

Fall Symposium Report: A Student's Perspective

Ainslie Fowler

As a recent high school graduate, I appreciate that MCATA is seeking the student perspective on the role of communication in mathematics.

With regard to the first question—What is the value and role of communication in mathematics literacy?—I feel that the role of communication is to effectively relay concepts to the student and ensure that a relationship exists between student and teacher. The role of verbal communication in mathematics literacy is to bridge the gap between the language of math and the daily language of discourse.

However, the value of communication varies from teacher to teacher, and this variance can make or break a student's success in class. When teachers value communication highly, they adjust to different forms of communication to appeal to all kinds of students.

Communication in the classroom can take on these adjustments. Communicating the curriculum orally involves more than just daily lectures; it also involves the conversation between students and between students and teachers. Help sessions, student tutors and student presentations are all examples of oral communication that can increase student understanding of mathematics concepts. Visual communication also plays a key role in understanding. Written work (such as notes, daily quizzes to gauge growth or catch problems, and exams) is yet another vehicle for students to convey their status to the teacher.

These two forms of communication can't be successful unless a basic standard for communication is established before classroom work begins. This includes approachability, mutual respect and, more specific to the curriculum, goal-oriented tasks being made evident to students at all times. If students have clear goals tied to their assignments, their incentive to work will increase. Moreover, from the teacher's perspective, formative assessment (such as daily quizzes and small projects) communicates the class's status in a stress-free way. For the student, attending class and knowing the teacher should bring about greater academic achievement.

What is the value of the mathematics diploma exams for Alberta students? The diploma exams standardize testing for all Alberta students. Students are given a fair chance to show their knowledge—no matter where they live, what school they attend or who their teacher is. Overall, classroom work is targeted toward making success on the diploma exam seem like an attainable goal, and the exam represents a student's knowledge and effort over the year. Furthermore, diploma exams are an accumulation of all math units and concepts. Including more than one math concept in a question gives students an opportunity to demonstrate their ability to correlate units, to think outside the box (no memorizing of steps) and to show a holistic knowledge of the course.

For students, the written-response section of the mathematics diploma exams is paramount in proving one's complete understanding of concepts. If a student is prepared and has done well in the class, it is a nice payoff to be able to show his or her knowledge directly.

Multiple choice has its merits as a form of testing, but it is an indirect form, because the options can throw off even a prepared student. Multiple choice has a narrow scope in that it tests only the result, not one's understanding of the process. Multiple-choice questions are designed to be "hard" or "easy," and a rough estimate is made as to how many students will get each question wrong.

On the other hand, written response is a chance for students to clearly demonstrate their knowledge, from equation to answer. Showing one's work allows the marker to see one's logic, even if the final answer is wrong. If a student makes a simple arithmetical mistake, the answer will be wrong, but it will still be clear that the student understands the concept, through how he or she communicates the steps in solving the problem. With written response, students have more control over the answer.

A combination of multiple-choice questions and written work caters to every kind of test writer and learner. If one section of the diploma exams is eliminated, many students will suffer academically. (For

example, I scored higher than 90 per cent on the written section and about 70 per cent on multiple choice.) Also, this balance reduces stress for students when writing the exam, because having two parts gives them a chance to redeem themselves if one part doesn't go well. Basing half of a student's final grade on 50 multiple-choice questions constitutes unbalanced assessment and will place immense stress on students.

Written response also prepares students for post-secondary math classes, where they will be expected to write out all their application questions and show every step. The calculator is a secondary device in written-response questions: students must show

equations, show every step and even show the buttons they pressed on the calculator. The most important aspect of written response is how coherently the student can communicate the steps that have led to the answer. This occurs to a greater degree in post-secondary math courses, where calculators are often not allowed. Multiple choice can turn into a race to see who can type values into the calculator faster, as opposed to the combination of calculator use and logical explanation used in written response.

If communication is so important in the classroom and clearly yields success, then why would it be done away with in the biggest exam of the year?