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THE CONNECTION BETWEEN THE PROBLEM-SOLVING BEHAVIOUR AND PROFESSIONAL KNOWLEDGE OF BIOLOGY STUDENTS

Abstract:

The development of the problem-solving skills is determined as an aim in each field of national curricula of the different countries so in case of Hungary as well. This is explained by a central aim to take due care of it in each subject during secondary and tertiary education too. To successfully solve problem exercises, the student must own appropriate professional knowledge (declarative knowledge), and it must know the practical steps of problem-solving (procedural knowledge) (Kilpatrick et al, 200; Gol, 2010; Revákné, 2013). The investigation of the problem-solving skills in the public education was investigated several times (Anderson et al, 2001; Mayer, 2008; Molnár, 2016), however, less attention was drawn to it in tertiary education (Katrina & Paivi, 2011; Gita & John, 2012, Blömeke et al, 2015). In Hungary, students can enter science department in tertiary education with low scores even without having the school leaving certificate of the target subject thus the professional knowledge, skills and abilities are unequal. In our presentation, we try to measure the competencies of the university-entering students (highlighting the key competence of problem-solving), furthermore, by which factors of the public education are these influenced. The investigation was made in the September of 2017. The freshman biology students (N=102) must have written an entering exam in the underlying biology course with the aim of providing information for the educator about the level of their professional knowledge. In the exam, various questions and exercises must be solved which are able to analyse the scientific competence and knowledge. Thus a background questionnaire was attached to explore the social background variables, the academic achievement and the secondary school education. In our presentation, we investigated the results of the problem-exercise of the exam through correlation and factor analysis. Regarding the results, significant individual differences can be detected between the professional knowledge and problem-solving skills of the students entering higher education, although the knowledge of the majority is extraordinary low. Half of the students are not able to interpret the outlined biological problem and even fewer can discover the connection between the data required for the solution or can create a hypothesis. Those students are more successful in problem-solving who had teamwork, project or debate more frequently biology lessons in public education, however, the frequency of these methods is quite low. Instead of them, those methods are dominating which have a negative influence on the development of the problem-solving skills.

Keywords:

problem-solving, professional knowledge, freshman