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Biotech: Not Just for Geeks

Business students get high marks for scientific literacy

Fred Ledley

November 20, 2019

In a down economy, biotechnology jobs are growing faster than the overall Massachusetts state economy. The numbers don't lie, says a recent industry [study](#):

- More than 53,000 people in the Bay State are employed in the biopharmaceutical industry
- More than 28,000 people in biotechnology collectively earn more than \$6 billion per year

These are big numbers. They reflect the state's leading role in an industry that comprises more than 70,000 establishments, employs more than 1.5 million people nationwide, and continues to grow, according to the Massachusetts Biotechnology Council.

But there's a more important observation. The Massachusetts biotechnology industry is maturing, with several important new drugs launched in the past year and 10 more awaiting FDA approval. As it advances, its workforce needs are changing. And it goes well beyond science geeks.

Between 2010 and 2011, the greatest job growth in the biotech industry occurred on the business side: finance and administration, operations, business development, and quality. Sure, start-up biotechnology companies are fueled by scientific minds, but by the time biopharmaceutical companies successfully bring their products to market, the majority of the workforce is engaged in business functions such as general and administrative and marketing.

Far too often, these are hard positions for companies to fill. In addition to outstanding business skills, it takes an interdisciplinary knowledge of science as it is applied in a business context. In biotechnology, science and

technology must be closely integrated with corporate and business strategy. Business professionals have a critical role in shaping the direction of research and development to align with the company's business model and strategy as well as establishing the goals, staffing, and budget for the company's technical functions.

This does not suggest that business professionals need to be able to do science or even be expert in their company's technologies. But they do need to know how to understand the nature of science and technology, the process of technology innovation and implementation, and the strategic role of technology in business. In a word, business professionals need to be scientifically literate.

The National Academies of Science have defined scientific literacy as “the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity.” Others have defined scientific literacy as the ability to understand articles at the level of the *New York Times* Science Times section — a level arguably close to the typical biotechnology business plan or annual report — or the ability to “understand the scientific issue of our times.”

In fact, less than one-third of Americans achieve these levels of scientific literacy. This is a problem for industries like biotechnology that are critically dependent not only on a workforce of scientists, engineers, technicians and clinicians, but also on business professionals with the interdisciplinary skills in science, technology, and business to manage, invest in, and lead their enterprise. As a result, employers routinely emphasize the need for a greater focus on science and technology in the undergraduate curriculum.

We recently completed a [survey](#) of leading business schools, and found that 80 percent of these schools require science courses as part of their undergraduate curriculum. Our study also found, however, that very few schools have designed courses explicitly tailored to business students.

The number of undergraduate science courses has been shown to be the single strongest predictor of scientific literacy. Courses designed to prepare students with an interdisciplinary knowledge of science and business

applications could become a similarly strong predictor of professional success in growing, technology-driven industries like biotechnology.

Biotechnology is not just for characters like Dr. Amy Farrah Fowler, a neurobiologist on the popular sitcom *Big Bang Theory*, and a quintessential science geek. But, characters like her have started companies that are rapidly maturing, creating new opportunities for business professionals who are prepared.

[Fred Ledley](#) is professor of natural and applied sciences and professor of management, and director of the Center for Integration of Science and Industry at Bentley University.