

OPINION

By Assoc. Prof. Daniela Todorova Kozhuharova, PhD

Trakia University, Stara Zagora

of a dissertation for the award of an educational and scientific degree "Doctor"

in the field of higher education 1. Pedagogical sciences,

Professional field 1.3. Pedagogy of teaching in...,

PhD program: Methodology of teaching in informatics and information technologies

Author of the dissertation: **Muharem Asanov Mollov**

The topic of the dissertation: **Methodical approach for application of competence-based training in the “Application programmer” profession**

Scientific adviser: assoc. prof. Gencho Dimitrov Stoitsov

1. General presentation of the procedure and the PhD student

This opinion was prepared on the basis of order № ПД-21-425/24.02.2023 of the Rector of the University of Plovdiv, in accordance with the requirements of Law on the development of the academic staff of the Republic of Bulgaria, the Rules for its implementation and the Rules for the development of the academic staff of University of Plovdiv "Paisiy Hilendarski".

The author of the dissertation is Muharem Asanov Mollov – a full-time PhD student at the Faculty of "Education in Mathematics, Informatics and Information Technologies" with scientific supervisor Assoc. Prof. Gencho Dimitrov Stoitsov, PhD, Faculty of Mathematics and Informatics, University of Plovdiv "Paisiy Hilendarski". The presented set of materials is in accordance with low Art. 36 (1) of the Regulations for the Development of the Academic Staff of the University of Plovdiv.

2. Relevance of the topic

The developed dissertation research is relevant for the modern pedagogical reality, because it examines the formation and development of professional competences for software development, as well as key competences inextricably linked to this by trainees in the “Application programmer” profession, through an innovative methodology of focus on the constructivist approach, which are lacking in relation to secondary vocational training.

3. Knowledge of the problem

In the dissertation research, the author analyses the scientific literature on the topic of the dissertation. An analysis of global trends in software engineering education and classification of com-

puter education, modern trends in computer science education in Europe, as well as computer science and software engineering education in Bulgaria was made. The role of constructivism in education, the essence of the competence approach, the concepts of competence and competence, competence models and competence profiles are clarified. The essence and specificity of competence-based learning is described, and a comparison is made with the traditional context-based pedagogy of knowledge. An analysis of the competency frameworks related to the "Application programmer" profession was made. After the study of the world and national experience and the existing practices in the education of computer science and software engineering, the main ideas and vision for solving the tasks set to achieve the goal of the dissertation research were synthesized.

The terms approach, method and training methodology are not fully clarified, and in places in the text they are used interchangeably. As stated on page 24 "On the basis of the constructivist theory, methods are offered for personally oriented training for the development of students' competences", the dissertation describes the methodology or methodological system, based on the constructivist approach developed and tested by the author, not the developed methodological approach.

4. Research methodology

The concept of the research is presented in the introduction of the dissertation, which introduces the essence of the overall research at the very beginning. The purpose and tasks, the subject and the object are correctly formulated, with the remark that the author creates a training methodology, not an approach. Adequate research methods and means have been selected. Formulated criteria and indicators of the dissertation research are missing.

The organization and conduct of the pedagogical experiment is presented, the results of the research are summarized, on the basis of which specific conclusions are drawn. The methodology is tailored to the age characteristics of the students and is subordinated to the theoretical statements. The summary of the results of the experimental research are presented and analysed in a quantitative and qualitative aspect. The results are summarized in tables and illustrated with corresponding graphs.

5. Characteristics and evaluation of the dissertation and contributions

The dissertation consists of an introduction, 3 chapters, a conclusion, a list of the author's publications on the topic, a list of used literature and appendices. Its volume is 138 pages, not including the three appendices. Perspectives for future development, contributions of the dissertation work and declaration of originality are added to the work.

References included 184 article and book titles and 47 Internet sources. Cited articles and books are 77 in Cyrillic and 107 in Latin. Internet sources are 21 in Cyrillic and 26 in Latin.

I accept the contributions of the dissertation work formulated by the author, again with the remark that the author creates a teaching methodology, not an approach:

- A methodological option for competence-based training of students in the profession of "Application programmer" in secondary vocational education, based on the ADDIE model, has been developed and tested.
- An adaptation of the learning environment was proposed and tested, allowing mixed synchronous and asynchronous learning on-site and in an electronic environment, teaching by a team of educators (teachers, university professors and representatives of the ICT sector) and joint distance learning in an electronic environment of more than one group.
- A methodological tools was developed and tested for diagnosis and assessment of the level of professional competences acquired by learners, for self-assessment of professional and basic competences of learners and expert assessment based on the recommendations of specialists.

6. Evaluation of the publications and personal contribution of the PhD student

The results of the dissertation research have been published in 8 scientific publications, which are sufficient as a quantitative criterion for obtaining the scientific and educational degree "doctor", according to the specific requirements of the Faculty of Mathematics and Informatics of the University of Plovdiv "Paisiy Hilendarski". Two of the publications are independent and six are co-authored. Six of the publications are in publications referenced in Web of Science. Some of the publications were cited 11 times - 4 in foreign and 7 in Bulgarian articles.

7. Abstract

The abstract was developed according to the requirements of the Rules for the development of the academic staff of the University of Plovdiv "Paisiy Hilendarski" and accurately reflects the main results achieved in the dissertation research.

8. Recommendations for future use of dissertation contributions and results

In the dissertation research, the author has presented the prospects for the development of the research, which include a comprehensive implementation of the proposed methodology for competency-based training in the "Application programmer" profession in secondary vocational education. For this purpose, it is necessary to create a set of tasks for all units of learning outcomes from the State Educational Standards, and for each of them there are enough options, with which the learning can be adapted to the interests of the learners, their psychological attitudes and stereotypes of learning, and aimed at solving the problems they encounter in mastering the profession.

CONCLUSION

The dissertation contains scientific and applied results, which represent a contribution to the methods of training in informatics and meet the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of Law on the Development of the Academic Staff in the Republic of Bulgaria and the relevant Regulations of University of Plovdiv "Paisiy Hilendarski". The presented materials and dissertation results are the result of the specific requirements of the Faculty of Mathematics and Informatics, adopted in connection with the Regulations of the University of Plovdiv for the application of Law on the Development of the Academic Staff in the Republic of Bulgaria.

The dissertation work shows that PhD student Muharem Asanov Mollov possesses theoretical knowledge and professional skills in the scientific specialty Teaching methodology in informatics and information technologies, demonstrating good research qualities and skills for independent organization and conducting in-depth scientific research.

Advice stated above, I give my **positive assessment** for the conducted research-no, presented in the above-reviewed dissertation work, abstract, achieved results and contributions, therefore I propose to the honorable scientific jury **to award the educational and scientific degree "Doctor" to Muharem Asanov Mollov** in field of higher education 1. Pedagogical sciences, professional direction 1.3. Pedagogy of teaching in..., doctoral program Methodology of teaching in informatics and information technologies.

13.04.2023

Prepared the opinion:

(assoc. prof. Daniela Kozhuharova, PhD)