interview

CORE PLUS AND ACHIEVEMENT IN SCIENCE

Damon Blackman *has been teaching mathematics at San Pasqual High School in Escondido, California, for eight years. Over the past five years, he has participated in the National Field Test to help prepare the* CMIC *curriculum for publishing. He currently teaches* CMIC *Courses 1 and 2. In this interview, he describes the correlation between his* CMIC *students and their achievement in science.*

ML: Describe the makeup of your mathematics department, as well as your classes.

DB: San Pasqual High School is located in Escondido, California, just north of San Diego. We have been using the *Contemporary Mathematics in Context* curriculum since the 1994–95 school year. Currently, students are given a choice between enrolling in the traditional sequence of algebra I, geometry, algebra 2/trigonometry, and pre-calculus and enrolling in *CMIC* 1–3 through their junior year. For their senior year, students would select from *CMIC* 4, precalculus, AP calculus, and AP statistics, depending on their undergraduate interests for college. It is not uncommon to have a few *CMIC* students enroll in two math courses their senior year if their schedules permit.

The 1995–96 and 1996–97 school years were the first years that students took *CMIC* at San Pasqual. This group of students also represented the largest number of heterogeneously grouped, non-accelerated students who took *CMIC* 2.

ML: How do science teachers in your school view the achievement level of *CMIC* students?

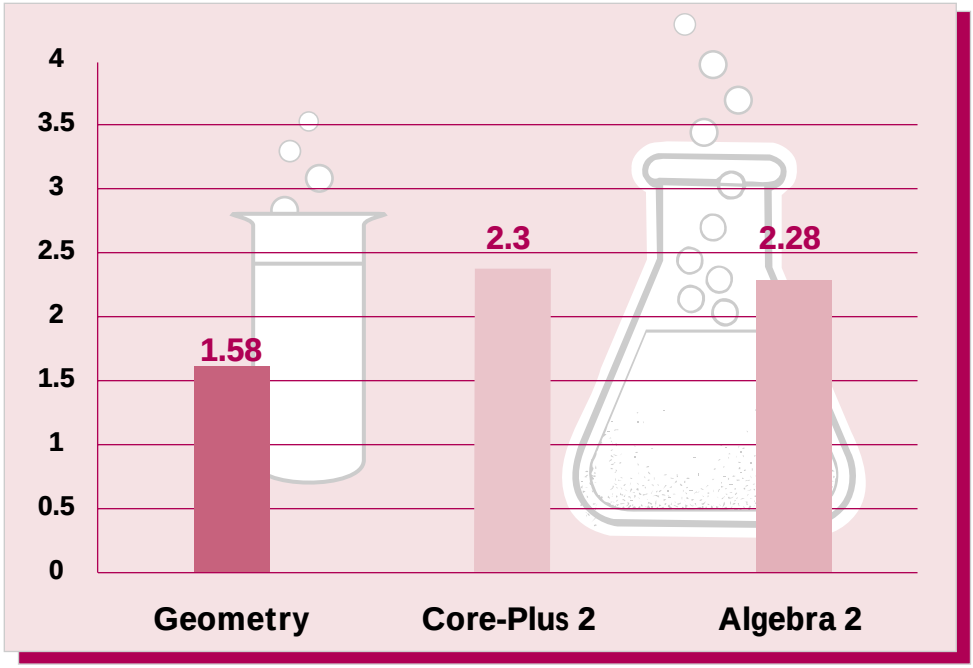
DB: Our science department administers a short, computational test assessing students' ability to solve simple linear equations and proportions, factor trinomials, and solve quadratics without a calculator. Prior to *CMIC,* the science department teachers said that the test was a reasonably good indicator for success in chemistry. Since solving proportions, factoring trinomials, and solving quadratic equations are not taught until later *CMIC* courses, however, students subsequently did very poorly on the pretest.

The *CMIC* teachers met with teachers in the science department to discuss the results of the test. Our department reassured the science teachers that *CMIC* students had the math skills to adequately prepare them for science, and, in particular, for chemistry. Some math teachers questioned whether or not factoring trinomials and solving quadratic equations were essential skills required for success in chemistry. It seemed to the chemistry teachers that, in the past, students with a mastery of those math skills were ready for the rigorous work required in chemistry. In retrospect, it would have been better if the math and science teachers discussed the alignment between *CMIC* math skills and the requisite skills needed for various science courses. We are doing this now.

ML: How does *CMIC* students' performance in science compare to performance of students in traditional mathematics classes?

DB: It was very important to monitor the progress of students in other content areas, especially science. Initially, the only concern of science teachers seemed to be in the area of chemistry. This was solely based on the *CMIC* students' performances on the chemistry pretest; students had already shown a solid performance in biology. The math department decided to measure the success of *CMIC* 2 sophomores who were taking chemistry. These students were compared to other sophomores in chemistry who were taking geometry. The data clearly revealed that chemistry grades for the second semester in 1996 and 1997 were significantly higher for students taking *CMIC* rather than traditional mathematics. In fact, sophomores in *CMIC* 2 (at grade level in math) performed as well as a mix of sophomores (accelerated in math by 1 year, about 25% of that group) and juniors (at grade level, approximately 75%) in algebra 2/trigonometry. Both of these results, especially the latter, surprised the chemistry teachers and led to a discussion of why *CMIC* students did so well in chemistry. This also dispelled the original concern of the science department that *CMIC* students were ill prepared for chemistry as shown by the poor performance on the chemistry pretest.

Chemistry Grades* by Math Course at S.P.H.S. – Listed as G.P.A.s



For Spring Semesters in 1996 and 1997

ML: Why do you think students in the *CMIC* classroom had higher test scores?

DB: There are many reasons why *CMIC* students perform well in science courses. For example, *CMIC* 1 students study ways of calculating changes in population over time (also solved in biology, but in a different way). Students learn how to solve linear equations and add like terms in *CMIC* 1–3, which are important skills for balancing equations in chemistry. *CMIC* 3 students who solve for a variable in the abstract PV = nRT, solve for T in chemistry. *CMIC* 3 students study position over time, velocity over time, rates of change, and vectors.

More important, the success of *CMIC* students in science courses is furthered by the habits of mind, or ways of thinking that are an integral part of the connections between mathematics and science. Students continually collect, analyze, display data, and interpret many different types of graphs. Students are taught how to find equations that model data well and are taught how to determine if any data collected may be invalid.

ML: What feedback have you received from students about how *CMIC* has helped them in science classes?

DB: Students have reported that they see the connection between mathematics and science much more clearly than ever before—partly because the *CMIC* text includes a large number of science questions and investigations, and partly because they understand "why" something works rather than just getting an answer from a formula. Students clearly have a much deeper understanding of science through achieving greater mathematical power.

ML: What feedback have you received from science teachers about how *CMIC* students perform in their classes?

DB: Science teachers are excited about the new mathematics skills *CMIC* students bring to science. For example, systems of linear equations are solved using matrices (*CMIC* 2). Students are able to recognize patterns in data used for writing equations. The science department plans on including graphing calculators and a CBL.