STANDPOINT

by Prof. Todorka Zhivkova Terzieva, PhD
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of a dissertation thesis for obtaining the Educational and Scientific degree "Doctor"
in the Area of Higher education **1. Pedagogical sciences**
Professional field **1.3. Pedagogy of teaching in….**
Doctoral program **Methodology of Mathematics Education**

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Topic: "Synergetic aspects of continuity in Mathematics Education in the Secondary School (5th – 7th grade)

Scientific supervisor: Assoc. Prof. Dobrinka Vasileva Milusheva-Boykina, PhD, University of Plovdiv "Paisii Hilendarski"

1. General description of the presented materials and the PhD student

By order № РД-22-395 of 20.02.2026 of the Rector of the University of Plovdiv "Paisii Hilendarski", I was appointed as a member of the Scientific Jury for a public defense procedure of a dissertation on the topic **"Synergetic aspects of continuity in mathematics education in the secondary school (5th – 7th grade)"** for obtaining the educational and scientific degree "doctor" in the field of Higher education 1. *Pedagogical sciences*; Professional Area 1.3 *Pedagogy of teaching in…*, Doctoral program *Methodology of Mathematics Education*. The author of the dissertation is Penka Georgieva Karadzhova – PhD student in part-time form at the Department of Education in Mathematics, Informatics and Information Technologies (DEMIIT) of FMI, with supervisor Assoc. Prof. Dobrinka Vasileva Milusheva-Boykina, PhD from University of Plovdiv "Paisii Hilendarski", Plovdiv.

The set of materials on electronic media, presented by Penka Georgieva Karadzhova is in accordance with the relevant law Art. 36 (1) of the Regulations for Development of the Academic Staff of University of Plovdiv (RDASPU). The submitted documents are accurately formatted. The doctoral candidate has attached 5 publications on the topic of the dissertation.

From 1998 to 2002, Penka Karadzhova studied at the Faculty of Mathematics and Informatics at Plovdiv University, majoring in Mathematics, and obtain a Bachelor's degree. In 2004, she obtains a Master's degree in Accounting and Control from the Faculty of Economics at St Cyril and St Methodius University of Veliko Tarnovo. From 2017 to 2018, she studied at the Faculty of

Mathematics and Informatics at Plovdiv University and earned a qualification as a "Mathematics Teacher." From 2019 to 2024, Penka Karadzhova was a part-time doctoral student in the DEMIIT, Doctoral program *Methodology of Mathematics Education*. From November 2016 to February 2020, she was a Mathematics Teacher at Petko Karavelov Primary School in Asenovgrad. From December 2021 to December 2023, she was a researcher at the Institute of Robotics – BAS, Sofia. From September 2020 to the present, she has been a Mathematics Teacher at St. Constantine-Cyril Philosopher High School in Plovdiv. Her professional work involves planning, preparing, and teaching mathematics curriculum content to students.

2. Relevance of the topic and expediency of the set goals and objectives

The dissertation developed by Penka Karadzhova is related to a current problem in education. The Introduction clearly defines the research objectives and tasks, as well as the research focus, subject, and hypothesis. The subject of the research is the synergistic aspects of continuity in mathematics education, the implementation of continuity in mathematics education at the lower secondary level, and the methodological approaches for their implementation. Six main tasks have been formulated for the realization of the set objectives, which adequately reflect the planned activities and correspond to the set goals.

3. Knowledge of the problem

The doctoral candidate has carried out a theoretical analysis and review of 144 literature sources on the topic of the dissertation, 80 of which are in Bulgarian, 64 in English, and 10 Internet sources. A significant number of Bulgarian and foreign authors have been correctly cited. Knowledge of the problems in both theoretical and practical aspects provides a good basis for conducting the research and developing the dissertation.

4. Research methodology

The dissertation research used a set of activities to collect empirical data, such as theoretical analysis and research on pedagogical experiences. Theoretical and empirical research methods were used to realize the aims and objectives and to test the hypothesis: observation, comparison, analysis, synthesis, modeling, theoretical generalizations, group discussions, discussions with current mathematics teachers and tests. The doctoral student also used personal experience gained in teaching mathematics and in mathematics education with the application of a synergistic approach to achieve continuity in the lower secondary school stage. A didactic experiment was made and mathematical-statistical methods were applied to process the experimental data. The chosen research methodology allows achieving the set goals and objectives.

