

HJR 90
Study of Science, Math, and Technology Education
<http://dls.state.va.us/TechEd.htm>
General Assembly Building, House Room C
Richmond, VA 23219
September 30, 2008, 10:00 AM

Meeting Summary

- I. Opening Remarks --** The Honorable Delegate John Cosgrove, Chairman of the HJR 90 Joint Subcommittee.

Delegate Cosgrove welcomed members of the joint subcommittee to the second meeting of the 2008 interim. Staff Attorney Patrick Cushing briefly reviewed some follow-up materials that are available on the joint subcommittee's website.

- II. Pre-engineering, the STEM Workforce, and Virginia Tech Online Courses for Teachers --** Dr. Mary Kasarda, Associate Professor, Department of Mechanical Engineering and Dr. Brenda Brand, Associate Professor, Department of Science Education, Virginia Tech

Dr. Kasarda presented on pre-engineering, the STEM workforce, and Virginia Tech's online courses for teachers. Dr. Kasarda proposes that the Commonwealth require at least one pre-engineering course in the pre K-12 curriculum. Massachusetts is currently the only state with a similar requirement. To prepare teachers for this type of requirement, Dr. Kasarda and Dr. Brand have developed two online, in-service teachers training classes to better prepare teachers to teach engineering concepts in the classroom.

Dr. Brenda Brand addressed the joint subcommittee and discussed the difficulty in attracting underrepresented populations to the STEM fields in the pre K-12 system. One successful program highlighted by Dr. Brand was a high school elective class built around and integrated with the FIRST Robotics program.

Building from this model, Dr. Kasarda and Dr. Brand propose developing two online courses with participation from engineering and education faculty, including graduate students, from Virginia Tech, Norfolk State University, and James Madison University. The first two classes developed will be targeted at in-service teacher training and will focus on how to teach pre-engineering content. The goal of the classes will be to engage and train teachers on STEM content and engineering principles. The price to teachers to take one of the proposed classes online will be \$800. A key component of the classes will be participation from major engineering corporations, which have already offered employees to assist in teaching and developing content. The goal of offering these classes is to prepare teachers for the eventual prospect of requiring at least one pre-engineering

course in the pre K-12 system. Dr. Kasarda and Dr. Brand have completed a significant amount of preliminary work and are now looking for funding to develop the full content for the two classes.

Delegate Cosgrove asked how much it would cost to implement the program. Dr. Kasarda responded that they are looking for \$700,000 from the General Assembly. Dr. Kasarda and Dr. Brand are currently pursuing private and federal funding and would appreciate any amount of funding from the General Assembly to help stimulate federal and private contributions.

Delegate Toscano recommended that once funding is secured, Dr. Kasarda and Dr. Brand track the outcomes from this program and its success in training teachers and ultimately improving student performance and interest in the STEM fields. If successful, hard data would be helpful when approaching the General Assembly for funding in the future.

Delegate Nutter pointed out that teacher preparation has been a main focus of this committee and he would like to see support for this program in the list of final recommendations of the joint subcommittee.

Delegate Saxman stated that he would like some additional financial details of this program. Dr. Kasarda reassured Delegate Saxman that after the initial investment this program would be self sustaining and all future funding would be generated from tuition payments.

III. Strengthening the Teacher Pipeline; Initiatives at the University of Virginia -- Dr. Robert Pianta, Dean of the Curry School of Education, University of Virginia; Jim Wyckoff, Professor, Curry School of Education, University of Virginia

Dr. Robert Pianta and Jim Wyckoff, Curry School of Education, UVA stated the Commonwealth needs to work towards attracting excellent teachers in hard to staff schools, provide opportunities for teachers to become excellent teachers, and retain the very best teachers in traditionally hard to staff schools. Using information from the New York City K-12 education system Dr. Pianta and Dr. Wyckoff presented their research on why changes to the New York City K-12 system generated such a positive outcome on STEM performance in public schools. Between 2000 and 2005 teachers achievement in the poorest schools increased to the point where they were even or above the achievement of teachers in more wealthy districts. During that time, NYC made a policy shift and mandated that all teachers be certified. The result was an increase in alternative teacher licensure pathways pursued by teachers to meet the mandate. The main conclusion presented by Dr. Pianta and Dr. Wyckoff was that recruiting more teachers with strong qualifications could substantially improve student achievement.

Delegate Toscano asked Dr. Pianta how the Commonwealth could take the lessons learned in New York City and apply those in Virginia. Dr. Pianta stated that data collection is essential. For example, in the Commonwealth there is poor data on the effect

of pre-k education, we have no way of tracking the progress of students exposed to pre-K education. Delegate Toscano followed with a question asking if UVA could help in providing the necessary data collection and management. Dr. Pianta and Dr. Wycoff responded that they are currently working to improve data collection and analysis in the Commonwealth.

