

The inside track from academia and industry

System-ready scientists

Government and industry must do their bit to ensure that universities provide the workforce they want.



Michael Alvarez

However complex a system might be, there is a reasonably reliable three-step approach by which it can be changed or enhanced: design, development and implementation. Each step has its challenges, and the fact that the process can be depicted simply should not be taken to mean that it is easy. But the tenets of this framework are sound, and can be applied to management, education and workforce development just as well as to programming and product commercialization. Early on in their careers, scientists would do well to consider how they can fit into and contribute to the enhancement of the labour force or, more specifically, the scientific enterprise.

Viewing people merely as operators that form part of a system may seem dehumanizing, but to an extent this model — which quantifies people in the same way that other natural systems are often quantified — can be both helpful and fruitful. Doctoral training in the sciences helps students to achieve a level of command or mastery within a chosen area of research. It is

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likely that, sooner or later, such students will be looking for some form of employment. In this way, individuals become part of our broader labour market and contribute to our economic system.

The idea that trainees should be prepared or ‘engineered’ to fulfil certain functions within society might sound mechanical. Some may even raise questions about the individual’s free will or the degree to which government and political structures should be responsible for shaping society. For the sake of clarity, the purpose here is to emphasize the importance of our three broad employment sectors (academia,

government and industry) working together to construct a healthy society.

In the United States, the need for reform of the education system, from kindergarten through to graduate school, has been well documented. *Rising above the gathering storm* is a 2005 report by the US National Academies that forms the basis for legislation still being considered in Congress. It highlights the fact that global competition for prominence in science and technology is intensifying, and proposes that the United States will need to do a better job of leveraging its greatest assets (higher education, industrial capital and federal resources) to retain a position of leadership. The committee that authored the report recommends, for example, that the United States strengthen its commitment to basic research that “has the potential to be transformational, to maintain the flow of new ideas that fuel the economy, provide security, and enhance the quality of life”. Many fundamental elements are required to produce a healthy economy, and support for innovation is a key ingredient. The education and innovation systems and their inputs need tweaking.

One way that universities can help address the nation’s needs and simultaneously retain strength in higher education is to gather information from government and industry about their ‘design specifications’ for incoming talent. By making use of this such information, universities are better informed and positioned to develop graduate training programmes that produce suitably qualified trainees.

As for then ‘implementing’ scientists and engineers within the workforce, each company or agency typically has its own methods. What is important is that the dialogue takes place;

government and industry must provide academia with input about their needs and the barriers they face. The US Food and Drug Administration, for example, may want to expedite the drug and device

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approval processes, whereas the companies they regulate might want to identify areas of unmet need or methods by which to enter a particular market. Universities can be instrumental in developing people and technologies that offer solutions.

And programmes that raise awareness of these challenges and of the various functions across a company or government organization make trainees more prepared to contribute. These initiatives are valuable to organizations taking on new staff, because they won’t need to spend as much time in the early stages of a new recruit’s employment getting them up to speed.

In this way, companies that forge links with organizations providing higher education find a more ‘system-ready’ candidate, with a deeper knowledge of the broader scientific enterprise. Only through open, honest communication can academia, government and industry help design, develop and implement changes that will forge a more efficient science workforce. It is hoped that such changes will lead to a system that gives individuals the best opportunities and societies the best chance to maximize discovery and innovation. ■

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