AC 2012-3834: ARE WE UP TO THE TASK OF CONFRONTING A DECLINE IN STUDENT PERFORMANCE? A PANEL DISCUSSION

Dr. Kathy Schmidt Jackson, Pennsylvania State University

Kathy Jackson is a Senior Research Associate at Pennsylvania State University's Schreyer Institute for Teaching Excellence. In this position, she promotes Penn State's commitment to enriching teaching and learning. Jackson works in all aspects of education including faculty development, instructional design, engineering education, learner support, and evaluation.

Dr. Mark D. Maughmer, Pennsylvania State University, University Park

Mark D. Maughmer received his B.S. and Ph.D. degrees in aeronautical and astronautical engineering from the University of Illinois, and an M.S.E. in aerospace and mechanical sciences from Princeton. He has been on the faculty in the Department of Aerospace Engineering at Penn State since 1984. His research activities are analytical, experimental, and computational, and generally in the areas of aerodynamics, primarily aircraft and wind turbines, and aircraft design, flight mechanics, and stability and control. He has worked on aircraft designs with a number of companies, and has played a key role in the development of winglets for sailplanes and low-speed aircraft. He is actively involved in the American Institute of Aeronautics and Astronautics (AIAA) and the International Organization for the Science and Technology of Soaring (OSTIV). He has served as the Chairman of Aerospace Engineering Division of ASEE, and received their Distinguished Service Award in 2006. He received the Outstanding Teaching Award from the Penn State Engineering Society in 1993 and the Premier Teaching Award in 2001. For the past two decades, he has been the "cat herder" for a project-based learning course, based on the German Akafliegs, in which freshman through seniors together are designing and fabricating sailplanes, participating in the AIAA Design-Build-Fly competition, and currently working on a human-powered aircraft to compete for Kremer Prize Competition administered by the Royal Aeronautical Society of Great Britain.

Dr. Robert H. Bishop P.E., Marquette University

Robert Bishop is the Dean of Engineering at Marquette University and is a professor in the Department of Electrical and Computer Engineering.

Dr. Wallace T. Fowler P.E., University of Texas, Austin

Wallace Fowler has served on the faculty of the Department of Aerospace Engineering and Engineering Mechanics at the University of Texas, Austin, since 1965. He is a Fellow of both the American Society for Engineering Education (ASEE) and the American Institute of Aeronautics and Astronautics. He served as National Pesident of ASEE in 2000-01. He currently directs the NASA Texas Space Grant Consortium. He was the recipient of the 1985 AIAA/ASEE John Leland Atwood Award and the 1994 ASEE Fred Merryfield Design Education Award.

Are We Up to the Task of Confronting a Decline in Student Performance? A Panel Discussion

Across the nation, we debate the current state of our students. Internationally our youths' educational standings are falling and by the time we get students into universities, are they ready for the rigor and demands of collegiate learning? Two years ago at the ASEE 2009 Conference, a paper was presented entitled, "Is Student Performance Declining? A Look at 25 Years of Data."[1] The results found that there was a significant decrease in the difficulty level of the exams given to aerospace engineering students in the two courses examined. Often blame is placed on the students' lack of perquisite knowledge and while that is a contributing factor, we believe the problem is much deeper. While setting high standards is paramount to student achievement, we realize that you still have to teach so that students can succeed. How can you appropriately challenge and prepare the current generation of students without relaxing course content and requirements? At question is what can and should be done to rectify this situation? In this panel discussion, several experienced engineering educational practitioners will consider and discuss strategies to help mitigate this confounding situation.

We will not suggest that concerns about student performance are novel or unique to this day and age. For example a 1981 article entitled, "Declining Student Performance in Higher Education" identified factors including, "increased government intervention in education, declining faculty expectations and lowered standards, administrative policies, and changing student attitudes and expectations."[2] The article goes onto suggest that faculty are relaxing expectations in order to better accommodate students and to earn higher scores on student course evaluations. We have found these claims are not outdated and in fact one recent call for reform states, "It is time for the faculties of American colleges and universities to take teaching and – and their students' futures – more seriously."[3] Using data from the *National Survey of Student Engagement* [4], the authors note that students are spending on average only 14 hours per week for preparation for their entire course load and that professors are aware of this situation. Accordingly, they state, "These numbers suggest that although professors recognize that student participation in consequential educational activities is substantially less than they believe to be appropriate, they are unwilling to increase the demands of their courses." [3]

Our panel will share the stories and perspectives of three esteemed engineering professors along with insights on what they have seen through the years in terms of student skills, preparation and performance. The professors recognize the need for motivating students through innovative curriculum and hands-on experiences as well as the real need to help our students become self-regulated learners. It is not our intention to place blame on our students, the professorate, or the universities, but rather to identify real concerns and issues as well as to offer aerospace space-specific approaches to embracing a rigorous pedagogy that requires real commitment from the students and faculty.