5. Characteristics and evaluation of the dissertation

The dissertation comprises 256 pages, of which 178 constitute the main body, including: An Introduction; three chapters; a Conclusion; Main Contributions, 9 pages of references; and three Appendices totaling 69 pages. The Introduction presents the relevance of the research problem, the object and subject of the study, its aims and objectives, the research hypothesis, the methods employed, and the structure of the dissertation. Chapter I. provides a systematic theoretical analysis

of the concept of continuity in education and explores the possibilities for integrating the synergetic approach into mathematics education at the lower secondary level. Chapter II. delineates the theoretical and applied framework of the technological model designed to ensure continuity in mathematics education through the implementation of a synergetic approach in Grades 5th – 7th and the constructed technological model is presented. Chapter III. presents the diagnostic procedure of the study. The results of the pedagogical experiment are statistically processed and analyzed, and conclusions and inferences regarding the working hypothesis are formulated.

The Conclusion presents the achieved results, formulates the main contributions, reports and publications on the results of the PhD thesis, 2 publication citations are listed and presents some perspectives for future development. The Appendix presents the diagnostic tests used, their results, and teaching materials.

6. Contributions and significance of development for science and practice

The main contributions resulting from this dissertation are of a scientific-applied and practical-applied nature. The main scientific-applied contributions include:

- A technological model has been developed and implemented in mathematics education at the lower secondary stage.
- The curriculum content and teaching methodology in Grades 5th – 7th have been analyzed and opportunities for applying a synergistic approach in an educational context have been proposed.

Practice-Applied contributions of the dissertation research are:

- The constructed didactic model has been approbated in a real school environment.
- A didactic toolkit has been developed, including six modules and a system of criteria and indicators for diagnostics.
- Methodological guidelines for teachers have been developed, encouraging purposeful use of the synergetic approach in planning, implementing, and analyzing educational situations.

The relationships between the contributions, the tasks, the place of description in the thesis and the publications made are described in a table. I believe that the contributions outlined above are sufficient to award the academic degree of "Doctor".

7. Evaluation of the dissertation publications

A total of 5 publications are attached to the dissertation work, 3 of which are independent, the remaining 2 are co-authored with the supervisor. One of the articles is in English, the rest are in Bulgarian. The presented publications on the topic of the dissertation research, three of which are independent, demonstrate the undeniable personal contribution of Penka Karadzhova in the creation and implementation in the teaching practice of the developed technological model in mathematics education at the lower secondary stage. A review of the submitted documents shows that the PhD student meets the minimum national requirements (40 points) and exceeds the minimum of 30 points

set out in the regulations for the implementation of the LDASRB. I have not identified any plagiarism in the materials submitted to me for review.

8. Abstract

The submitted abstract is prepared in accordance with the requirements, consists of 32 pages, is relevant to the content of the dissertation text and reflects the main results achieved in the dissertation research.

9. Critical remarks and recommendations

I do not find any significant gaps in the materials provided to me, but I would recommend that the doctoral student continue her work and publish her results in refereed scientific journals.

10. Personal impressions

I do not personally know doctoral student Penka Karadzhova, but the scientific papers and methodological developments provided to me for review present her capabilities as a professional for effectively solving problems related to the mathematics educational process.

CONCLUSION

The dissertation of **Penka Georgieva Karadzhova contains scientific-applied, and applied results, which represent an original contribution to science and meet** the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for application of LDASRB and the respective Regulation on the Development of the Academic Staff in University of Plovdiv "Paisii Hilendarski".

The dissertation shows that the doctoral student – Penka Georgieva Karadzhova has a profound theoretical knowledge and professional skills in the Methodology of Mathematics Education, as demonstrated qualities and skills to independently conduct research.

Due to all of the above, I confidently give my ***positive assessment*** of the research presented by the above peer-reviewed dissertation thesis, abstract, achieved results and contributions, and I **propose to the Honorable Scientific Jury to award the educational and scientific degree "Doctor"** to **Penka Georgieva Karadzhova** in the Area of Higher education 1. **Pedagogical sciences**; Professional field 1.3.; **Pedagogy of teaching in….,** Doctoral program **Methodology of Mathematics Education**.

25.03.2026 Reviewer: .....

Plovdiv (Prof. Todorka Terzieva, PhD)