

STATEMENT

By Assoc. Prof. Silvia Nikolaeva Gaftandzhieva, PhD

University of Plovdiv "Paisii Hilendarski"

of a dissertation for awarding the educational and scientific degree "Doctor"
in field of higher education 4. Natural sciences, mathematics and informatics
professional field 4.6. Informatics and Computer Science
doctoral program "Informatics"

Author: Vladimir Hariiev Tsvetkov

Topic: "Adaptivity in an e-learning system based on pedagogical patterns"

Scientific supervisor: Assoc. Prof. Stanka Ivanova Hadzhikoleva, PhD – University of Plovdiv "Paisii Hilendarski"

1. General presentation of the procedure and the PhD student

By order No. P21-653/21.03.2024 of the Rector of the University of Plovdiv "Paisii Hilendarski" (PU) I have been appointed as a member of the scientific jury to ensure a procedure for the defence of dissertation work on the topic "Adaptivity in an e-learning system based on pedagogical patterns" for the acquisition of the educational and scientific degree "Doctor" in the field of higher education 4. Natural sciences, mathematics and informatics, professional field 4.6. Informatics and Computer Science, Doctoral Program "Informatics". The author of the dissertation is Vladimir Hariiev Tsvetkov - a full-time PhD student at the Department of Computer Informatics, supervised by Prof. Dr. Stanka Hadjikoleva from PU.

The set of materials presented by Vladimir Tsvetkov is under Article 36 (1) of the Regulations for the Development of the Academic Staff of the PU and includes the following documents:

- a request to the Rector of the PU to disclose the procedure for the defence of a dissertation work;
- curriculum vitae in European format;
- protocol from the departmental council for the opening of the procedure and with a preliminary discussion of the dissertation work;
- abstract;
- declaration of originality and authenticity of the attached documents;
- certificate of compliance with the minimum national requirements;
- list of publications;
- dissertation work;
- copies of the 7 publications on the topic of the dissertation work.

In 2018, doctoral student Vladimir Tsvetkov obtained a bachelor's degree at Plovdiv University "Paisii Hilendarski". He obtained a master's degree at the same university in 2019. Since 2020, he has been a full-time doctoral student at the "Computer Informatics" department at the FMI of the PU "Paisii Hilendarski".

After obtaining the bachelor's degree, the doctoral student worked as a business analyst at "Seeburger Bulgaria" (2018-2019). From 2019 to today, Vladimir Tsvetkov has worked as a software engineer at "Adastra Bulgaria" (2019-2020), "Paysafe Group" (2020-2022), "Resolve Systems" (2022-2023) and "A1 Bulgaria EAD" (since 2023), dealing with the automation of business processes. During his training as a PhD student, Vladimir Tsvetkov conducted exercises at the Faculty of Mathematics and Informatics of PU.

2. Relevance of the topic

The topic of the dissertation work is interdisciplinary (Informatics and Pedagogy) related to the design and development of models and tools with pedagogical patterns that allow optimization of the learning process. Such software tools are useful for different groups of users - they help teachers during the preparation of the learning process by facilitating the structuring of the learning content, as well as learners by motivating and encouraging the assimilation of new theoretical knowledge and acquisition of practical skills.

I find the topic of the dissertation completely up-to-date. I believe that the formulated tasks allow the primary goal of the research to be achieved.

3. Knowledge of the research problem

For his research, Vladimir Tsvetkov has studied 139 references, of which 126 are in English and 13 in Bulgarian. The bibliographic reference led me to conclude that the PhD student has thoroughly familiarised himself with the state of research on the problem considered in the dissertation work.

4. Research methodology

The chosen research methodology is standard for a dissertation in Informatics. Based on the results of a study on pedagogical patterns and software tools with the possibility of creating pedagogical patterns, Vladimir Tsvetkov has proposed a conceptual framework of an e-learning system based on pedagogical patterns and developed a plugin for LMS Moodle. Specific patterns are modelled with the developed plugin.

The research methodology allows him to achieve the set goal and fulfil the tasks solved in the dissertation work.

5. Characterization and evaluation of the dissertation work and contributions

The main text of the dissertation (124 pages in total) includes an Introduction, four chapters and a Conclusion. The provided lists of used abbreviations, tables and figures, and used literature contribute to the clarity of the presentation.

