

OPINION

by Prof. Dr. Maria Petkova Hristova

regarding a dissertation submitted for the award of the educational and scientific degree
“Doctor” (PhD),

Field of Higher Education: 4. Natural Sciences, Mathematics and Informatics

Professional Field: 4.6. Informatics and Computer Science

Doctoral Program: Informatics

Author of PhD THESIS: **Gergana Dimitrova Vassileva**

Title of PhD THESIS:

MODELS AND METHODS FOR PROVIDING PERSONALIZED SERVICES IN E- LEARNING

1. General Description of the Submitted Materials and the PhD Candidate

This opinion has been prepared in accordance with Order No. 100 dated 4.05.2026 of the Director of the Institute of Information and Communication Technologies (IICT) at the Bulgarian Academy of Sciences (BAS), by which I was appointed as a member of the scientific jury in connection with the procedure for the defense of the dissertation thesis of the PhD candidate Gergana Dimitrova Vasileva on the topic “Models and Methods for Providing Personalized Services in E-Learning” for the acquisition of the educational and scientific degree “Doctor” in the professional field 4.6. Informatics and Computer Science.

Gergana Vasileva holds a Master’s degree in Marketing and Management from the University of National and World Economy. She has specialized in mediation at the United Nations Institute for Training and Research and in Neuro-Linguistic Programming at NLP University. Since 2005, she has been a lecturer and representative for Bulgaria of the London School of Public Relations. Prior to that, she was a managing partner at the PR agency “United Partners” Ltd. She is an established expert in the fields of communications, public relations, training, and international project management, with more than 20 years of professional experience. She possesses extensive practical and academic expertise in PR, marketing, leadership, training, and competency development, including the development of innovative models for e-learning and personalized learning using artificial intelligence. During the period 2019–2021, she was a full-time PhD student at IICT-BAS.

The set of materials submitted by the PhD candidate complies with Article 8 of the Regulations on the Specific Conditions for Acquiring Scientific Degrees and Holding Academic Positions at IICT-BAS.

2. Relevance, Aim, and Objectives of the Dissertation

The relevance of the dissertation is determined by the growing need to implement intelligent and personalized approaches in e-learning in the context of the dynamic development of digital technologies, digital transformation, and the requirements for lifelong learning. Modern educational systems increasingly face the need to adapt educational content to the individual characteristics, competencies, and needs of learners. This places emphasis on the development of models and methods for creating individual competency profiles and personalized learning programs.

The significance of the research is further enhanced by the practical need for organizations and educational institutions to have effective tools for diagnosing competency gaps, automatically generating personalized learning paths, and monitoring learners' progress. In this context, the proposed approach has both scientific and practical value and creates prerequisites for improving the efficiency, flexibility, and quality of e-learning.

The aim of the dissertation is formulated as follows: "To propose a model, methods, and software tools for analyzing training needs, creating an individual competency profile, and conducting personalized learning programs." The stated aim possesses the potential of a doctoral dissertation. In order to achieve it, five main objectives have been formulated.

3. Knowledge of the Problem Area

The clearly defined aim of the dissertation, the well-motivated and specifically formulated main objectives, the logically consistent structure and presentation of the dissertation text, as well as the bibliography containing 130 literary and internet sources (all properly cited in the text), demonstrate the PhD candidate's in-depth theoretical and practical knowledge of contemporary achievements in the researched field.

4. Research Methodology

The research methodology is based on a comprehensive approach combining theoretical analysis, modeling, design, and applied software implementation in the field of e-learning and competency-based learning. The research proceeds through consecutive stages aimed at analyzing the problem domain, developing conceptual models and methods, designing the architecture, implementing a prototype software platform for personalized learning, and analyzing the obtained results.

5. General Characteristics of the Dissertation and Its Contributions

The dissertation comprises 174 pages and consists of an introduction, four chapters, a conclusion, scientific and applied contributions, directions for future research, and a bibliography. The graphical part includes 31 figures and 4 tables. The structure of the dissertation is logically consistent and ensures a good connection between the theoretical, methodological, and applied parts of the research. The introduction substantiates the relevance of the topic, defines the problem, outlines the need for personalization in e-learning, and argues the role of the competency-based approach and AI technologies. Chapter One presents a literature review, outlines the conceptual framework, and establishes the methodological foundations of the research. Both pedagogical and managerial aspects of learning are included. Particularly important is the section discussing current problems in building personalized learning profiles, the limitations of standard e-learning systems, and the difficulties in adapting to individual needs. Chapter Two is the main scientific and methodological chapter of the dissertation. A model for identifying competency gaps, comparing current and target competency levels, and automatically determining training needs has been developed. Methods for adapting learning paths, mechanisms for content recommendation, and parameterization of learning resources are proposed. A clear tendency toward a data-driven approach is evident here. Especially relevant and valuable is the section on integrating OpenAI technologies, generative AI in the creation of educational content, and automated generation of learning materials.

