

Copyright 2000 Federal News Service, Inc.

Federal News Service

July 13, 2000, Thursday

SECTION: PREPARED TESTIMONY

LENGTH: 2536 words

HEADLINE: PREPARED TESTIMONY OF DANICA MCKELLAR

BEFORE THE HOUSE COMMITTEE ON SCIENCE SUBCOMMITTEE ON
TECHNOLOGY

SUBJECT - A REVIEW OF THE MORELLA COMMISSION REPORT:
RECOMMENDATIONS TO ATTRACT
MORE WOMEN AND MINORITIES INTO SCIENCE, ENGINEERING, AND
TECHNOLOGY

BODY:

Hi, my name is Danica McKellar, and I want you to listen to my thoughts about women in mathematics. Why should you? I actually read the entire Commission's Report. Yes, all 100-some pages. I graduated Summa Cum Laude with a math degree from UCLA with the highest departmental honors, blab, blah, blah. I co-authored a math theorem in 1998, which is now published in the British "Journal of Physics A: Mathematical and General." I have been helping students with math problems for 1 1/2 years on my website www.danieamckellar.com - I am the national spokesperson for the government sponsored campaign "Figure This!" which is aimed at middle school math students. Yes, I love math, and finally, I am a woman.

Before I go into that, let me say that from my point of view, there are many sociological factors contributing to the deficiency in mathematics of women, minorities, and

people with disabilities. I have little experience on the issues that minorities face and almost no experience on the issues that people with disabilities face, therefore my testimony will focus on women.

I believe the problems with under-representation of women in SET (Science, Engineering, and Technology) fields boils down to two fundamental issues, which actually affect the majority of students in all demographics, and which start in elementary and middle school.

Students are not prepared for SET careers, and Students are not even interested in SET careers.

I will call these issues, Problem #1 and Problem #2.

1. Students not prepared: Among other things, we need better pre- college teachers--teachers who are... I don't know... qualified, for instance?

2. Students not interested: Most students do have any real concept of the options or the opportunities available in SET careers. Students cannot be expected to take interest in careers they do not understand. Plus, how can we blame them for not being interested, when to pursue a SET career appears to involve becoming an anti-social nerd who wears tape on his glasses?

I will highlight how these issues particularly impact women in a just a minute. Before I get into the problems as I see them, I'll address the issue of women in SET majors at college.

Personal Story, about Women in College

I was asked to tell from a first hand perspective, what problems or obstacles a young woman faces when deciding to pursue a math/science career in college.

I got news for you. There were no problems in college.

The faculty was extremely supportive. In fact, another female student and I were given the two highest distinctions in the UCLA math department at graduation. The only problems I faced were related to getting research money, and the problem was the fact that I'm not a minority. I was told, "Well, you are female- that helps, but if you were only Latina or African-American, then you'd have a real shot at the grant." The problems are big for women, but I do not believe that the serious problems exist in college.

Rather than simply issuing more grant money in an attempt to keep the SET demographics proportionally equivalent to the US population, I think you'll see that the real solutions must be long term, based in the roots of the two problems I mentioned earlier.

According to the Commission's Report, "more than 50% of American middle and high school children said they plan to drop math as soon as the option is presented to them."! Clearly, if US students entering college already lack the desire and the talent to succeed in SET fields, what chance do US businesses have of harnessing SET skilled workers within the US to compete in the present/future technological based world?

Problem #1: Lack of Preparation for SET Careers

This one seems pretty simple to me. We don't have enough good teachers, and many of them are not even certified!2 Our math/science education becomes inadequate in the middle school years, and continues to decline through high school, and it is devastating to the students' chances at a successful pursuit in SET fields.

The famous 1996 TIMSS study showed that among fourth grade students, the United States did fine, that among eighth graders, the US scored below average in mathematics,

and that among twelfth graders, the US scored among the LOWEST in mathematics and science?

