Undergraduate biology textbooks fail to teach how science can improve industry practice

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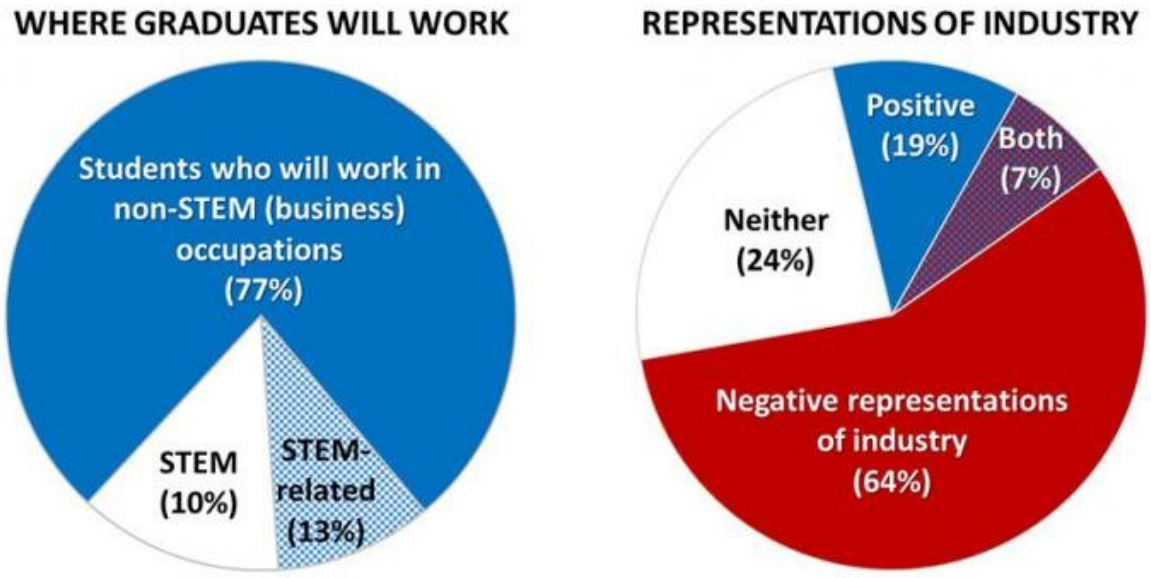

While most undergraduates will work in non-STEM, business occupations, biology textbooks predominantly describe business in negative terms. This may impair both student engagement and their ability to apply science in the workforce. Credit: Bentley University Center for Integration of Science and Industry

Undergraduate biology textbooks do little to teach students how science can contribute to successful careers in industry or improved business practices at a time when some fear that science is under attack by

corporate interests. A new study from the Center for Integration of Science and Industry at Bentley University shows that textbooks for first-year, undergraduate biology fail to provide context for applications of science in business and instead perpetuate a negative stereotype of industry and its relationship with science. This may impede the goals of science education by impairing both student engagement in the science curriculum and their ability to apply science in the workforce.

The article, entitled "Representation of industry in introductory biology textbooks; a missed opportunity to advance STEM learning" appears in the journal *CBE—Life Sciences Education*. The research used text analysis to identify passages mentioning business or industry in textbooks used by >2 million first year biology students annually in the US. The analysis found few passages describing how biology could be employed in business careers and few examples of industrial applications of scientific concepts to support context-based learning. In addition, the research found that most of the mentions of business or industry were associated with negative connotations and that there was a disproportionate number of descriptions of irregular or fraudulent corporate actions. While the large majority of students who enroll in undergraduate biology will ultimately work in business occupations, these curricular materials provide little foundation for applying science in these careers.

"We are concerned that the negative representations of industry in science textbooks may both alienate the large majority of undergraduate students who are preparing for careers in non-STEM occupations in industry, and lessen the likelihood that they will employ science in their business," said Dr. Sharotka Simon, lead author on the paper. "For science teachers, it is intuitive that science can contribute to the success of business, but we don't help our students make that connection. We need to do more than train future scientists; we need to help all students understand how science can help them succeed in the workforce."

The article discusses the results in the context of research showing that business decisions inevitably begin with fast, intuitive thinking, which can introduce biases into critical analysis. Repetition of negative stereotypes of business in science textbooks, coupled with the prevalence of such stereotypes in the popular media, encourages students to see science as being essentially at odds with business practice. A more effective strategy would be to provide constructive examples of how science can inform effective business practice to encourage reflexive use of science in business careers.

"Our research focuses on how to maximize the public value that comes from scientific advances by better integrating the best practices of science and business," said Dr. Fred Ledley, Director of the Center for Integration of Science and Industry. "Business leaders need to recognize that science is not in conflict with business, but when effectively integrated, provides a foundation for successful products and business strategy."

More information: Sharotka M. Simon et al, Representation of Industry in Introductory Biology Textbooks: A Missed Opportunity to Advance STEM Learning, *CBE—Life Sciences Education* (2018). DOI: 10.1187/cbe.17-03-0057

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