

Practices Worthy of Attention
Intensive Mathematics Program
Grant High School
Portland, Oregon

Summary of the Practice. Grant High School mathematics teachers provide an intensive mathematics program by giving students double periods of mathematics for two years. In the two years, the students completed three years' worth of mathematics—Pre-Algebra, Algebra I, and Geometry.

Need. Grant High School teachers noticed that their Pre-Algebra students were predominantly ethnic minorities, while their Precalculus students were predominantly white. The teachers wanted to change their practices to ensure that all students gained access to the same mathematics curriculum and education opportunities.

Goal. The goal of Grant High School's two-year mathematics program was to help students who entered high school behind in mathematics to catch up, pass the Oregon high school math assessment, enroll in higher-level mathematics courses while in high school, and enroll in non-remedial post-secondary mathematics courses.

Demographics

Portland Public Schools is leveling enrollment across all their high schools. Grant High School had the largest student population, but, as a result of the new district policy, the school has seen a reduction in freshman class size since 2003–2004. Table 1 lists the enrollment for Grant High School from 2002–2003 to 2005–2006.

Table 1. Grant High School Enrollment Data by Grade Level

Academic Year	9	10	11	12	Total
2002–2003	477	482	410	405	1,835
2003–2004	517	466	461	404	1,848
2004–2005	425	504	445	441	1,815
2005–2006	412	423	464	392	1,691

Table 2 shows the percentage of students enrolled since 2002–2003 by race/ethnicity and economic disadvantage. In general, the majority of students are white (~70% across years), followed by black (~20% across years), Hispanic (~5% across years), and Asian American (~5% across years).

Table 2. Grant High School Enrollment Rates

Demographics	2002–2003	2003–2004	2004–2005	2005–2006
Asian American	4.8	5.4	5.7	4.7
Black	18.0	20.1	21.0	19.4
Hispanic	5.0	4.3	3.8	5.6
White	72.1	70.6	69.7	68.4
Economically Disadvantaged	*	*	21.0	*

Note: The asterisk (*) notes that data were not available.

Grant has an intensive two-year mathematics program. Table 3 lists the percentage of students enrolled in the two-year mathematics program in its first three years (2002–2003 through 2004–2005) by race/ethnicity and economic disadvantage. While the majority of students in the high school were white (~70%) and not economically disadvantaged (~80%), the majority of students in the two-year mathematics program were ethnic minorities (e.g., 75% in 2002–2003 and then 61% in 2004–2005) and/or economically disadvantaged (70% in 2004–2005).

Table 3. Two-Year Mathematics Program Enrollment Rates

Demographics	2002–2003	2003–2004	2004–2005
Asian American	9.2	7.4	2.1
Black	57.0	51.9	55.7
Hispanic	10.3	19.7	7.2
White	25.3	29.6	30.9
Economically Disadvantaged	27.6	*	70.0

Note: The asterisk (*) notes that data were not available.

Description of Practice

Mathematics teachers were frustrated that Grant High School seemed like two schools within one building—in the Pre-Algebra courses, the students were predominantly racial or ethnic minorities, while in the Precalculus courses, the students were predominantly white. Teachers felt that this division illustrated unequal access and opportunity for all students. When they examined student data, they saw that a large percentage of minority students at grade 8 were scoring below the benchmark level on the state standardized assessment and thus were not considered ready for Algebra I. The teachers did not want to simply teach the mathematics at a slower pace, which would keep the struggling students behind their peers; they wanted instead to speed up the instructional pace. They decided to intensify instruction in double periods for two years, in effect giving the students three years of mathematics—Pre-Algebra, Algebra I, and Geometry—in just two years, beginning in their freshman year.

In 2002–2003, four teachers started the two-year mathematics program for students who were entering high school in Pre-Algebra. The plan was to keep students with the same teacher for two class periods per day for the entire two years. However, due to student attrition, only

three teachers were needed in the second year, so some students were not with the same teacher for their second year.

