaders, and other school personnel such as registrars or counselors. However, centering equitable efforts to support all students' learning needs in mathematics is a priority. As such, leaders of mathematics at all levels, NCSM members, and other relevant stakeholders play a key role in ensuring mathematics classrooms meet the needs of all students. Thus, the following are some ways in which schools and districts can support the implementation of strengths-based flexible grouping to support all students.

- **Form groups in a variety of ways and based on students' strengths, needs, and readiness as related to the topic(s) of study as opposed to past test scores.** These groups should be made daily or every few days based on the complexity of the mathematics under study and students' own understanding.

- **Use professional learning communities to examine where and when within- and between-class groupings may be appropriate.** This analysis of quantitative and qualitative data, including student work, should lead to richer differentiated learning experiences and not ability grouping.

- **Recognize flexible grouping is more than a means of differentiating learning or a means to explore more advanced content.** Flexible grouping structures create a stronger mathematical learning community, and students benefit from hearing ideas, and ways of thinking, that are different from their own.

- **Examine current grouping practices and beliefs to understand strengths and areas of improvement, focusing on equitable outcomes for all students.** Extreme attention must be given to avoid implicit tracking in the name of flexible grouping. Such work may be areas of ongoing professional learning within grade-level teams, schools, mathematics departments, or entire districts.

- **Consider policies that simultaneously advocate for flexible grouping within and between classrooms for mathematically exceptional students while denouncing tracking as a practice in school systems.** Tracking, the practice of placing students in certain tracks of study based on their perceived ability, creates inequities by restricting the types of mathematics and mathematics learning experiences to which students have access. All students, regardless of their perceived mathematical ability, must have access to meaningful mathematics teaching and learning.

- **Review curricular units of study, pacing guides, and formative assessments practices to ensure all students have access to rich, on grade-level mathematics instruction.** Consider where flexible grouping can lead to collaborative learning experiences that address both deep conceptual understanding and procedural fluency.

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