



# UNIVERSITY OF HAWAII SYSTEM

## Legislative Testimony

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Testimony Presented Before the  
Senate Committees on  
Economic Development and Taxation, and  
Education

March 13, 2007

By

David McClain, President, University of Hawai'i  
John Morton, Vice President, University of Hawai'i Community Colleges

H.B. 1268 H.D. 3 RELATING TO INNOVATION IN EDUCATION

Chairs Fukunaga, Sakamoto, Vice Chairs Espero, Tokuda, and Members of the  
Committees:

Thank you for the opportunity today to present testimony on House Bill 1268 H.D. 3, which proposes an number of measures aimed at creating a 21<sup>st</sup> century workforce with the science, technology, engineering and mathematics (STEM) skills sufficient to ensure innovation and the sustainability of Hawai'i's economy.

Larry Foster, former dean of UH's Richardson School of Law and the current president of the East-West Center Alumni Association, opened their recent conference in Hanoi by recalling that Copernicus was criticized for asserting the world is round, when the conventional wisdom was that it is flat.

Ironically today, 500 years later, Tom Friedman, the messenger of globalization, is being taken to task for asserting that, in a competitiveness sense, the world is indeed flat.

It's not time to shoot the messenger, however uncomfortable his message might be. These United States, all 50 of them, are facing a crisis of competitiveness, unlike any seen in a couple of generations.

In my youth, the Cold War threat of a Soviet launch of Sputnik in 1957 galvanized a competitive American response that culminated with placing a man on the moon in 1969.

Today, the challenge to our economy is much more subtle. Creeping globalization has slowly eroded America's competitive advantage.

Our predicament today, as compared with the Sputnik era, reminds us of the old story about the frog thrown into a pot of boiling water knowing to jump out, but the frog sitting in a pot where the temperature rises slowly learning too late, and being cooked.

The temperature of the global competitive challenge is rising, and we need to respond before it's too late for America, and too late for Hawai'i, that is, before we're cooked.

### The University's Position

The University is in support of H.B.1268 H.D. 3's goal of improving the scientific and mathematical preparation of Hawaii's students. The continued decline in the number of students entering science, technology, engineering, math (STEM) programs throughout the United States has become a critical economic development issue, with other states and the federal government currently seeking ways to improve performance, reduce remediation, and make students enjoy the pursuit of scientific inquiry through applied, contextual learning.

Unfortunately, Hawai'i is lagging other states when it comes to the development of students' mathematical and scientific skills and knowledge. In *Measuring Up 2006*, a state-by-state analysis published by the National Center for Public Policy and Higher Education, it was reported that, "(Hawai'i's) eighth graders are not well prepared for challenging high school courses. They perform very poorly on national assessments in math, science, reading, and writing."

This initiative meshes well with UH's goals as a higher education system: to develop the educational capital of the state; to develop our workforce; to diversify the economy; and to increase our efforts on behalf of underserved regions and populations, particularly Native Hawaiians. It also increases the dimensionality of UH's United for Learning "P-20" initiative, which promotes collaboration between the UH, the Department of Education, and the early childhood Good Beginnings Alliance.

When we first launched the business school's entrepreneurship initiatives a few years ago, at the end of the economic slump of the 1990s, the goal was to help Hawai'i live by its wits, as so many other resource-poor regions and countries do, instead of relying on tourism, the military, and land development.

We learned at that time how critical it was to go beyond the X's and O's of starting a business and seeking financing. We needed to reach out to the science and engineering departments at UH as the source of the many of the new business ideas in this technologically-saturated age.

Fortunately, UH is particularly strong in these areas; UH Mānoa is a top 25 public research university, and we bring in \$430 million per year in research and training grants and contracts, about twice as much as five years ago.

To get students excited about these STEM fields, however, you have to intrigue them at an early age, long before they get to college, since these disciplines are so complex.

More importantly, the habits of inquiry involved in mastery of these STEM fields have benefits whatever profession and career path students choose.

