Who can learn mathematics?

It is surprising that mathematics is such an emotional subject. In school, one student may feel the joy of success and another may feel the pain of failure in their encounters with the subject, and this happens from K to 12. It is not easy to understand why this is so, but we can see how it affects a person's attitude about their own ability to do mathematics.

In the light of the current studies in which infant human beings exhibit logic and number sense, I am suspicious of the claims that some people can't learn mathematics. The simple-minded, pardon the pun, notion ascribing math skills vs artistic skills to the discredited left-right brain mythology, is misleading. Let us take a look at the way mathematics is taught. In your first twenty years you have developed a definite, almost unshakeable, attitude of what you can do in art or science. This clearly defines your preferences for one path or another in your life.

Undoubtedly, the decision you have made about your talents are genuine and provides you with your "comfort zone." Whether you would want to read a book that has the word *mathematics* in its title would be determined by this personal vision of yourself. But is this vision accurate? Are you just being prejudiced against your own ability? I have known cases in which a student's angst about their own ability to do mathematics is totally unfounded, a consequence of having an extremely unmindful teacher who was either too good or too bad at mathematics.

If they were too good, then they might not acknowledge that a problem is difficult. These teacher may have had such little trouble learning mathematics, that they were prone to use adjectives such as "easy" or "trivial," a favorite word of some trigonometry teachers. "Wow, if this is easy then I must be dumb," you might say. On the other hand, a less trained or less secure teacher may impart some of his or her own feelings of inadequacy to their students.

Ordinarily, mathematics teachers do not fall into these two categories; they are usually competent and empathetic. One difficulty, I sometimes see in teaching secondary school and higher mathematics, is the requirement of cramming too much material into a course. It is the "depth *vs* breadth" argument. I opt for more depth and less breadth. We try to teach 2500 years of mathematics in one or two semesters; how dumb is that?

In my opinion, the best way to teach mathematics, is to let the students have a stake in the learning. If the students themselves present solutions in the classroom, other students can see how a person struggles with a problem, tries and re-tries various approaches before finally getting it. And the presenter is learning even more. This slower approach might mean that the teacher cannot "cover all of the material". But, you have to ask yourself, "Who has covered it?" Only the teacher.

I have taught mathematics to African children in both rural and urban Zimbabwe, and I taught a college credit mathematics class at Wallowa High School. In the city school in Zimbabwe, I was asked "Can those pupils out in rural districts learn mathematics?" Then, back in the USA I have been asked, "Can those African kids learn mathematics?" Here in Wallowa I have heard people ignorantly ask, "Can those farm kids you taught at Wallowa High really learn mathematics?" In my nearly 60 years of teaching mathematics I have been asked, "Can girls learn mathematics?"

The answers are Yes, Yes, Yes, and Yes. I would love to get society to abandon its ignorance about the ability of human beings everywhere to learn mathematics. I am also hoping you all, of any age, will abandon your own prejudicial opinion that you cannot learn mathematics.

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