Appendix 12b

REPORT

of dissertation for the acquisition of:

educational and scientific degree " **doctor** "	X
scientific degree **"Doctor of Science"**	
	the true is indicated by the sign "X"

Author of the dissertation:

		Monika	Yanulova	Petrunova	45 "Konstantin Velichkov" Primary School - Sofia
academic position	scientific degree	name	middle name	last name	workplace

Topic of the dissertation:

Interactive training and testing systems

Scientific area:

4	Natural sciences, mathematics and computer science
code	name

Professional area:

4.6	Informatics and Computer Science
code	name

Scientific specialty:

Informatics

The report was written by:

Assoc. Prof.	Dr	Lilyana	Stefanova	Koleca	UCTM
academic position	scientific degree	name	middle name	last name	workplace

1. Meeting the minimum requirements under the Regulations:

A) The candidate meets the minimum requirements	20 points	X
B) The candidate doesn't meet the minimum requirements	0 points	
		one of the answers given is marked with the sign "X"

It is mandatory to fill in if answer B is marked. The publication activity of the candidate is analyzed. The response of the results achieved (quoted) is analyzed.

Master Eng. Monika Petrunova has published the results of her dissertation thesis in 3 scientific articles – 1 in a journal with an SJR and 2 in journals, all referenced in Scopus. The scientific results of the work on the dissertation thesis have been presented at a total of 2 international conferences. The candidate fully meets the requirements according to the Regulations - has 81 points in Appendix 5a.

2. The relevance of the topic of the dissertation:

A) The topic is relevant and new (there are no known results on the topic by other authors)	8 points	
B) The topic is relevant and results from other authors are known	6 points	X
C) The topic is not relevant, but results from other authors are known	2 points	
D) The topic is not relevant and no results from other authors are known	1 point	
E) The topic does not correspond to the level of dissertation	0 points	
		one of the answers given is marked with the sign "X"

The evaluation of the relevance of the dissertation must be substantiated
The presented dissertation is dedicated to the research, development and application of interactive training and testing systems in the modern educational environment in Bulgaria. The relevance of the topic under consideration is determined by the growing role of digital technologies in education. The need to implement effective tools for distance and hybrid learning in the field of school education, especially in the conditions of the dynamically changing educational environment. The dissertation analyzes the existing platforms for e-learning and assessment, considering their functional capabilities, advantages and limitations. Particular attention is paid to the mechanisms for creating, conducting and automated assessment of tests, as well as to the methods for visualization and interpretation of the results obtained. Models for analyzing and converting test results into final grades, consistent with the regulatory framework and practices in the educational system, have been developed. The presented results are of a scientific-applied nature and contribute to improving assessment methods in an electronic environment, as well as to increasing the objectivity, effectiveness and adaptability of training through the use of interactive systems.

3. Type of research:

A) Theoretical	4 points	
B) Applied	4 points	
C) Theoretical with application elements	4 points	X
D) It does not correspond to the level of dissertation	0 points	
		one of the answers given is marked with the sign "X"

The level of research must be substantiated if answer D is marked.
The proposed dissertation work can be defined as theoretical-applied, since along with the analysis of existing e-learning and testing platforms, models for evaluating and processing the obtained results have been developed and applied. In parallel with the study of the functional capabilities of the systems used, their influence on the effectiveness of training and the objectivity of assessment has also been examined.

The work shows that the application of automated methods for analysis and interpretation of results allows for faster and more accurate identification of knowledge gaps, as well as more flexible conversion of the obtained results into final grades. The obtained results suggest good applicability of the developed approaches in a real educational environment and create prerequisites for increasing the effectiveness and transparency of the assessment process.

4. Objectives of the research:

A) Realistic and of scientific and / or applied interest	8 points	X
B) Realistic, but not of scientific and / or applied interest	3 points	
C) Unattainable (unrealistic)	0 points	
		one of the answers given is marked with the sign "X"

Objectives must be specified. The type of the set objectives must be justified.
The objectives of the research presented in the dissertation are clearly formulated and relate to: 1. Analyzing the existing platforms for e-learning and testing and their functional characteristics. 2. To examine the regulatory framework of education in the Republic of Bulgaria and to draw conclusions about how the knowledge of students is tested. 3. To conduct a study of which testing methods are preferred by teachers and students, as well as which are the most frequently used platforms for their implementation. 4. Based on the analyses, to develop and implement assessment methods. 5. To study how existing online assessment platforms are evaluated and to formulate rules for their conversion into an assessment. 6. To implement a method for automatic analysis of "most frequently made errors" or "most incorrect answers in the test", which would facilitate the work of the teacher. 7. To create formulas for converting points (percentages) into a grade, which can be applied and changed according to specific requirements. The objectives of the conducted research have a clearly expressed scientific-applied nature and are aimed at improving the assessment process, increasing its objectivity and efficiency, as well as expanding the possibilities for using interactive systems in modern education.