Chapter Three presents the technological and system implementation of the proposed models. A web-based architecture, modular structure, and integration environment for competency management have been developed, and the main modules, workflows, communication between components, data processing, and user profiles are presented. Chapter Four is entirely application-oriented. It presents a prototype software platform for creating personalized learning paths based on the learner's competency profile. The prototype demonstrates the relationship between competency gap analysis, competency profiles, and the generation of learning programs, thereby proving the practical applicability of the developed solutions.

The conclusion summarizes the achieved results and the scientific and applied contributions. The results obtained in the dissertation are original and correspond to the stated aim and objectives.

I accept the main contributions summarized by the PhD candidate at the end of the dissertation, which in my opinion may be systematized as scientific and applied contributions:

- A method for personalizing learning programs according to the learner's individual competency profile has been developed;
- A model for creating individual competency profiles and personalized learning programs has been developed;
- A model for the use of generative artificial intelligence in the creation of educational content has been developed;
- A model of a comprehensive software environment for managing personalized learning has been developed, and the requirements for the functional capabilities of the individual modules have been defined;
- An architecture and prototype of a web-based platform for creating personalized learning programs have been developed.

The contributions may be characterized as enriching the existing scientific field with new knowledge and applied aspects.

Some opportunities for future development of the discussed problem in various directions are also outlined. I believe that the directions for future work are correctly presented and achievable.

6. Evaluation of the Publications Related to the Dissertation and the Personal Contribution of the PhD Candidate

The PhD candidate has submitted a total of 8 authored publications related to the dissertation topic, published in refereed and indexed editions. All publications are in English; two are single-authored, and in four of them the PhD candidate is listed as the first author. Two of the publications are journal articles: one published in *Cybernetics and Information Technologies* (Scopus indexed), and one single-authored publication in *Problems of Engineering Cybernetics and Robotics*. Six of the publications are conference papers: two presented at conferences indexed in IEEE Xplore, and one indexed in WoS (*International Conference on Education and New Learning Technologies*, Palma, Spain).

A total of 29 citations of three of the candidate's publications have been identified in authoritative editions, which is additional evidence of the international visibility of the obtained results. I believe that the dissertation results have been presented very successfully to

the scientific community. A report from a plagiarism check performed with licensed plagiarism detection software has also been submitted. No plagiarism has been detected in the dissertation. I have no doubt that the dissertation and the obtained results are the personal work of the PhD candidate.

7. Fulfillment of the Minimum National Requirements and the Requirements of IICT for the Educational and Scientific Degree “Doctor” in Professional Field 4.6

According to the attached report on the fulfillment of the minimum requirements of IICT, with 30 points required for Group “G” (Publications in editions indexed and refereed in globally recognized scientific databases such as WoS, Scopus, Zentralblatt, MathSciNet, ACM Digital Library, IEEE Xplore, and AIS eLibrary), the PhD candidate has accumulated 56 points from 4 submitted publications, thus exceeding the requirements.

8. Abstract

The abstract complies in volume (49 pages) and content with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations on the Specific Conditions for Acquiring Scientific Degrees and Holding Academic Positions at IICT.

9. Critical Remarks and Recommendations

I have no substantial critical remarks regarding the submitted dissertation or the accompanying materials. I recommend that the PhD candidate continue the initiated research, as the topic has a high degree of applicability and broad prospects for development.

CONCLUSION

My evaluation of the dissertation, the abstract, and the scientific publications related to the dissertation of Gergana Vasileva is entirely positive. The PhD candidate demonstrates profound theoretical knowledge in the specialty of the doctoral program “Informatics,” a high level of mastery of the terminology related to the dissertation topic, and proven abilities for independent scientific research.

Considering the original scientific and applied contributions achieved, I believe that the dissertation fully complies with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, its implementing regulations, as well as the Regulations on the Specific Conditions for Acquiring Scientific Degrees and Holding Academic Positions at IICT. This gives me sufficient grounds to recommend that the respected members of the scientific jury award Gergana Dimitrova Vasileva the educational and scientific degree “Doctor” in the professional field 4.6. Informatics and Computer Science, doctoral program: Informatics.

20.05.2026
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