

Use of Critical Thinking Methods in Information Analysis

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Introduction. Within chemistry course – a fundamental science – students not only learn specific facts but also gain experience in information systemisation, learn to argue their opinions, interpret experimentally obtained data, analyse causes and consequences – learn critical thinking methods. The goal is not to radically change the study process but rather make existing methods more effective by using critical thinking as an instrument for mastering the course. The chemistry course, in turn, serves as a context for developing critical thinking methods.

Aim, Material and Methods. The research evaluated empiric data in order to substantiate the choice of a particular method. It was concluded that the most effective study form from organisational perspective is transition to practical study forms (laboratory work, seminars) by using accented and non-accented critical thinking methods. The developed didactic method is tailored to specific study situations – to promote mastering of study material in chemistry course based on information analysis and critical thinking principles when student's previous knowledge is not sufficient.

Results. Questionnaires at the beginning and end of the semester included all first-year students – both Latvian and foreign. Since the purpose of the anonymous questionnaire was to obtain data concerning all students and their grades as well as effectiveness of the method, participants were not divided into experimental and control groups. The research was carried out comparing the data obtained at the beginning and end of the semester. Students were evaluated based on qualitative criteria developed for evaluating exam results in medical chemistry course and the questionnaires provided feedback on the course and the critical thinking development methods. Within questionnaires students evaluated previous learning experience, medical chemistry course, critical thinking methods and their own input. By combining questionnaire results over the period of four years, a didactic model was developed and is continuously improved depending on a situation in the study process. The didactic model includes methods psychological and pedagogical substantiations accent context independent critical thinking. In accented critical thinking methods thinking principles are clearly formulated, in non-accented critical thinking methods the principles are incorporated in content of the course without specifically highlighting them. The initial questionnaire showed that most students lack skills in analysing broad information.

Conclusions. In this case, by concentrating on problem-task solving, students learn general reasoning principles and develop information evaluation and systemisation skills. The conclusions of the research were:

1. By learning critical thinking methods in medical chemistry course, students understand the need for information analysis and evaluation in their education.
2. The optimal organisational study form is work in small groups with increased proportion of practical work and provision of comprehensive study material for self-dependent work.
3. Tests have clear and previously known evaluation criteria which are used throughout the whole semester for feedback purposes.
4. It is important to tailor the study process to suit different students of different backgrounds by correcting it based on results achieved by students.