



## CURRICULUM AND EMPLOYMENT CHALLENGES

Although the hierarchy that Paul S. Rosenbloom describes (“A New Framework for Computer Science and Engineering,” Nov. 2004, pp. 23-28) is not necessarily the best option, I believe that all computer science and engineering faculty should read his interesting and insightful article. There is indeed a need to rethink and restructure the computer science and engineering curriculum to make it relevant to students, research needs, and employer needs.

In another article in the same issue, Mike O’Neal also provides an interesting perspective on this topic, especially with regard to job outsourcing and the corresponding implications for US graduates in areas related to IT, programming, and even hardware design (“Restructuring Computing Programs to Meet Employment Challenges,” Nov. 2004, pp. 29-34). Intel, for example, now has design houses in India, and many traditional Indian software companies such as Wipro and Tata Consultancy Services have open fables design services.

However, I must point out that there is a tendency to blame all of the concerns about job opportunities for graduates with computer-related degrees on outsourcing. Although outsourcing is indeed a factor, the lack of standards in the US education system also is partly to blame. In addition, organizations like the ACM and the IEEE are not doing enough to encourage students to take courses that prepare them for pursuing an engineering education. When middle school and high school students are subjected to low expectations in their learning and performance, they feel that the computer science and engineering disciplines are too demanding, hence they are reluctant to seek an education in these fields.

We need to do more if we want more engineers and scientists in this country.  
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The author of “Restructuring Computing Programs to Meet Employment Challenges” is widely off the mark, totally missing the implications of the new economic reality facing the knowledge professions in developed countries. The strategies proposed in this article can just as easily be implemented in emerging economies, leading to an endless regress.

Meaningful economic competition can only occur among economic peers operating from similar baselines. Engineers from emerging economies work in an environment in which they can have a culturally mainstream livelihood for a small fraction of the cost in a developed economy. They are the de facto beneficiaries of an unprecedented metamorphosis of the global economic landscape via information technology.

Arguments that frame the wage dilemma in terms of traditional notions of economic competition demonstrate the extent to which traditional economic theory has degenerated into dogma that no longer addresses reality.

Failure to regulate the flow of knowledge labor will lead to the collapse of wages and currencies in developed economies. This will devastate the exclusively export-based emerging economies. Anything done in developed economies can be done cheaper in emerging economies where there is an educated workforce. The only thing that will stop this trend is the collapse of wages and living standards in developed economies.

The only sustainable solution is regulation of trade with the goal of eventually bringing all economies to the same baseline in a controlled manner. Competition is a false argument. Regulation of trade to prevent the total loss of economic capacity and massive social dislocation is not protectionism. Failure to accept this will lead to the economic ruin of the West through rapid deindustrialization, the collapse of domestic technical education as perceived economic return for such a major investment disappears, and catastrophic currency devaluation via

massive borrowing to maintain an unsustainable standard of living. These trends are already recognizable.

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*Mike O’Neal responds:*

As the letter from John Powers illustrates, offshore outsourcing is a “hot button” issue. While I agree with Sandeep Shukla that “outsourcing is indeed a factor” in the tighter US domestic IT market, I would take issue with Powers’ assertion that this trend “is leading to the collapse of wages and currencies in developed economies.”

I agree with Shukla that part of the answer to maintaining a robust domestic IT market is to raise the educational bar—while avoiding the tendency toward grade inflation that is becoming more prevalent. However, what we teach is at least as important as the academic standards we set for our students. It is no longer enough that graduates be competent technically. To thrive in the current environment, they also must be flexible, team-oriented, aware of current industrial practices, and exhibit good communications skills.

## ERRATUM

The last sentence in “Restructuring Computing Programs to Meet Employment Challenges” should read as follows: “Nonetheless, the benefits of interdisciplinary research teams are clear—especially for smaller schools—because pooling their talent can help these schools compete for national funding in focused research areas, while simultaneously improving their students’ educational opportunities.”

In pointing out the error in the published version, Mike O’Neal states that he specifically does *not* believe that graduates of smaller schools face more limited job opportunities than graduates of larger schools.