

OPINION

by Assoc. prof. Eugenia Kovatcheva, PhD, ULSIT

for the acquisition of the educational and scientific degree PhD in the professional area 4.6 Informatics and computer sciences the doctoral program Information technologies (Information and communication technologies) order No. RD-38-307/01.07.2022 of the Rector of SU St. Kliment Ohridski.

with a dissertation on:

METHODS AND TOOLS FOR SUPPORTING THE INQUIRY-BASED LEARNING

presented by Elitsa Vasileva Peltekova,

PhD candidate in the Department of Information Technologies
of the Faculty of Mathematics and Informatics,
University of St. Kliment Ohridski

with scientific supervisor, Prof. Eliza Stefanova, PhD

I. Evaluation of the qualities of the PhD thesis

Elitsa Peltekova's PhD Thesis is an attempt to give impetus to the development of scientific research in an educational context with innovative methods in the use of information and communication technologies for STEM education. Numerous specific scientific experiments on the application of the research approach in practice have been planned, conducted, evaluated, and analysed.

PhD student Peltekova has set extremely important research questions for our time, which she answers in her presentation.

- Is there a combination of methods and tools supporting an inquiry-based approach to teaching such as to ensure high learner interest and support STEM subject learners?
- Is it possible to derive criteria for the selection of technological means according to the context of research training?

- Can a model be proposed that supports the process of generating, customising, and using educational scenarios, according to the methods, means, and context of their application?
- Can model educational learning scenarios be created that combine methods and tools to support an inquiry-based approach to learning to achieve science learning objectives?
- Does the application of the created sample educational scenarios lead to an increase in interest and results in science?

The purpose of the PhD thesis is to research and propose methods and tools to support the research approach in the education of natural, technical, engineering, and mathematical sciences (STEM), to increase the interest and results of the learners, as well as to develop a methodology (system model) to build educational scenarios combining the methods, means, and context according to the application. It is achieved through the development of eight tasks, to which original solutions are given.

The abstract corresponds to the submitted dissertation work.

II. **Dissertation Research Contributions**

In the development of the dissertation work, Elitsa Peltekova made scientific research and applied scientific contributions as follows:

Scientific Research contributions

- She made an overview of scientific research in education in view of the applied methods, with the emphasis being placed on the research approach in education.
- She analysed the applicability of modern technological means in science education, including mobile technologies and virtual reality.
- She systematized criteria for the selection of technological means according to the context of research training.
- She brought out the advantages and limitations for the application of technological means in the education of natural sciences, based on studies conducted on the applicability of methods and means in STEM education in Bulgaria, factors affecting the increase of the interest, motivation and results of the students.

Scientific applied contributions:

- She developed a system model for generating educational scenarios, which is based on a service-oriented architecture.
- She created models for the application of the system in the detection of scenarios, according to the methods, means, and context of their application.
- She has developed and successfully approved reference educational scenarios for training within the international research projects weSPOT and ELITE
- She has experimentally established that the created samples of educational scenarios lead to an increase in interest and results in natural science education.

III. **Applicant data**

Elitsa Petletkova is a Master in e-learning at SU "St. Kliment Ohridski", Erasmus+ PhD student at Warsaw University of Natural Sciences, Poland. Since 2013, she has been a lecturer at RAABE Bulgaria, where he applies the research approach in training seminars and is an expert in information assurance, Sector "Electronic and distance learning" (EDO), at FMI of SU.

IV. **General description of the achievements and scientific works of the candidate**

Over the years at SU Elitsa has taken an active part in 35 educational and research projects. So are the presented articles.

Her participation in conferences is impressive in 12 years 43 presentations.

The presented articles for the acquisition of the educational and scientific degree "doctor" are only 5, which cover the minimum national requirements and the Regulations for the terms and conditions for the acquisition of scientific degrees and holding academic positions at SU "St. Kliment Ohridski" (PURPNSZADSU). There are 7 projects in which Elitsa Peltekova participated, related to her work on the dissertation work.

V. **Recommendations**

My main recommendation to Elitsa Peltekova is to keep her research spirit and continue her scientific career and include her hobbies in discovering STEAM and STEAME (Science, Technology, Engineering, Art, Mathematics and Entrepreneurship) approaches. For his future studies, she can turn to the well-forgotten "old" developed in the *Problem Group on Education*, or the so-called *Sandov's system*.

VI. Personal impressions of the candidate

I know Eliza Peltekova when she started working at the Computing Center of SU. I got deeper impressions of her when she started getting involved in projects of the Department of Information Technologies. She was distinguished by her systematic scientific approach and cheerful smile. In 2009, he enrolled for a master's degree in Electronic Learning at SU. I was then the coordinator of the master's program. A strong impression was made by the research project in which "School of the Future" was included with three other colleagues. The result of it was published in the article *From a "Flap of a Butterfly Wing" to the "Wind of Change"*. After completing her master's degree, she became actively involved in the activities of the Department of Information Technologies.

VII. Conclusion

Based on the above, I recommend the scientific jury to award Elitsa Vasileva Peltekova the educational and scientific degree PhD in scientific field 4.6 Informatics and computer sciences, the doctoral program "Information Technologies (Information and Communication Technologies)".

September 19, 2022 г.

Prepared the opinion:.....

Assoc. Prof. Eugenia Kovatcheva, PhD