The progressive educator John Dewey emphasized wonder, discovery and connectedness in an individual's successful education. In Dewey's conception, students become confident learners by "doing", by investigating the world around them, and by paying thoughtful attention to what happen. Thus at his Laboratory School at the University of Chicago, students aged 6 and 7 understood chemistry, physics and

biology by examining the foods eaten at breakfast, their origin and transformation during cooking.

### The HiEST and FIRST Academy Models

So it is with the proposed FIRST pre-academies and the HiEST academies. FIRST focuses on engaging students in middle school and the first years of high school with math, science, engineering, problem-solving and teamwork concepts in a project-based contextual learning environment; special emphasis is given to robotic and space contextual learning.

HiEST is inspired by the UH Community Colleges' Construction Academy initiative, now in 26 high schools, and by its leadership in developing the CISCO Academy.

Both initiatives motivate learning by stressing its relevance, in the best Dewey tradition. Both are voluntary, which should facilitate integration with current academic programs at the DOE.

The community colleges of the University of Hawaii have actively sought ways to integrate high school learning with a collegiate pathway through Career and Technical Education. There is clear recognition that rigor and relevance when combined with successfully designed learning experiences and curriculum can excite and invigorate student interest in scientific inquiry.

The current high rates of remediation in math and communications of DOE graduates enrolled in community colleges need to be reversed. Colleges experience a need for remedial and developmental skills in up to 80% of their incoming students. Gear Up data illuminates the problem. The goal is to reduce need for remediation to 20%, and save the taxpayer from paying for course work twice (or more).

We will focus on the group Dale Parnell, father of Tech Prep, called the neglected majority – those students are not being well served by the current mainstream curriculum. It is not designed to compete with programs already serving specialized

needs that are recognized for their success with academically talented and gifted students. We seek to provide the average student a solid foundation in STEM skills.

The community colleges have the experience in implementing workable academies through the models of both the Cisco and the Construction Academies. There are 22 Cisco high school academies linked to community colleges, with students gaining experience in networking, and course work converted to college credit. All teachers are high school computer science and technology teachers trained and certified through the Pacific Center for Advanced Technology Training of the community colleges.

The Construction Academy integrates a common curriculum with a combined teaching staff of high school and community college faculty with specialized construction technology skills. We support the development a a similar model for the HiEST Academy, with a community college science teacher integrated into the high school science teaching environment.

The curriculum and labs will be purchased as a turnkey operation, and has been demonstrated nationally to be successful. A common curriculum will lead to having measurable outcomes of the same standards. Faculty will have substantial training on the curriculum provided to them, with follow-up support.

#### Other Initiatives in H.B. 1268; Financing Issues

The University is also supportive of the intent of the complementary initiatives in H.B. 1268, including efforts to increase the number of outstanding STEM faculty in grades K-12 via professional development programs and stipends for STEM graduates to become teachers; internships at high schools and college; college scholarships for HiEST academy graduates; and funding to match private donations for endowed chairs at the University.

We note, however, that the matching-funds endowed chair initiative was part of the University's legislative package in 2006, but has not been included in our legislative

package this year. This is not because we believe this kind of initiative is not a good idea; we do. It's simply that we have other, higher priorities.

For the Committee's information, we also note that the estimated cost of the scholarships for STEM graduates would be about \$1 million in the first year at UH Mānoa tuition rates, if 200 students qualified. This amount would rise to \$6.7 million after four years, by which time 800 students would be in the program. While scholarships are no longer included in this draft of the bill, we believe they are a critical component in the process of getting more students to enroll in postsecondary STEM programs.

Finally, we note that the experience of similar programs to the FIRST pre-academies (e.g., the Hawai'i Council for Economic Education's efforts to promote K-12 economic and financial literacy) suggest that the staffing proposed will not be sufficient to achieve the outreach intended. Such programs are more labor intensive than the bill anticipates.

Consequently, we ask that the Legislature, as it considers funding for H.B. 1268 H.D. 3, fund these initiatives only after all initiatives in all three priority tiers of the Board of Regents approved budget have been funded.

In conclusion, we support the intent of H.B.1268 H.D.3, and if funded look forward to working with Superintendent Hamamoto and the DOE in its implementation.