IV. Strengthening STEM in Virginia: Insights from the 2008 Technology Counts Report -- Christopher Swanson, Ph.D., Director, Editorial Projects in Education Research Center (EPE)

Dr. Swanson presented information from the Technology Counts 2008 report published by EPE. Dr. Swanson stated that students in the Commonwealth are struggling in 4th grade math and the poverty gap in math and science test scores.

Delegate Cosgrove asked Dr. Swanson why CA, TX, and MA score so low in the overall state grade for technology. Dr. Swanson stated that many of these states have a high-tech economy but lack the same level of focus in their education system. These states also tend to import a large percentage of its high-tech workforce.

Another statistic highlighted by Dr. Swanson was that teachers in Virginia earn 83 cents on the dollar compared to similar careers, which is below the national average.

Delegate Nutter asked if the Commonwealth should require more math classes or whether the current classes need to be more focused and structured. Dr. Swanson responded that US curriculum is an inch deep and a mile wide. The problem is not necessarily a lack of time spent on math and science education, but rather the depth of the curriculum taught to students. For example, countries like Japan, which have leading scores in the STEM fields, have a narrower STEM curriculum as compared to the US education system. However, students in Japan are taught more advanced principles and critical thinking within the narrower band of topics.

V. Youth Development Programs in STEM -- Ms. Colleen Hahn, President and Executive Director of the Equal Footing Foundation

Ms. Hahn provided a presentation highlighting the Computer Clubhouses established by the Equal Footing Foundation, the charitable arm of the Northern Virginia Technology Council. Computer Clubhouse offer children ages 8-18 an opportunity to receive exposure to STEM disciplines after school through the use of hands-on projects and competitions. The cost to establish a clubhouse varies but operating costs are roughly \$30,000 per year for all programs. The cost to establish and operate a clubhouse is kept low by cross purposing community centers.

Delegate Saxman asked if the foundation targeted a specific demographic. Mrs. Hahn responded that each computer clubhouse tries to cater to the demographic of the area. Although one of the main goals is to target low income and disadvantaged students, the centers are open to all students.

Delegate Cosgrove asked if the foundation tracks students progress outside of the computer clubhouses. Mrs. Hahn responded that for the past three years the foundation has been working to collect that type of information. Mrs. Hahn also explained the membership system and the requirements and incentives that keep students interested in attending the clubhouses.

Ms. Hahn concluded her presentation by stating that over 20 private companies help support the computer clubhouses directly, while the majority of funding comes from the NVTC member companies as a group.

Delegate Cosgrove expressed interest in expanding the computer clubhouse program to the Hampton Roads area and Ms. Hahn informed the committee that there is already an individual interested in expanding to Hampton Roads.

VI. Concerns and Recommendations Regarding Math and Science Education in the Commonwealth -- Mr. Speaker Pollard, Partner, Christian and Barton; Board Member, Virginia Math and Science Coalition and Dr. William Haver, Professor of Mathematics, Virginia Commonwealth University

Speaker Pollard provided an update on the math specialist program and informed the committee that 150 teachers have received master's degrees to be qualified as a math specialist and about 200 are currently enrolled in the program. Currently about 200 schools in the Commonwealth, mostly in urban areas, have a designated math specialist.

Mr. Haber presented on some of the preliminary results of the math specialist program. In grades three through five students scored higher on math in schools with math specialists. Although the results are not statistically significant, Mr. Huber stated that qualitative feedback from teachers and students has been overwhelmingly positive.

The joint subcommittee requested staff to research preliminary estimates on the cost of implementing math specialists in all schools of the Commonwealth.

VII. Public Comment

Cindy Jones, Virginia Children's Engineering Council, requested the opportunity to present at the next meeting. Delegate Cosgrove directed staff to coordinate with Mrs. Jones and have her present at the next meeting.

VIII. Directions to Staff, Dates for Future Meetings -- Chairman and Joint Subcommittee Members

Delegate Cosgrove requested staff to compile a list of recommendations for the joint subcommittee to review at the next meeting. In addition to the presentation by Mrs. Jones, Delegate Cosgrove requested a presentation from UVA on their Produced in Virginia program, which is a partnership between UVA and the VCCS that provides

certain community college students the opportunity to continue their engineering education at UVA upon successfully completing an associate's degree in engineering.

The next meeting of the joint subcommittee will take place at one of the Equal Footing Foundation's Computer Clubhouse's in Northern Virginia.

Staff:

Patrick Cushing, Staff Attorney, Division of Legislative Services

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Scott Madrea, Deputy Clerk, Committee Operations, Virginia House of Delegates