All four teachers were very experienced and were trained in complex instruction, meaning they could develop and use curricula for students with various abilities using group-work activities and could use instructional strategies that required students to use cooperative norms and specific roles to manage their own groups. They also believed that students could be successful in the intensified mathematics program. At the beginning of the program, the teachers used materials from Connected Mathematics and Integrated Mathematics I and II, though they often modified those curricula so that students could access the material and concepts in ways they found interesting. Since then, however, Portland Public Schools has adopted the College Preparatory Mathematics curriculum, so teachers in the intensive math program are now using the CPM Algebra Connections and Geometry Connections materials. The teachers worked closely together to keep each other motivated. They cultivated an optimistic feeling among themselves that the hard work would pay off.

The teachers worked closely with special education teachers to learn about ways to address students' specific needs. Teachers were also involved in parental outreach, making sure parents were aware of the intensified mathematics work their children were doing. Teachers assured parents that the two years of intensive mathematics was not a punishment, but a chance for the students to become more academically engaged and catch up with their peers. On the whole, parents appreciated the teachers and the program. Teachers also called parents when students were absent from class to keep parents updated about student participation.

The principal helped teachers overcome logistical barriers by arranging the schedule so that all four teachers had a common daily planning time. This planning time was considered a teacher duty, which released them from other administrative duties they would normally have. In addition, no transfers were allowed into the courses after the third week of school to keep class sizes reasonable as well as keep the class on track with the intensified pace of the coursework.

During the same year the two-year mathematics program began, the school also created academies for all entering freshmen. In these academies, the students shared three class periods and only three teachers, so teachers got to know all of their students quickly. If students were enrolled in the intensive two-period math class, then they would likely have five classes together and four teachers in total. This helped teachers create a culture of learning and support that students could feel in their two periods of math. The students spent the majority of their time together, so they got to know each other well, and this encouraged the formation of small learning communities in which students could begin to trust one another and work together. Although the students were no longer grouped in academies during their sophomore year, they typically had the same math teacher. This provided continuity for these students and a strong connection to a particular teacher.

Finally, the school invited people of color from different professions to talk to students in this course about navigating the school system. This was one of the ways teachers helped model success for students—showing what people did to succeed, not just in mathematics, but also in school and life in general.

Results

In spring 2006, the first cohort of students who began the intensified math practice in their freshman year graduated. This cohort started with 126 freshmen in September 2002–2003, and 66.7% completed the first year of the two-year mathematics program. The following year, 17.5% left Grant High School to go into another high school, 9.5% left Grant but did not enroll in another high school, and 6.3% stayed at Grant but moved into another class as dictated by their individualized education plan. At the beginning of the second year (September 2003), 62 students of the original 126 were enrolled—about half the number who began the program. No other data is yet available about the number of students completing the program or where students went when they left the program.

The measures of success that Grant High School tracked were retention, percentage of students meeting state benchmarks, and increases in advanced mathematics enrollment (such as Algebra II and higher). The first cohort who started the two-year program in 2002–2003 was ready for Algebra II in 2004–2005, meaning a higher number of racial/ethnic minorities were enrolled in Algebra II than in previous years. Table 4 shows that, between 2002–2003 and 2004–2005, the percentage of black students enrolling in Algebra II at Grant High School increased from 8.9 to 17.9. In addition, the percentage of students with economic disadvantage who enrolled in Algebra II increased significantly, from 3.3 to 20.9.

Table 4. Grant High School Algebra II Enrollment Rates

Demographics	2002–2003	2003–2004	2004–2005
Asian American	5.6	6.3	5.1
Black	8.9	12.3	17.9
Hispanic	2.3	2.4	4.3
White	83.2	80.6	72.7
Economically Disadvantaged	3.3	*	20.9

Note: The asterisk (*) notes that data were not available.

Table 5 lists results for tenth-graders at Grant High School and in all of Portland Public Schools on the Oregon state assessment mathematics exam by race/ethnicity and economic disadvantage. In general, Grant High School students outperform the district across all years and subgroups. Portland Public Schools scores appear to be increasing steadily for most groups. Scores for all subgroups at Grant except Hispanic students were higher in 2005–2006 than they had been in 2002–2003, though Grant's scores seemed to vary widely from year to year rather than showing the steady growth of the scores in the whole district.

