The Myth of Ability

All children, except possibly the severely-disabled, can be led to think mathematically.

By John Mighton

People who claim that they were born without mathematical ability will often admit that they were good at the subject until a certain grade, as though the gene for mathematics carried a definite expiry date.

Most people will also recall an unusual coincidence: that the year their ability disappeared, they had a particularly bad teacher.

Perhaps more than in any other subject, in mathematics it is easy to turn a good student into a bad one in a very short time. The myths surrounding the subject encourage children to give up the moment they encounter any difficulty.

As well, mathematical knowledge is cumulative: a child who misses a step in the development of a concept cannot go on.

Based on my observations of hundreds of students, I predict that with proper teaching and minimal tutorial support, a grade 3 class could easily reach a grade 6 or 7 level in all areas of the mathematics curriculum without a single student being left behind.

Imagine how far children might go (and how much they might enjoy learning) if they were offered this kind of support throughout their school years.

It is possible, of course, that children who had a head start in early childhood might always remain ahead of their peers (although I believe that significant differences between children would tend to disappear if the children were all offered proper support in the lower grades).

It is even possible, though I do not personally believe this, that some children might be genetically programmed to be more intelligent than others.

But even if this were the case, it would not, I expect, be of any consequence in a society that educated its children.

What's Possible?

I conducted a rudimentary experiment with a grade 3 class recently to see how much they could learn in a month if they were taught by my method, with adequate tutorial support. I gave four weeks of lessons, each lesson 40 minutes long, on fractions, followed by a week of review.

Two volunteer tutors came into the class once a week, and the teacher assisted in most lessons. Five students, including three who were considered learning-disabled or slow-learners, received three extra tutorials in groups of two or three students.

At the end of five weeks, the class wrote a practice test, followed the next day by a 15-minute review, then a final. The children were expected to add and subtract fractions, reduce fractions, change mixed fractions to improper fractions, add mixed fractions, compare fractions for size, and solve simple word problems involving fractions.

Because at least half the class hadn't known any times tables when I started the lessons, the denominators in most of the questions were divisible by 2, 3, 4, or 5. Otherwise, the tests were at a solid grade 6-7 level. All of the students in the class scored over 80% on the practice test and over 90% on the final (with more than half of them scoring 100% on the final).

By the time they wrote the tests, the weakest students in the class had shown remarkable improvements in concentration, memory, and numerical ability, so that there was much less of a gap between them and the strongest students. One boy, who had been recommended for a slow-learners class, finished his practice test ahead of half the class and scored 90%.

When I said to the class, "You all got A's on the practice test — do you think I need to give you the final?", the students shouted in unison **"Yes!"**

This is where the debate about intelligence misses the point. The results of my tutoring suggest that we can raise the level of even the weakest students sufficiently to enable them to appreciate and master genuine mathematics.

At this level, sheer intelligence is almost secondary. Einstein was not a great mathematician technically, but he had a deep sense of beauty and a willingness to question conventional wisdom.

If a music teacher were to say, "Gifted children will simply pick up an instrument and play well; the rest will become only mediocre musicians," we would take it as a sign of incompetence. Why then do we tolerate this view among math teachers?

A simple analogy shows the extent to which people still believe that only a few children are born with intellectual ability. If children in any part of Canada were being starved to the point where they looked like famine victims, people would demand that they be fed.

But children regularly graduate from our schools after reaching only a tiny fraction of their potential. Why do we tolerate this vast loss of potential, this great neglect of our children?

It is not because we are inhuman. We must all believe, on some level, that these children are not being starved, they are simply incapable of eating.

As long as we insist that mathematicians are born and not made, we will tolerate poorly-designed programs in our schools and classrooms in which children who have fallen behind cannot get the help they need to succeed.

(Adapted with permission from* The Myth of Ability *– see our review on page 3. Dr. Mighton founded JUMP, a Toronto charity that co-ordinates math tutoring. © John Mighton, with permission of Anansi Press)