

Connecting Education to Employment Through Skill Development

San Diego Regional BioScience Center

Life Science Education to Employment: a Conundrum

Seventy-two percent of undergraduate education providers believe that their graduates are adequately prepared for entry-level positions, yet 56% of these graduates are not sure their bachelor's degree has improved their chances of finding a job. Furthermore, 45% of employers say a lack of skills is the main reason for entry-level vacancies. (McKinsey Survey 2014)

A gap exists where increasingly higher levels of graduates can't find jobs, while employers can't find applicants with critical job skills.

Life Sciences Industry: Growth and Opportunity

Life science is a flourishing industry that includes pharmaceuticals, medical diagnostics, medical devices/equipment, agriculture and biofuels. The life sciences industry is one of the most important technology industries of the 21st century. The industry is developing products and technologies to fight disease, reduce the environmental footprint and feed the hungry, all while having an overall positive impact on the economy.

There are approximately 73,000 life science companies that employ 1.6 million people. The significant growth of this industry requires talent to meet the demand. Approximately 12% of employees within the industry are high school graduates, 61% have undergraduate degrees and 22% have graduate degrees.

The industry is well-funded with four states, California, Massachusetts, New York and North Carolina, receiving more than a billion dollars a year in National Institutes of Health (NIH) funding. San Diego receives approximately \$785 million in NIH funding, has more than 2,500 companies engaged in life sciences and employs more than 115,000 employees in the industry.

Life Science Education to Employment

The San Diego Regional BioScience Center, located on the La Jolla High School campus, represents a bridge between a traditional education and employment in the life sciences industry. The goal of the BioScience Center for high school students is twofold: 1) inspire students to pursue undergraduate and graduate degrees in science, and 2) prepare high school students to secure positions in our local life sciences industry upon graduation.

The BioScience Center is designed with modern facilities for teaching biology and chemical lab skills including safety, notebook writing, scientific presentations, analytical technique and critical thinking. The BioScience Center would also teach life skills including communication skills, leadership, presentation skills, professionalism, problem-solving and teamwork.

The BioScience Center would also present "Teach the Teacher" sessions, bringing knowledge and practical lessons to teachers in the San Diego community and working with school counselors to understand what

options exist for the wide variety of students in San Diego. For example, using its extra lab and prep space, the Center could regularly host biology classes from other San Diego Unified District high schools. Instructors accredited through the Life Sciences Summer Institute (LSSI) of Miramar College could teach bioscience labs for college credit at the Center's facilities. Teachers from San Diego County and surrounding areas would participate in professional development programs that expose them to new biotechnology lab, and local biotechnology companies. This would help teachers prepare students with STEM competencies necessary for careers in the modern workforce.

If teachers could be provided, the Bioscience Center facilities would enable the (summer) LSSI program to be expanded. This would open the LSSI courses to many additional San Diego high school students, who cannot be accommodated today.

Bioscience employers, many of which are concentrated in the Torrey Pines / La Jolla area, must be involved in this process. They can collaborate with education providers so that students learn the skills they need to succeed at work. Effective "Education-to-Employment" programs involve employers and educators stepping into each other's worlds. Employers advise and assist educators in the design and development of curriculum to ensure it meets the demands of the workforce. They can also offer employees to serve as guest faculty. Educators arrange job training and hiring placement. Educators and employers work with students early and intensely. It is not a linear program in which enrollment (and cost) leads to skills and then possibly a job, but a continuum in which employers hire interns from across San Diego County as part of the training and curriculum. Greater student access can be achieved through coordinated effort and strategic planning to develop and connect satellite locations and offer flexible course scheduling.

Furthermore, the Bioscience Center can serve as a venue for educational videos of lessons taught by local guest lecturers, which could then be published on educational, peer-reviewed websites such as JOVE (Journal of Visualized Experiments).

Government and school administrators also play a crucial role. Strong programs have been established at community colleges such as Mira Costa College. Starting this training in high school enhances the community college programs and provides a clear path from high school education through community college programs to jobs requiring STEM training.

The ultimate goal is to create successful life science students through experiential learning, internships and learning-by-doing. Work experience is part of the curriculum.

Inspiration and education in the life sciences starts with:

1. Inspiring students' interest in the life sciences
2. Focusing on curriculum that teaches the skills
3. Developing partnerships between schools and industry
4. Building teaching facilities that provide real-world learning opportunities
5. Engaging administrators, teachers and counselors in the process

The journey from education to employment can be complicated and there are multiple routes to success. Each route involves practical training and experiential learning to bridge the knowledge gap. The San Diego Regional Bioscience Center bridges the gap for those high school students interested in life sciences education and employment.

As evidence of the School District's focus on modernizing bioscience education, La Jolla High School will be offering Project Lead The Way (PLTW) Biomedical Sciences Pathway for grades 9-12, beginning in the 2015-2016 school year. Project Lead The Way is the first organization to provide K-12 pathways in computer science, biomedical sciences, and engineering. PLTW's world-class, activity-, project-, and problem-based curriculum and high-quality teacher professional development, combined with an engaged network of educators and corporate partners, help all students develop the skills needed to success in the global economy. PLTW's Biomedical Science program is a rigorous and relevant four-course sequence that allows students to play the roles of biomedical professionals as they investigate and study the concepts of human medicine, physiology, genetics, microbiology, and public health. Students engage in activities like investigating the death of a fictional person or dissecting a sheep's heart, learning content in the context of real-world cases. They examine the structures and interactions of human body systems and explore the prevention, diagnosis, and treatment of disease, all while working collaboratively to understand and design solutions to the most pressing health challenges of today and the future.

COMMUNITY SUPPORTERS of the BIOSCIENCE CENTER PROJECT:

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