OPINION

by Kalina Ivanova Aleksieva, PhD –

professor at Konstantin Preslavsky University of Shumen

of a dissertation for the award of the educational and scientific degree **"doctor"**

by: field of higher education *1. Pedagogical Sciences,*
Professional Field *1.3. Pedagogy of Education in…,*
doctoral program *Mathematics teaching methodology*
Author: *Keti Agop Angelova*
Topic: *"Technological model for pedagogical interaction in the formation of elementary quantitative concepts in 6-7-year-old children"*
Scientific supervisor: *Assoc. Prof. Dimitrina Petrova Kapitanova, PhD – Paisii Hilendarski University of Plovdiv*

1. General presentation of the procedure and the doctoral student

By order No. PD-22-2102 of 27.10.2025 of the rector of Paisii Hilendarski University of Plovdiv, I have been appointed as a member of the scientific jury to ensure a procedure for the defense of a dissertation on the topic *"Technological model for pedagogical interaction in the formation of elementary quantitative representations in 6-7-year-old children"* for the acquisition of the educational and scientific degree " doctor" in: field of higher education *1. Pedagogical sciences,* professional field *1.3. Pedagogy of education in …,* doctoral program *Methodology of Mathematics Teaching*. The author of the dissertation is *Keti Agop Angelova* - a full-time doctoral student at the Department of Primary School Pedagogy, with scientific supervisor *Assoc. Prof. Dimitrina Petrova Kapitanova, PhD* from *Paisii Hilendarski University of Plovdiv.*

The set of materials on paper presented by *Keti Agop Angelova* is in accordance with Art. 36. (1) of the Regulations for the Development of the Academic Staff of the University of Sofia, and includes the following documents:

- a request to the rector of the University of Plovdiv to open a procedure for defending a dissertation;
- CV in European format;
- minutes from the department council, related to reporting the readiness to open a procedure and preliminary discussion of a dissertation;
- dissertation;
- abstract;
- a list of scientific publications on the topic of the dissertation;
- copies of scientific publications;
- declaration of originality and authenticity of the attached documents.

The doctoral student has attached 5 publications to the procedure.

Doctoral student Keti Angelova has obtained a master's degree in Preschool and Primary School Pedagogy at the Paisii Hilendarski University of Plovdiv. In the period 2021 - 2022, she was a teacher at the Slavei and Ralitsa Primary Schools, and from 2023 to the present, she holds the position of assistant professor at the Paisii Hilendarski University of Plovdiv.

2. Relevance of the topic

The topic presented in the dissertation is predetermined by the need of modern times for a new concept of preschool education, which defines new educational goals and policies. The author presents an innovative, interdisciplinary technological model of pedagogical interaction, which maximally meets the modern needs and capabilities of each child and the requirements of society as a whole, which preschool mathematical education needs.

3. Knowing the problem

The doctoral student demonstrates knowledge of the main issues related to preschool mathematics education and makes comparisons with the research of established educators, psychologists and methodologists engaged in this topic. In - depth and related studies have been conducted. With the clarification of some specific aspects in the educational process of 6–7-year-old children in the period of formation of knowledge, skills and competencies from the core of quantitative relations. A bibliography is presented with a volume of 149 sources, mainly - books, textbooks, manuals, journal articles and documents.

4. Research methodology

The methodology chosen by the doctoral student for conducting the study is adequate to the set goals and objectives. The methods and means for their implementation have been successfully selected. The experimental study used a variety of research methods, correctly selected in view of the specificity of the research problem and the age characteristics of preschool children.

To achieve the goals and objectives set out in the model, a total of 17 interdisciplinary pedagogical situations with a thematic context: "Mathematics in fairy tales and creativity", distributed in three separate modules, are included. The research work involves a total of 244 children and 48 teachers.

5. Characterization and evaluation of the dissertation work and contributions

The dissertation consists of a main text with a volume of 311 pages, of which 199 pages are main text, and the rest are bibliography and appendices. The following are distinguished: introduction, three chapters, conclusion, conclusion, appendices. 149 sources were used on the topic.

The introduction justifies the relevance of the topic, correctly defines: object, subject, goals, hypotheses, tasks and significance of the dissertation research.

In **chapter one**, "*Theoretical Statement of the Problem,"* the doctoral student examines: Didactic aspects of mathematics education in kindergarten ; Modern pedagogical technologies and models of education in preschool age ; Theoretical models for the formation of quantitative representations in preschool age, as well as the educational content of the "Quantitative Relations" core in the "Mathematics" field and the concepts of interdisciplinarity, integrativity and project-based learning in preschool education.

