

Improving field-oriented learning technologies in teaching English to students of biotechnology

Mahliyo Faxriddin qizi Yuldasheva
Namangan State University

Abstract: this article defines that learning technologies in teaching English to students of biotechnology. Moreover, there are many useful methods for teaching biology faculty students.

Keywords: Biotechnology, science and economics, biotech, biology.

Biotechnology uses living systems to develop products, increase quality of life, and improve the health of our planet. It requires a highly trained workforce, and career opportunities in biotechnology are as diverse as they are rewarding. Some jobs fall into the areas of research and development, including lab technician, zoologist, food/plant scientist, microbiologist, biochemist, and biomedical engineer. Biotech careers can also exist outside the lab in fields like technical writing, sales, marketing, and manufacturing. Such a variety of jobs demands a wide-range of education and training, but all careers in biotechnology are built on strong foundations in science and economics.

Biotechnology's interdisciplinary nature demands biotech professionals to be well-versed in multiple STEM (Science, Technology, Engineering and Math) areas including biology, chemistry, environmental science, physics, and engineering. Preparing students to become tomorrow's biotech super heroes is a tall order, and some employers may give priority to candidates with hands-on lab experience.

Biotechnology: Science for the New Millennium uses a lab manual and textbook to present complex subjects in small doses. Students of all levels can master the material, which helps to instill science literacy, research skills, and career awareness. Furthermore, the flexibility of BS4NM makes it ideal for high school and college settings. The curriculum can be used as an introductory course for careers in pharmaceuticals or environmental engineering, or as a capstone class to illustrate the application of general chemistry, biology, physics, or environmental science. It can also be tailored to a single semester's curriculum, or extended to cover four years' worth of high school or college activities, ensuring that each school can develop a biotech program to meet the future career needs of their students. Additionally, *BS4NM* provides extensive teacher support materials, including lesson plans and professional development opportunities to ensure that instructors feel confident in the ever-changing world of biotech.

Biotechnology refers to the application and manipulation of technology that reflects biological processes upon whole or part of a living thing in their natural form, in order to produce a product, a system, a new environment, or to solve problems. While there is a wide definition for biotechnology in the industry, the Office of Technological Assessment defined it as: "... any techniques that use the whole or part of the organism to produce or modify products, to improve plants and animals, or to produce microorganisms for specific purposes".

According to Wells (2016), biotechnology is a specific content unit within the context of biological systems. When we refer to technology education, biotechnology is a content unit that naturally requires high cognitive thinking skills. Biotechnology is also closely related to STEM education. In the context of the Malaysian education system, biotechnology is a subtopic in the additional science curriculum. Additional science is an elective subject in the non-science stream. Students who underperform in science and mathematics in lower secondary examinations, obtaining at least an E grade, but who are still interested in studying advanced science in higher secondary, are allowed to register for this subject. However, additional science is not that challenging or covered as deeply as the 'pure' science subjects such as physics, chemistry and biology. However, subtopics such as cells, reproduction, hereditary genetics and gene variation are taught through the science and biology curriculum, which together form the basis of biotechnology. From the perspective of the future economy, biotechnology is one of the key areas emphasized.

It was the intention of the government, especially the Ministry of Education, that a high student intake into the science/technical stream in secondary schools would generate large pools of STEM and biotechnology talents for the economy by the year 2020. Twenty-first century skills are crucial to success in the 21st century job market.

Thinking skills include creativity, innovation, problem-solving and decision-making, whereas living skills and career prospects include: communication skills, teamwork, leadership, flexibility, self-directed learning, lifelong learning, entrepreneurship and adaptability to different cultures (CDC, 2014). The present study focuses on the 21st century skills of digital-era literacy skill, inventive skill, and spiritual values. Digital-era literacy skills include: basic literacy, scientific literacy, economic literacy, technological literacy, visual literacy, information literacy, multicultural literacy and global awareness.

The inventive skill encompasses adaptability managing complexity, self-direction, curiosity, creativity, risk-taking, higher-order thinking and sound reasoning. Spiritual values are based on the moral values listed in the Additional Science Curriculum Specification.

All in all science is an opportunity for the students who are interested in science to continue studying the subject at SPM level, equivalent to O-Level or GCSE.

However, recent results of the Lower Secondary Examination (PT3) for science were a great disappointment for educators, students and parents. These underperforming students are disqualified from further study in the pure science stream, but may opt for a technical stream that offers science and additional science. Additional science serves as an alternative non-core science subject for those who are interested in studying advanced science at a level that is not particularly challenging, compared to the pure science subjects. The authors found that the students who perform well in the additional science and other technical subjects are allowed to apply to local polytechnics and vocational colleges. It provides another bright prospect for these once-weak students with promising career pathways. The future working market in the 21st century is not just focused on academic achievements but also technical and vocational-based achievements.

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