In the *Introduction*, the PhD student introduces the topic of the researched area and sets the main goals and objectives of the dissertation research.

In *Chapter 1*, the PhD student presents the results of the research done on the types of patterns, languages for pedagogical patterns and software tools and repositories that use and store pedagogical patterns. Different types of learning adaptability are discussed. The results of this study show that pedagogical patterns have a wide application in education due to the structured approaches and strategies that allow teachers to optimize the learning process and improve the effectiveness and efficiency of the teaching and learning processes. These facts motivate the development of software solutions for using pedagogical patterns in e-learning.

Chapter 2 presents a conceptual framework of an e-learning system based on pedagogical patterns. The system architecture, main modules, functionalities, types of users and others are described in detail. A three-layer model of pedagogical pattern is proposed.

In *Chapter 3*, the PhD student presents a developed plug-in for the Moodle e-learning environment, which allows for modelling pedagogical patterns and describes the main functionalities of the developed prototype.

In *Chapter 4*, the PhD student presents the results of a training and experiment on the applicability of the patterns and offers practical ideas for modelling six patterns in Moodle.

The *Conclusion* summarises the results of Tasks 1 - 5. The PhD student states the scientific, scientific-applied and applied contributions of the dissertation work and formulates perspectives for future development. The main *scientific contribution* of the dissertation research is the proposed conceptual framework of a learning system based on pedagogical patterns. *Scientific-applied contributions* of the study are the proposed model of a pattern, setting a framework for an abstract description of pedagogical patterns, and a model of an instance of a pedagogical pattern suitable for software implementation. As *applied contributions* of the dissertation work, the developed plug-in for working with pedagogical patterns in Moodle and practical examples of using pedagogical patterns through the standard learning activities and resources of Moodle can be indicated.

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

The results obtained in the dissertation have been presented to a sufficient extent to a specialised scientific audience, and the main ones are reflected in the publications of the PhD student.

The results are presented in seven peer-reviewed publications, of which two are published in journals. Two of the publications are in English, and five are in Bulgarian. The fact that two of the publications are in journals indexed in the world-famous databases SCOPUS (SJR=0.632, Q2) and(or) Web of Science (IF=0.8) makes a good impression. The minimum national requirements for acquiring the educational and scientific degree "Doctor" in a professional field have been met - 98 points against a minimum requirement of 80 points.

There are seven citations of three publications on the topic of the dissertation work by 16.04.2024, which is proof of the relevance of the topic of the dissertation research and the significance of the achieved results.

I do not doubt the personal contribution of the PhD student in the attached publications.

7. Abstract

The abstract, written in Bulgarian and English, is made according to the current requirements and adequately reflects the content, main results and contributions of the dissertation work.

8. Recommendations for future use of dissertation contributions and results

I have no significant critical comments on the layout of the dissertation. In places, the text of the dissertation needs refinement. I recommend the PhD student present summarized results of conducted user satisfaction surveys in tables or charts in future research.

The results obtained have the potential to be disseminated and multiplied. In this regard, I fully share the prospects for the development of the subject, as noted by the PhD student. I recommend the PhD student to continue research in the field and participate more actively in international conferences that would allow a wider international scientific community to evaluate the achieved results.

CONCLUSION

The dissertation contains scientific, scientific-applied and applied results, which represent an original contribution to science and all the requirements of the Act for the Development of the Academic Staff in the Republic of Bulgaria, the Rules for the Implementation of the Act for the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), and the relevant Rules of the University of Plovdiv "Paisii Hilendarski".

The dissertation work shows that the PhD student Vladimir Tsvetkov possesses in-depth knowledge and professional skills in the scientific speciality "Informatics", demonstrating qualities and skills for independent conduct of scientific research.

Due to the above, I confidently give my positive assessment of the conducted research, presented by the above-reviewed dissertation work, abstract achieved results and contributions, and I propose to the honourable scientific jury to award the educational and scientific degree "Doctor" to Vladimir Hariev Tsvetkov in the field of higher education: 4. Natural sciences, mathematics and informatics, professional field 4.6. Informatics and Computer Science, Doctoral Program "Informatics".

16.04.2024 г.

Reviewer:

Assoc. Prof. Silvia Gaftandzhieva, PhD