So, why does this problem seem to emerge in middle school years? This is when math gets hard. Before middle school, math class amounts to memorizing the techniques of basic arithmetic. Sure, long division is hard to learn at that age, but it doesn't require much complex conceptual prowess to describe the method of long division. However, beginning in middle school, math entails much more than rote memorization of methods. Suddenly, students are asked to swallow concepts like fractions, percentages, negative numbers, etc. I've run into students at UCLA- some in my freshman and sophomore math classes- who didn't truly understand manipulation of fractions.

This is serious.

Interesting Personal Story, related to Problem #1

My personal roadblock to mathematics surfaced in the 7th grade. The math just seemed different, and the new challenges scared me. Adults had always referred to math as "hard," and that's when I understood why! I felt completely lost. It was a foreign language, and I never would have guessed that my failure could have been in any way the fault of the teacher. At that point, I felt defeated, and had decided that I couldn't do math. Then, like a miracle, our teacher was switched midway through the year to a gentle older woman named Mrs. Jacobson. On one of the first quizzes she gave us, I can remember staring at it, seeing nothing but a blank page. I had to hold back tears as I hear the bell ring for recess, knowing that I had failed again.

For reasons I still do not truly understand, Mrs. Jacobson did not collect my quiz at the end of class, but instead she let me stay through recess after all the other kids had left. Somehow I relaxed and actually scored a C+ on that quiz, and I quickly became an A student

in that class. I couldn't figure out why she chose to reach out to me just then. All I know is that her faith in me at that moment was perhaps the greatest gift of encouragement I have ever received. Mrs. Jacobson made math fun and interesting, and if all middle school teachers were like her, we wouldn't have very much to talk about in this hearing today!

Teachers always have, and always will have a profound effect on kids growing up---for the better or worse. And better middle school teachers, highly qualified to teach math and science, are crucial for solving our SET crisis in the United States today. Let's not forget the impact teachers have on shaping our country.

Solutions for Problem 01:

Better teachers I propose focusing on middle school educators as a crucial point where highly qualified teachers are needed for math education. Teachers simply deserve more money than they make, and until they are paid adequately, the people attracted to the teaching profession will not measure up.

Outside of the school system, math initiatives such as "Figure This!" should be encouraged and expanded, giving kids access to fun, positive forms of education outside the classroom.

Problem #2: Lack of Interest and Identification with SET Careers

After all, if girls are not interested, and do not identify themselves as scientists, mathematicians, or computer technicians, a better education will not be enough to significantly increase the numbers of women in SET Careers.

While girls are forming their self-image in those pivotal middle school years, they need to be exposed to

positive images of female scientists to combat the stereotypical white male images heavily portrayed by the media. The media, as well as prejudices against women in the sciences, contributes to the serious deficiency of role models for females who might be otherwise interested in pursuing SET careers. There are many young women who are extremely talented in the sciences, but who do not even identify with their own talent, not believing they would make good scientists because of deeply rooted social conditioning.

One of the studies mentioned in the Commission's Report stated that "by 8th grade, girls' interest in mathematics and confidence in their mathematics abilities has eroded, even though they perform as well as boys in this subject."4

My experience reflects this very issue.

Personal Story, related to Problem #2

When I came to UCLA, I never planned to be a math major. Never even entered my mind. Why?

The answer is not clear.

I had been successful in the challenging math and science courses offered at my private high school, but I simply didn't see myself pursuing a SET major in college. I didn't think I'd be able to compete after all, math was hard enough; college math must be impossible! And just as importantly, I didn't identify with being a scientist or a mathematician. I just didn't see it. And I couldn't even tell you why. No-one ever told me I couldn't do math or science; I just saw it as inaccessible and foreign.

I harbored all of these self-doubts and feelings of alienation in regards to SET careers, and here I was, a student in the top 3% of her high school, graduating with

honors and an A+ in the highest AP Calculus exam offered in the US.

At college, I started to miss the math classes I had taken in high school, so at the end of my freshman year, I decided to take a math course at UCLA. Having been a bit apprehensive to try college math, I was completely baffled by my immediate success--I scored highest on the very first midterm. Clearly, I was much more prepared for the class than I had thought.

Looking at my own resistance to college math, in spite of my strong background, it should come as no surprise that many female students do not even try SET majors.

