

TECHNOLOGY-SUPPORTED HYBRID INQUIRY-BASED LEARNING IN SCIENCE EDUCATION

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In the 21st century, learners need to acquire comprehensive skills that will enable them to be successful and effective members of the knowledge-based society. Such 21st century skills include problem-solving, critical thinking, creativity, collaboration, information and communication technology (ICT) literacy, and inquiry skills. To date, emphasis has been placed on the development of inquiry skills in science teaching, of which inquiry-based learning (IBL) may be a suitable learning approach. However, open IBL has been widely criticized. Most critics agree that they are too abstract for students, so they need support to carry out their research. Some other challenges are the tremendous development of technology and the problem of maintaining the interest of students. New hybrid approaches to IBL can address these challenges. We selected different learning approaches based on the following criteria: (1) technology supports the learning/teaching process; (2) they respond to the challenges and expectations of science education in the 21st century; and (3) IBL is combined with some other learning approaches to increase the efficiency of the learning/teaching process. Consistently with this, we identified four inquiry-based learning approaches in the international peer-reviewed literature: project-based inquiry learning, game-transformed inquiry-based learning, web-based collaborative inquiry learning, and simulation-based inquiry learning. In this study, we define what these terms mean, what empirical evidence supports their effectiveness, which levels of education they appear at, what learning outcomes are achieved, and what similarities and differences exist between them. It is important to mention that it is not enough to come up with more and more attractive learning approaches, teachers are also need to be educated to recognize these approaches, and introduce them into their teaching practice. Moreover, the biggest constraint on the use of technology may be the pre-existing beliefs about technology itself. This study draws attention to the huge pedagogical potential of these technology-supported hybrid IBL approaches and the value of researching them. It also points out that the application of these approaches depends to a large extent on teachers' beliefs about technology and science teaching and learning.

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