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Joint Subcommittee Studying Science, Math, and Technology Education in the Commonwealth at the Elementary, Secondary, and Undergraduate Levels

Summary for the October 10, 2006 Meeting

The second meeting of the Joint Subcommittee took place on October 10, 2006 in Richmond. After the chairman called the meeting to order, the subcommittee heard presentations from a total of five speakers and also two students from the Shenandoah Valley Governor's School.

Speakers

Marcia Hickey, Adjunct Instructor at the College of Integrated Science and Technology at James Madison University, informed the Joint Subcommittee about the Children's Engineering Guide.

The Guide was first published in July 2003, and the intent is for K-5th grade teachers to use it as a supplement to the core curriculum. Ms. Hickey maintains that children in kindergarten through fifth grade should study technology in order to make connections between the natural and man-made world, develop critical thinking skills, develop problem solving skills, have experiences with the true application of knowledge, gain ownership of essential knowledge, and bridge the gap between memorization of facts and the understanding of skills and processes. Technology education teaches students to determine the problem, brainstorm solutions, create solutions, evaluate the chosen solution, and finally to test the solution. Ms. Hickey's main point was that the guide helps teachers enhance the current teaching in the core Standards of Learning areas of English, math, science, history, and social science and allows children to retain content described in the Standards of Learning more successfully. She gave the subcommittee an example of a project that a third grade teacher could utilize for a math lesson. It consists of a challenge where small groups of students must brainstorm, restate the problem, build, record difficulties, and evaluate the chosen solution. After each challenge the teacher assesses each student's performance.

Ms. Hickey finished her presentation with a few statistics to demonstrate the need for further attention in the area of children's engineering. She noted that since the guide was published in 2003, only 150 teachers (.05% of the teaching population) have received school division level in-service training through Design and Technology workshops, thus professional development is an area where resources are needed. Ms. Hickey emphasized that teachers need to be trained so that they can be confident in implementing design and technology in the classroom as a means to extend and support Virginia's Standards of Learning.

Kathleen Stansbury, President of the Virginia Technology Education Association, presented the Joint Subcommittee with a preliminary report on the need for technology

education in Virginia, as the Association envisions a citizenry that is technologically literate. There are six initiatives promoted by the Association as essential to achieve their vision: (1) Elementary School -- integrated learning through the elementary school curriculum; (2) Middle School -- required instruction in technology education for each student; (3) High School -- provide at least two technology education electives; (4) STEM initiative -- funding for two biennial periods to establish K-12 based technology education courses; (5) Technical Assistance -- provided by the Virginia Department of Education to the local education agencies through the services of at least three technology education program area specialists; and (6) Teacher Preparation -- establishment of pre-service and in-service education to make sure a sufficient number of teachers are available.

Ms. Stansbury emphasized that ensuring that each learner benefits from Technology Education means that it must be included within the Commonwealth's educational requirements. The Association believes that to improve and strengthen the education of all learners in Virginia's schools the study of technology, which emphasizes technological content, processes, and effects, must be included within the curriculum for every learner K- 12. Additionally, teachers must be prepared in the content and methods for developing the individual learner's technological literacy and capability.

George R. Willcox, Career Cluster Coordinator for Career and Technical Education, spoke on behalf of the Virginia Department of Education about The Standards for Technological Literacy and Project Lead the Way, a national program that partners with state agencies to provide specialized education in high school. The Standards for Technological Literacy establish requirements and benchmarks for all K-12 students, with 20 broadly stated standards that specify what every student should learn about technology, and as a result a technologically literate person understands what technology is, how it is created, how it shapes society, and is in turn shaped by society. Project Lead the Way is a not-for-profit organization offering a four year curriculum in engineering that when coupled with math and science classes introduces students to the scope, rigor and discipline of engineering and engineering technology prior to entering college. Currently 24 Virginia schools in 14 different school divisions offer Project Lead the Way courses.

Linda Cauley, Director of the Shenandoah Valley Governor's School spoke to the subcommittee about the Governor's School generally. She has been the director since it opened and emphasized that the Governor's School teachers never stop learning. The Shenandoah Governor's school provides an arts/humanities track and a math, science, and technology track with a range of options available through each. Ms. Cauley estimated that roughly half of the students that apply to attend the Governor's School are able to attend. Two current students spoke to the subcommittee about their experiences at the school. They both noted that the school is preparing them for college, gives them a chance to work independently, and allows them to take advantage of dual enrollment courses.

Dr. Daniel J. La Vista, Executive Director of the State Council of Higher Education for Virginia spoke at the first meeting in August, and returned to answer various follow-up questions the Joint Subcommittee generated at the end of that meeting.

Dr. La Vista informed the committee that SCHEV is currently working on conducting a survey of Virginia institutions in order to determine the weak skill areas in math and science of college freshman. National surveys have been conducted and have found that 85% of faculty members responded that high school graduates are either unprepared or only somewhat well prepared to pursue a college degree. Dr. La Vista also stated that 10,000 degrees are conferred every year in VA in the math, science and technology fields. The subcommittee requested more detailed information including, what percentage of those degrees are awarded to students who attended Virginia High Schools. Additionally, Dr. La Vista noted that the median salary for all workers in 2005 was $34,000, compared to $56,000 among all science, math, and technology workers. With respect to professors in the STEM fields, Dr. La Vista stated that conversations with university deans and department heads acting as the hiring authority for most faculty positions reveal that teaching load is a major determinant as to whether or not a well-qualified candidate will accept a teaching offer. He also reported that other states are attracting research dollars by identifying research focus areas that attract federal research support, attracting and retaining top-notch faculty, developing new researchers from within the state, and growing the space available for faculty to conduct university research. Currently Virginia ranks 37th in the nation for research dollars expended per capita by universities, 32nd in the nation for federal research dollars per capital by universities, and 35th in the nation for state, local and institutional research dollars expended per capita by colleges and universities.

Next Meeting

The Joint Subcommittee's third meeting will take place on October 25, 2006 in Alexandria at the Thomas Jefferson High School for Science and Technology. The members will have the opportunity to attend an option tour of the school before the public meeting begins at 2:30pm. During the meeting, the subcommittee will hear a presentation about the school's background and also hear from the students currently attending the school.