Most female students simply do not identify with math, and do not feel confident about it... despite their skill! Many of these students are far more talented than they realize, and do "fit" among scientists and other jobs requiring mathematics.

Students, and in particular female students, must be able to "see" themselves as scientists, mathematicians, etc. The media still propagates stereotypes of scientists as being geeky white males. This can be an unsavory image for boys, but this stereotype certainly acts as a deterrent for girls who have the talent for SET careers. In fact, 75% of all scientists depicted on prime time television are white males, and a survey conducted by the US Department of Commerce revealed that "the more people watch television, the more they think scientists are odd and peculiar."⁵

Kids in middle school are also just beginning to worry about their own self-image and reputation. They want to be "cool," and will tend to reject what they believe is awkward or "uncool" in any way!

We can see the effects of this stereotyping particularly in girls, since girls are taught to be more concerned about their appearance than boys.

Personal Story, related to Problem #2

I have had my share of run-ins with not fitting the "stereotype" of a scientifically-minded young woman. Every day, people approach me, and recognize me for my portrayal of the character "Winnie Cooper" on the television series "The Wonder Years." And every day people ask me what I am doing now. When I tell them I took a break from acting in order to attend college, they inevitably ask what my major was. When I tell them "math"... Mouths drop open...mixed with stares of horror and confusion...usually followed by a looks of intrigue and newfound respect, but always the incredulous, "why...?"

They were not expecting that to come from me, since I do not fit among the ever popular stereotypical images of math nerds. (At least that's what I like to think.)

Even more telling, was an experience I had in the 9th grade.

After our first test, my science teacher pulled me aside and expressed surprise at my high score, exclaiming how unexpected it was that I would be a good student in science. "You just seem so outgoing and you wear such brightly colored earrings... I just didn't think you would be very smart." All based on appearances, the teacher was judging me according to the stereotypes that are so deeply ingrained in our society: the socially inept, nerdy looking guy who doesn't care about fashion. Here's the most interesting part.

The teacher was a woman.

It's time to start reversing negative stereotypes that detract from interest in, and identification with SET careers.

Proposed solutions for Problem #2 Math needs PR

We've got to show math and science in their true light, to make them exciting and interesting to all students, but especially to the underrepresented demographics. Let's call on the ambition of young people! What do young people usually aspire to be? Movie stars, sports heroes--glamorous jobs. Why not make SET careers more glamorous to kids? After all, in this new age of technology and information, the war for talent makes technically skilled workers more and more valuable, so let's make that known. We can appeal to the desire that kids have to be special and valued, and steer kids away from the fear of ridicule for being nerdy.

"Propaganda" videos for public schools: Make scientists the heroes of today. These videos would be, for lack of a better term, propaganda for the sciences.

They would celebrate mathematicians, scientists and computer workers as being on the cutting edge of the new age of technology. The videos would show SET careers as full of heroes. And many of these heroes will be females, minorities, and people with disabilities. The message of the video should be done in a very non-preachy fashion, but should emphasize that the student viewers are fully capable of leading exciting careers like those shown in the videos. Public service announcement campaign aimed at children This could propagate the same ideas I have mentioned for the videos, and should be shown during cartoons on television. Public service announcement campaign aimed at young women These could target the idea that technical jobs can be among the easiest to maintain while being a full time mother.

Today, more and more computer jobs can be carried out from a laptop computer at home.

- Have real life scientists and professors (preferably female minorities) visit schools as part of a campaign to teach students about how research and academia works at the University level. The earlier students understand their

options, the better.

In conclusion, I'd like to offer my services as a personality, actress, and mathematician to help any programs aimed at encouraging young girls to pursue math and science. In addition to writing my math website at www.danicamckellar.com and being the national spokesperson for "Figure This," I am always interested in being involved in new programs to build the strength of the SET community.

Thank you for your time!

FOOTNOTES:

1 Commission Report. Section Six, pg. 11
2 Commission Report. Section Three, pg.9
3 Commission Report. Section Three, pg.2-3
4 Commission Report. Section Three, pg.3-4
5 Commission Report. Section Six, pg.5-6

END

LOAD-DATE: July 14, 2000