Table 5. Percentage of Grade 10 Students Passing the Oregon State Assessment Mathematics Exam

Demographics	Academic Year	Percentage At and Above the Proficient Level	
		Grant High School	Portland Public Schools
All Students	2002–2003	66.0	45.0
	2003–2004	56.0	46.0
	2004–2005	63.9	49.3
	2005–2006	67.5	47.1
Asian American	2002–2003	65.0	51.0
	2003–2004	61.0	52.0
	2004–2005	58.6	54.3
	2005–2006	90.0	59.5
Black	2002–2003	25.0	17.0
	2003–2004	12.0	17.0
	2004–2005	25.3	17.8
	2005–2006	30.6	17.7
Hispanic	2002–2003	36.0	16.0
	2003–2004	35.0	20.0
	2004–2005	20.0	22.1
	2005–2006	29.4	25.6
White	2002–2003	75.0	56.0
	2003–2004	67.0	56.0
	2004–2005	77.7	61.0
	2005–2006	80.8	56.3
Economically Disadvantaged	2002–2003	29.0	21.0
	2003–2004	24.0	27.0
	2004–2005	36.3	29.2
	2005–2006	36.6	28.5

Note: The asterisk (*) notes that tests were not given in these years.

Students were surveyed at the end of the first year of the program, and the surveys show positive results in terms of student confidence. For instance, 63% were confident that they could find the solution to a word problem, and 74% were confident they could solve a multiple-choice mathematics item. The majority of students (87%) were prepared for class at least four times per week. And 87.5% of students were planning to complete high school; of those planning to complete high school, 100% planned to enroll in a college or university after graduation.

Some students reported that they had thought they would always be behind in math. But when their teachers encouraged them, and students started doing their homework, they realized they didn't have to be scared of math. They said that the teachers made math easier to learn and

motivated them to do what they needed to do. Teachers also helped them take school seriously, and students were thankful that the teachers paid attention to them and gave them a chance to understand more. They reported that they learned about getting into an academic routine, going to class every day, paying attention, and becoming more organized. Students indicated that even if they had a bad previous educational experience and were academically behind, they could work hard and be successful in math, even without knowing a lot of math to begin with. Students added that other things had made them successful, including being on time to class, staying on top of homework, having a good teacher wanting them to learn, staying focused, asking questions, and participating in class.

Conclusions

Grant High School's two-year intensive mathematics program has successfully graduated its first cohort of students and is in the midst of analyzing results to see how much this cohort differs from previous years in terms of course taking, standardized test performance, graduation rates, and acceptances to college. Teachers and district mathematics personnel believe that the program is working, and they encourage its use at Grant High School, even with the intensity of time and effort for the participating teachers. Students feel well supported and indicate that they have learned to like mathematics and that they are successful when they pay attention in class and do their homework.

About *Practices Worthy of Attention: Local Innovations in Strengthening Secondary Mathematics*

Practices Worthy of Attention is a joint initiative of Achieve, Inc. (www.achieve.org), and the Charles A. Dana Center at The University of Texas at Austin (www.utdanacenter.org). The initiative is led by Pamela L. Paek, a research associate at the Dana Center, who, in 2006, examined 22 program, school, and district practices that showed promise—based on early evidence and observation—of strengthening secondary mathematics teaching and learning.

Our goal was to document practitioners' descriptions of *what is really happening* in the field to strengthen secondary mathematics education around the country. Thus, while the practice highlighted may be common, the specific structures and strategies used to implement the practice are worthy of attention. These initial investigations set out to mark these practices for future rigorous scientific inquiry by Dana Center and other researchers.

Ultimately, we hope to create a community of inquiry made up of university researchers working with administrators and teachers from featured schools and districts to more rigorously research how effectively these practices improve secondary mathematics learning for all students.

Reports and practice profiles. An executive summary details the methods for this initiative and analyzes themes. Two cross-case analyses discuss specific strategies for raising student achievement and building teacher capacity. Brief profiles describe each practice. All of these publications are available on our website at www.utdanacenter.org.

Data. In all cases, data about the practice were provided by the program, school, or district studied as part of a description of their practice. We did not independently analyze data gathered through a consistent assessment tool, and we did not evaluate their uses of data for measuring effectiveness. Thus, the data in the practice profiles are intended not to prove the practice's effectiveness from a research perspective, but to paint a detailed picture of the practice and what data were used by the program, school, or district to gauge how well it was working.

Theoretical frameworks. In some cases, district staff mentioned specific literature on theory or practice that they used when they developed the practice we highlight. In those cases, we cite that literature in our discussion of the practice.

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