References

1. Maughmer, M. & Schmidt, K. (2009). "Is Student Performance Declining? A Look at Twenty-five Years of Data." Proceedings of the 2009 American Society of Engineering Educator's Annual Conference, Austin, TX.

2. Spinelli, Teri (1981). "Declining Undergraduate Student Performance in Higher Education." Eric Document 225509.

3. Gordon, M. & Palmon, O. (2010). "Spare the Rigor, Spoil the Learning." http://www.aaup.org/AAUP/pubsres/academe/2010/JA/feat/gord.htm, accessed January 11, 2012.

4. National Survey of Student Engagement, http://nsse.iub.edu/, accessed January 11, 2012.

Panelist Biographies

Dr. Robert Bishop Dr. Robert H. Bishop, Opus Dean of the College of Engineering, joined Marquette University in 2010. Prior to joining Marquette University, Dr. Bishop was a faculty member for twenty years in the Department of Aerospace Engineering and Engineering Mechanics at The University of Texas at Austin where he served as Department Chairman for six years. He held the Joe. J. King Professorship and was a Distinguished Teaching Professor. Previously, Dr. Bishop was a practicing engineer on the technical staff at the MIT Charles Stark Draper Laboratory.

Dr. Bishop is a specialist in the area of guidance, navigation and control. His research sponsors have included the NASA Jet Propulsion Laboratory, NASA Goddard Space Flight Center, NASA Johnson Space Center, Oerlikon-Contraves of Switzerland, NEC Corporation of Japan, National Instruments, Air Force Research Laboratory, Emergent Space Technologies, Lockheed Martin, and the Charles Stark Draper Laboratory. He is currently working with NASA on techniques for achieving planetary precision landing to support human and robotic missions. Dr. Bishop also initiated several picosatellite projects focusing on autonomous rendezvous and quick access to space. He recently launched his first picosatellite aboard the Space Shuttle STS-127 in July 2009. He was selected twice as a Faculty Fellow at the NASA Jet Propulsion Laboratory where he conducted basic research in observability of interplanetary spacecraft utilizing ground-based radiometric measurements. The Boeing Company selected him as a Welliver Faculty Fellow to work with their astronautics business units to learn about the needs of industry and to apply knowledge gained in the university environment to educate the next generation of engineers.

Dr. Wallace Fowler has served on the faculty of the Department of Aerospace Engineering and Engineering Mechanics at the University of Texas at Austin since 1965. He is a Fellow of both the American Society for Engineering Education (ASEE) and the American Institute of Aeronautics and Astronautics. He served as national president of the ASEE in 2000-2001. He currently directs the NASA Texas Space Grant Consortium. He was the recipient of the 1985 AIAA/ASEE John Leland Atwood Award and the 1994 ASEE Fred Merryfield Design Education Award.

Dr. Mark Maughmer received his B.S. and Ph.D. degrees in Aeronautical and Astronautical Engineering from the University of Illinois, and an M.S.E. in Aerospace and Mechanical Sciences from Princeton. He has been on the faculty in the Department of Aerospace Engineering at Penn State since 1984. His research activities are analytical, experimental, and computational, and generally in the areas of aerodynamics, primarily aircraft and wind turbines, and aircraft design, flight mechanics, and stability and control. He has worked on aircraft designs with a number of companies, and has played a key role in the development of winglets for sailplanes and low-speed aircraft.

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Moderator - ***Dr. Kathy Schmidt Jackson*** is a Senior Research Associate at the Schreyer Institute for Teaching Excellence at the Pennsylvania State University. She works with faculty across the Penn State campuses in enhancing their teaching and learning efforts. Prior to her appointment at Penn State, she spent eleven years as Director of the Faculty Innovation Center for the Cockrell School of Engineering at the University of Texas at Austin. Her areas of expertise include instructional design, faculty development, engineering education, and assessment. Dr. Jackson has a B.S. and a Ph.D. degree from the University of Texas at Austin as well as aM.Ed. from the University of Hawaii.

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