HJR 25 (2006): Joint Subcommittee Studying Science, Math, and Technology Education

July 16, 2007 - Meeting Summary

The Joint Subcommittee Studying Science, Math and Technology Education held its second meeting of the 2007 interim on July 16 in Richmond, with Delegate Cosgrove as chair.

Presentations

The Virginia Tech Department of Engineering - Inventing the Future of Engineering Education

Dr. Hayden Griffin, Department Head of Engineering Education, Virginia Tech, gave the joint subcommittee an overview of Virginia Tech's Engineering Education Department. He informed the joint subcommittee that Virginia Tech's program is one of two in the country and currently has 15 faculty members. He also noted that based on empirical research, it is necessary to capture the interest of students by the 3rd grade as they it is likely a student has already developed attitudes or attributes in favor or against STEM subjects.

Dr. Griffin spent the majority of his presentation giving the joint subcommittee a general outline of the graduate program in engineering education. The first course was offered in the spring of 2004 and Virginia Tech currently has 11 approved courses ranging from Foundations of Engineering Education, to Presenting Engineering Research, and Advanced Engineering Research Methods. A Virginia Tech graduate student with an undergraduate degree in engineering or science may earn a graduate certificate in engineering education by taking 13 credits of graduate work in engineering education. The certificate is viewed as important in assisting students "stand out" from the crowd of traditional engineering Education, which was approved by the Board of Visitors in March, and is on the agenda for approval at the SCHEV September 11, 2007 meeting. The Ph.D. program will be the second to form in the US, and will aim for an enrollment of 25, with six degrees awarded per year.

Dr. Griffin also briefly mentioned his desire to reach out to PreK-12th grade teachers through in service courses in engineering. He has drafted eight, 1-credit distance learning courses in basic engineering concepts and hopes to introduce them sometime during 2008, so that teachers at every grade level could feel comfortable introducing engineering concepts in the classroom.

Content Standards in Physics, Chemistry, and Engineering

Mr. Jim Batterson, Special Assistant on Loan from NASA to the Commonwealth's Secretary of Education spoke to the joint subcommittee about the analysis completed by three different panels formed to look at the physics, chemistry, and engineering curriculums in the Commonwealth. The panels are comprised of practicing scientists and engineers, who met for two days at the National Institute of Aerospace in Hampton to discuss the "gaps" in content in each of the three educational areas. There were nine members on both the physics and chemistry panels, and 14 members on the engineering panel. Mr. Batterson reported to the joint subcommittee on the preliminary findings of the panels, and noted that the final reports from each panel will be published by the end of the summer.

The panels were asked to identify what 80-90% of high school graduates need to know about physics, chemistry, and engineering in order to participate in political, social, economic, and technological business in the 21st century. The engineering panel found that there is no "STEM" program in Virginia, because the "E" for engineering, is missing. Engineering is generally taught through career and technical education courses, which are not required for all students. The panel believes that the engineering design process offers a different perspective from the scientific method, and that it should be required content to be taught in the Commonwealth. Also, the panel advocates wide-spread implementation of the Children's Engineering Guide for grades K-5; and also Project Lead the Way, an engineering program currently utilized in only 14 of 132 school divisions.

The chemistry and physics panels recommend that more labs and demonstrations be integrated into physics and chemistry courses, and also assessed. Additionally, the panels believe that teachers should have more leeway in developing content taught within the courses. The panel emphasized that the content is changing rapidly and teachers need to have flexibility to eliminate some of the existing modules. Similarly, the panels believe that teaching contemporary applications and emerging technologies of physics and chemistry is essential and could be accomplished by an open-source electronic bulletin board developed by the Virginia Department of Education as textbooks are difficult to keep current.

Concerns and Recommendations Regarding Math and Science Education

Mr. Speaker Pollard, a partner with Christian and Barton, LLP and a Board Member of the Virginia Mathematics and Science Coalition gave the joint subcommittee an overview of the Coalition's work on the issue, and its recommendations for improving math and science education in the Commonwealth. His comments focused on challenges related to the strengthening of mathematics and science education including: the current math and science teacher shortage, development of well prepared and qualified math and science teachers, the need for new models of teaching, and the need to implement technology and new media. He noted that Virginia is facing a shortage of math and science teachers and also an increasing attrition rate for math and science teachers. However, he emphasizes that any strategy must include ways to strengthen the work force in these two subject areas, as the implementation of any improved curricula is completely dependent upon a teacher's ability to teach the subject and interest students in math and science. Mr. Pollard closed with a detailed explanation of the Coalition's recommendations for improving math and science education, such as: detailed/updated research of problems, improved teacher preparation, improved professional development, support of the preparation and implementation of math specialists, consideration of a science specialist endorsement, consideration of possible economic incentives, review and revision of SOQ/SOL, review and revision of licensure requirements, consideration of proper funding and investment, and the development of a coordinated strategy.

Next Meeting

The joint subcommittee plans to have two more meetings during the 2007 interim. The next meeting will be held in September in Northern Virginia, either at Micron Technology, Inc. or at one of the elementary schools where Micron conducts outreach programs. The fourth and final meeting will be held in Richmond in mid-November.

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