

Effective Practices in Grade 9 Applied Mathematics (2015)

THE ISSUE

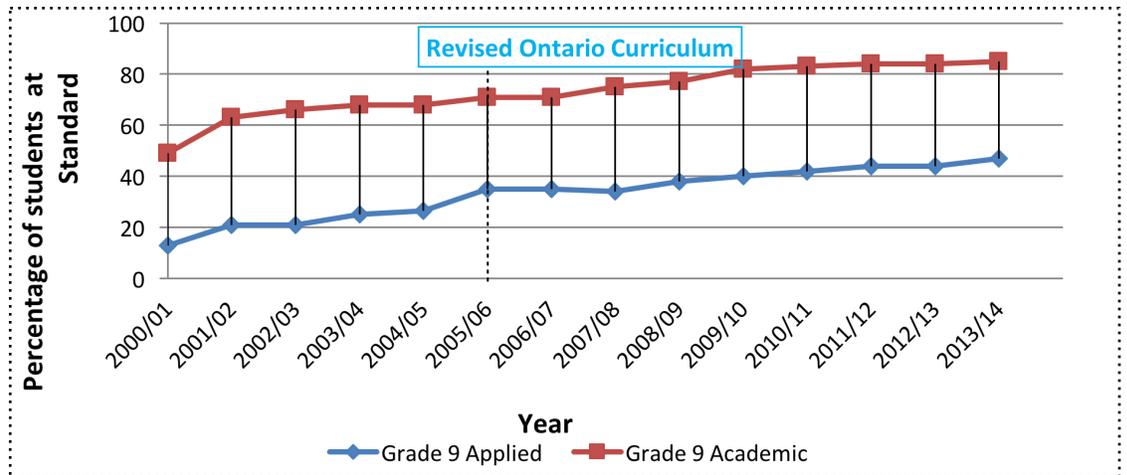
There is a stubborn and persistent achievement gap between applied and academic course-takers on the provincial assessment for Grade 9 Mathematics.

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Less than 4% of students who fail Grade 9 Applied English or Mathematics have completed secondary school after four years.

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King, Warren, Boyer & Chin



RESEARCH OBJECTIVES

The purpose of this qualitative study was to discern practices from the field that might contribute to better student outcomes in Grade 9 Applied Mathematics classrooms.

RESEARCH QUESTIONS

What practices are being used by high performing or rapidly improving schools, as measured by the Grade 9 EQAO Assessment for Mathematics?

Which of the specific practices identified in the mathematics and general reform literature as being related to better mathematics achievement have been adopted by the most successful schools?

METHODS

Mathematics education experts from across the province were interviewed and case studies were conducted at four of the province's most successful schools on the Grade 9 provincial mathematics assessment.

THE CONTEXT

A secondary mathematics teacher with twenty years of experience in 2014 would have had to implement three significant changes in the mathematics curriculum during their career to date.

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Students coming into college with a D in applied mathematics either fail or drop out of college in their first year. This translates to over 10 000 Ontario students being at risk of not completing their college program because of their first semester mathematics achievement.

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College Math Project, 2010

RECOMMENDATIONS FOR TEACHER PRACTICE

CENTRAL THEMES

- Reform-based teaching strategies are important for fostering intellectual engagement and investment in learning.
- High expectations boost performance.
- Collaboration is important to both teachers and students of applied mathematics.
- Stigma around Grade 9 Applied Mathematics can hold teachers and students back.
- When EQAO assessments and performance are valued, the bar for student achievement is raised.

- Have and hold high expectations for students in applied classrooms
- Build confidence and efficacy for students by beginning the course with measurement or geometry—areas that students traditionally do well in
- Affirm your students at every opportunity and celebrate success
- Use a variety of resources that engage students in active and hands-on learning
- Engage students in learning *through* inquiry/problem solving (as opposed to *for*) and encourage them to develop their own unique solutions
- Capitalize on the social nature of adolescents by using cooperative groupings and encourage students to be resources for one another's learning
- Provide students with frequent, oral, and descriptive feedback
- Chunk lessons into ten to fifteen-minute activities and allow students a short mid-lesson break where they can get up, move, and re-focus
- Offer open access to mathematical thinking tools such as manipulatives, calculators, and pencils, and expect students to use them
- Foster productive dispositions around mathematics by sharing the wonder, beauty, and your love of the discipline
- Help students to understand the long term consequences of doing well in Grade 9 mathematics, i.e., there is a better chance of graduating in secondary and post-secondary
- Integrate EQAO sample questions into your regular teaching and help your students to understand this text genre, e.g., discuss strategies for answering multiple choice questions, talk about what it means to “Justify your thinking”
- Provide samples of what good work looks like and engage students in self- and peer-assessment
- Develop anchor charts with the students, post them, and direct students to use them
- Use instructional technologies that help students conceptualize and connect mathematical ideas

References

- King, A. J. C., Warren, W. K., Boyer, J. C., & Chin, P. (2005). *Double cohort study phase 4 report for the Ontario Ministry of Education*. Kingston, Canada: Queen's University.
- Orpwood, G., Schollen, L., Leek, G., Marinelli-Henriques, P., Assuri, H. (2011). *College Math Project 2010. Final report for the Ontario Ministry of Education, and the Ontario Ministry of Training, Colleges, and Universities*. Toronto, Canada: Seneca College of Applied Arts and Technology.

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