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PREFACE

The conference entitled 7th EuroVariety – European Variety in University Chemistry Education has been organized by the University of Belgrade – the Faculty of Chemistry, the Serbian Chemical Society and the EUCheMS Division of Chemical Education. The main aim of the Conference is to provide an opportunity to share knowledge and experience relating to the important issues concerning university chemistry and chemical technology education in order to prepare future students to better respond to their personal needs and the needs of the contemporary society and to meet the labour market requirements. Therefore, the conference theme "**University Chemistry Education for the Challenges of Contemporary Society**" points out the need for continuous reconsideration of the connections between BSc, MSc and PhD chemistry studies and the contemporary professional, social and scientific challenges.

Over 70 participants from 29 countries have shared their experiences in their presentations offering their insights, pointing up the challenges and suggesting new solutions regarding the following Conference topics:

- Development of the university curricula for BSc, MSc and PhD chemistry studies
- Competency-based university chemistry education
- Chemistry education through university-industry partnerships
- Laboratory work as an element of problem solving and inquiry-based chemistry education
- Ethical guidelines and university chemistry education for sustainable development
- The use of ICT in chemistry education at the 3rd level
- The role of history of chemistry and philosophy of science in university education
- Cultural heritage and chemistry education
- Development of educational competencies of academic chemistry teachers
- Evaluation of learning outcomes and problems relating to assessment in HEIs
- The contemporary chemistry teachers' education and the long-term professional development of chemistry teachers.

Summaries in this Book of Abstracts deal with the practical aspects of teaching chemistry and research into chemistry education at both undergraduate and postgraduate levels with the aim of enabling students to build key professional and transferable skills needed in order to be successful in a highly competitive labour market and life in the rapidly changing world.

I wish all participants a successful conference and fruitful discussion. I hope you will all enjoy your stay in Belgrade.

Dragica Trivic

Head of the Local Organizing Committee

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RESEARCH-BASED DEVELOPMENT OF PRE-SERVICE CHEMISTRY TEACHERS' COMPETENCIES FOR THE IMPLEMENTATION OF THE CONTEXT-BASED APPROACH IN ORGANIC CHEMISTRY TEACHING

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Research has shown that students across the world consider the organic chemistry curriculum to be abstract and difficult to understand (Jimoh, 2005; O'Dwyer and Childs, 2014). Context-based teaching approach represents an effective tool for promoting conceptual understanding and functionalization of organic chemistry knowledge (Schwartz-Bloom *et al*., 2011; Putica and Trivic, 2016), which is why it is important to develop pre-service chemistry teachers' competencies for its implementation in organic chemistry teaching. In accordance with this aim, four pre-service teachers at the Faculty of Chemistry, the University of Belgrade, developed their context-based organic chemistry teaching competencies by means of experimental research. Each pre-service teacher conducted an experiment that compared the effectiveness of the context-based and the traditional teaching approach when it comes to promoting conceptual understanding and functionalization of the selected organic chemistry content. Three of these experiments were conducted in grammar schools, two within the elaboration of the teaching topic *Carboxylic acids and their derivatives*, and the third one within the elaboration of the teaching topic *Alcohols*. The fourth experiment was conducted in an elementary school, within the elaboration of the teaching unit *Alkanes.* Within each of these experiments, the pre-service teachers developed context-based teaching materials for the students in the experimental group, the pre-test and the post-test. Unlike the pre-test which consisted of items that resembled regular textbook items, the post-test, which was used as an instrument for comparing the effectiveness of the two teaching approaches, consisted of items that required deep understanding and the application of the newly acquired organic chemistry knowledge in solving real-life problems. The results of all four experiments confirmed that the context-based teaching approach was more effective than the traditional approach in promoting students' conceptual understanding and functionalization of

their knowledge. These findings also confirm that the research-based approach represents an effective tool for developing the pre-service chemistry teachers' competencies for the implementation of the context-based approach in organic chemistry teaching.

Keywords: Conceptual understanding and functionalization of organic chemistry knowledge, Context-based organic chemistry teaching, Research-based development of pre-service chemistry teachers' competencies.

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