

Expecting Girls to Be Poor in Math: Alternatively, Chance for a New Start

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Janet Ferguson, federal Minister of Science and Technology, told a conference recently that "half-baked myths about their lack of mathematical ability are responsible for girls dropping out of sciences in high school." Women from across Alberta heard the statement during a three-day conference sponsored by a university organization, Women in Scholarship, Engineering, Sciences and Technology.

The Minister said that during her travels through offices and campuses in Canada, she found "shockingly few women in professional and management positions" and that "girls need more opportunities to play with tools and explore their environments." More than ever, women must understand the impact of technology. "We need to examine our behavior and think about the ideas we're giving to our daughters. . . . Today, every human is living a life that is drastically altered every minute by science and technology," Ferguson said.

In light of these statements and in light of new federal and provincial initiatives aimed at producing realistic and lasting change, this old topic deserves a fresh look. So important a matter is this to the National Council of Teachers of Mathematics that it produced an official position statement on the subject, as quoted below in its entirety:

The Mathematics Education of Girls and Women

The National Council of Teachers of Mathematics is committed to the principle that girls and women should be full participants in all aspects of mathematics, both as students and as teachers.

Often employment opportunities and continuing educational progress are closed to many young women because of powerful social influences that discourage them from continuing their study of mathematics beyond that required by school policy. Mathematics educators, therefore, must make individual and organizational commitments to eliminate psychological as well as institutional barriers to women in mathematics. Innovative ways must be explored to convince both students and parents of the vital importance of continuing to take mathematics courses so as to keep open both educational and career options.

Each school or school system that does not have an equal proportion of the sexes in its most advanced mathematics classes should examine both its program and its faculty for influences that lead to "math avoidance" by girls and young women. The teacher is in a key role to stimulate and encourage students to continue the study of mathematics. Teachers at all

educational levels must take positive steps and use appropriate learning materials and experiences to overcome the mistaken notion that mathematics is a male domain.

Suitable programs, adequately financed, must be developed to promote the mathematical education of females. Both simple justice and future economic productivity require that we do so without further delay (April 1980).

It's really not enough for us to admit there is a problem, unless we are prepared to commit a significant amount of resources to remedy the situation. NCTM has, in fact, led the way for us by preparing a program called *Multiplying Options and Subtracting Bias*, consisting of videotapes and workshops.

Shirley Hill, former NCTM President, says that two essential conditions for the solution are (a) an increased awareness of the realities and options on the part of young people (both male and female), parents, teachers, counselors, and others who advise and influence them, and (b) intervention with systematic, deliberate programs to change fallacious beliefs and remove barriers to free choice.

The program preface indicates that it is not enough merely to *tell* females about the importance of mathematics in keeping career and life goals open, nor is it sufficient to *ask* females to change their behavior without changing the complex and embedded societal beliefs and forces operating on them. Rather, the handbook points out that the educational environment, consisting of the significant groups of math teachers, counselors, parents, and male and female students, needs changing. *Multiplying Options and Subtracting Bias* "was designed and developed to change these significant groups' beliefs about women and mathematics as well as to change each group's behavior.

The 192-page handbook introduces the preparation, rationale, objectives, and format of the workshops, qualifications and selection of facilitators, and the evaluation of workshops, format guides, and facilitator resources. These resources include a validation report of the videotape *Multiplying Options and Subtracting Bias* and selected reprints, including *Sexual Stereotyping and Mathematics Learning* (Fennema and Sherman), *Multiple Levels for Change* (Sells), *Math Anxiety* (Zanca), *Counselling the Math Anxious* (Tobias and Donady), and *The Power of the Raised Eyebrow* (Burton). Also included are an annotated bibliography, *Mathematics/Science Intervention Strategies for Female Students* (Fennema, Caretta, and Pedro), and evaluation instruments.

The program includes a student workshop, a teacher workshop, a counselor workshop, and a parent workshop, each of which includes an overview, activities, frequently asked questions or comments with suggested responses, overhead masters, handout masters, and a 30-minute videotape available in four formats.

Now is an opportune time to provide a full hearing of the subject. Anything less would be unfair, inconsiderate, and perhaps negligent. After all, mathematics is everybody's business.