5. Contributions of the dissertation:

A) With lasting scientific and / or applied response, they form the basis for new research and applications	20 points	X
B) They are of significant scientific and / or applied interest, complete and / or summarize previous research	16 points	
C) They are of scientific and / or applied interest	12 points	
D) Lack of significant contributions	8 points	
E) Lack of contributions	0 points	
		one of the answers given is marked with the sign "X"

Contributions must be specified. The type of results achieved must be justified.
Petrunova can be classified as scientific-applied and applied and are as follows: Scientific-applied contributions:

1. An analytical parallel has been drawn between the historical and contemporary normative assessment models in Bulgaria, proving the applicability of linear mathematical transformations to achieve objectivity in the contemporary 100-point system.
2. Contemporary platforms and models for online learning and testing have been systematized and analyzed. Based on empirical data, the key requirements of teachers for their functionality and pedagogical effectiveness have been derived.
3. The main pedagogical, technical and organizational difficulties in OPE have been identified and summarized.
4. Objective criteria for assessing the effectiveness of digital platforms in a real learning environment have been formulated.
5. The attitudes and preferences of teachers and students have been studied through questionnaire surveys.
6. The main problems and needs in the use of electronic tests have been identified.
7. An in-depth analysis of the assessment systems (point, percentage, numerical and letter scales) has been carried out, consistent with the regulatory framework in the Republic of Bulgaria and the international ECTS system.
8. A logical scheme for the decomposition of test results has been developed, which allows a transition from summative reporting (final number of points) to diagnostic profiling (identification of specific thematic gaps through error analysis).
9. Algorithmic differences in the way leading platforms structure the output data have been systematized (scripted access in Google versus tabular export in MS Forms/Kahoot), justifying the choice of specific computational approaches for each type of architecture.
10. A universal methodology for analytical interpretation of test results has been developed, aimed at diagnosing learning deficits, independent of a specific software platform or educational stage.

Applied contributions:
1. Functional solutions have been proposed to increase the efficiency of distance learning, including mechanisms for visual contact, attendance tracking, and collaborative work on resources.
2. Algorithms, scripts, and formulas for automated analysis of results have been developed that overcome the functional limitations of mass platforms and optimize pedagogical work.
3. A unified mechanism for automatic calculation and transformation of points into grades has been implemented, applicable to both digital and manual data collection.
4. An innovative method for identifying “critical issues” through automated analysis of zero and low results has been introduced, supporting the planning of targeted pedagogical interventions.
5. The applicability of the developed analytical framework has been proven in a wide range of educational contexts – from elementary school to university courses and entrance diagnostics.
6. A proprietary Google Apps Script based on JavaScript has been implemented, which extends the functionality of Google Forms through automated filtering and sorting of questions according to their difficulty in real time.
7. A library of practical Excel templates has been created for transforming raw data from Microsoft Forms and Kahoot, including advanced logical functions for checking data validity and excluding irrelevant records.
8. A sample Python program module has been developed for analyzing the frequency of incorrect answers, demonstrating the possibilities for automating the assessment process outside of closed software systems.
9. An experimental application of the proposed solutions in a real educational environment has been implemented, and the effectiveness of the developed methods has been validated through analysis of the obtained results.

6. Conclusion

A) The evaluation of the dissertation is **POSITIVE**	This evaluation is assigned to a total number of at least 40 points	X
B) The evaluation of the dissertation is **NEGATIVE**	This evaluation is assigned to a total number below 40 points	
		one of the answers given is marked with the sign "X"

To be filled in at the request of the member of the scientific jury
Master Eng. Monika Petrunova has 81 points, which significantly exceeds the minimum specified by the Regulations for obtaining the scientific degree "doctor". The results of the research have been published in 3 articles in refereed and indexed SCOPUS publications, one of which has an impact rank. My assessment of the dissertation work is "POSITIVE" and I propose to the Scientific Jury to vote "Yes" awarding the educational and scientific degree "doctor" to Master Eng. Monika Petrunova.

29.03.2026	The report was written by:	
date		signature