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An authentic task-based curriculum to deliver practically skilled laboratory technicians with critical thinking and problem-solving skills

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Abstract

The undergraduate educational program of 'Biology and Medical Laboratory Research' at the University of Applied Sciences Leiden (The Netherlands) specifically trains students to become biomedical laboratory research technicians with a Bachelor of Science (B.Sc.) qualification. To facilitate development of practical laboratory skills, as well as critical thinking and problem solving skills, we developed an inquiry-based curriculum framework that incorporates authentic task-based and iterative learning.
This curriculum consists of two main tracks that are based on authentic tasks a technician performs in the laboratory setting of the biomedical work field, providing an authentic context for their learning. In the first, skills-based, track students learn all basic laboratory techniques and (big) data analysis. Along this track, students learn biological concepts on the molecular, cellular and population level using e-learnings and team-based learning.
In the second, project-based, track integral learning is facilitated by combining the obtained knowledge and skills to set up and carry out experiments and analyze and report results from authentic research studies. These studies are either hypothesis-driven or focused on process development, optimization and validation within the context of the pharmaceutical companies, academic medical centers, university institutes or the plant industry. After a first course in project management skills like team-work, communication and planning, students perform four 16-week projects in small groups practicing their project management and research skills.
With this redesigned inquiry-based curriculum we aim to deliver practically skilled technicians with problem-solving, critical thinking and communicative skills.

Keywords: authentic task-based curriculum, laboratory technicians

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