Chapter **two** presents *the Design of the dissertation research in a structured manner.* The goal, tasks, object, subject, hypotheses and research methods are adequately formulated. For statistical processing of the data collected from the experiment, methods for checking reliability using Cronbach's Alpha, Mann-Whitney Test for rank data for two independent samples, descriptive statistics, etc. Specialized software **Microsoft Excel was used,** with added statistical functions.

The same chapter describes *the tools of pedagogical research*. At this stage of the dissertation, the author presents a specially developed *innovative technological model for pedagogical interaction,* deployed in **three separate modules**:

- ✓ **Module 1 (Interdisciplinary Technological Model) –** includes 8 pedagogical situations during which children are introduced to a literary work – a fairy tale. According to the content of the work, 6 cognitive tasks are formulated, included in a worksheet for each fairy tale separately.

✓ **Module 2 (Didactic mobile games) –** includes 2 pedagogical situations with a total of 10 mobile didactic games with a mathematical focus.

✓ **Module 3 (Interdisciplinary ICT technological model) –** includes 5 innovative pedagogical situations, conducted with an interactive whiteboard and additional creative engagement of the children.

The experimental work is presented correctly and the organization of the pedagogical research with 244 children from the cities of Plovdiv, Haskovo and Sofia and 48 teachers.

In **chapter three** *"Results of the experimental study"* analyzes and summarizes the results of the work on conducting the pedagogical experiment and testing the developed innovative technological model. Results of a survey (Survey Card 1 and Survey Card 2) of pedagogical specialists are presented, before and after testing the model. The analysis of the results of the experimental work and surveys with preschool teachers confirm the thesis that the model successfully works in a real pedagogical environment and leads to significantly better results in mathematics education in the preparatory group of the preschool educational institution. This is evidence in support of the assumption that the implementation of the *interactive* learning model proposed in the dissertation will contribute to increasing the intellectual and mathematical literacy of children and will prepare them for school.

The conclusions and conclusions made by Keti Angelova are fully confirmed by the scientific methods used.

I accept the theoretical and practical contributions formulated by the author. As main *scientific and applied* contributions we can highlight:

✓ Some specific aspects in the educational process of children from the preparatory groups during the period of formation of knowledge, skills and competencies from the "Quantitative Relations" core have been clarified;

✓ Development of *an author's conceptual framework* for interactive learning in preschool with 6-7 year old children, based on modern achievements in pedagogical and digital technology;

✓ Scientific argumentation of the relationship between the digital literacy of pedagogical staff and the effectiveness of the formation of quantitative concepts in preschool children;

The main contributions of *a practical nature* are:

✓ A technological model of pedagogical interaction for the formation of quantitative ideas in 6-7-year-old children has been created and tested, which integrates interactive technologies, game methods and interdisciplinary approaches;

✓ A set of pedagogical situations and games with a rich methodological focus have been developed to facilitate the process of forming elementary concepts and competencies for quantitative relations in children from the preparatory group of the DG;

✓ Trainings have been conducted for educators to learn the innovative model and approaches, which creates prerequisites for increasing their professional competence and adaptability to modern educational challenges.

The contributions listed above, as well as the comprehensive description of the conducted research and pedagogical experiment, present Angelova as an accomplished researcher.

6. Assessment of the publications and personal contribution of the doctoral student

A total of 5 publications are attached to the dissertation, in which Keti Angelova is the sole author. Four of the articles are in yearbooks, collections, magazines and forums of the Faculty of Pedagogy of the Plovdiv University and are published in the Plovdiv University Publishing House "Paisii Hilendarski" and one article is in a collection of reports of the VTU "St. St. Cyril and Methodius".

The data and results of the studies conducted (surveys, measurements, experiments) from the proposed list of publications of the doctoral student give me reason to believe that the results have been sufficiently approved by the specialized scientific community and meet the minimum national requirements for the procedure for awarding the educational and scientific degree "doctor".

7. Abstract

The second abstract is developed in accordance with the requirements and provides a complete overview of the structure and content of the dissertation. The total volume is 32 pages and contains basic ideas, results and analyses of the conducted research, conclusions and scientific contributions.

I have no reason to suspect plagiarism in the given dissertation and I believe that it is the author's personal work.

8. Recommendations for future use of the dissertation contributions and results

From the presented critical analysis and evaluation of the work, it follows that there is an interesting and current study with rich theoretical and practical significance. I would recommend that the doctoral student continue her work in this direction and popularize her scientific work among colleagues, students and parents, so that the conclusions and contributions obtained in it can be actually used.

CONCLUSION

The dissertation work contains scientific, applied scientific and applied results that represent an original contribution to science and meet all the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADSRB), the Regulations for the Implementation of the ADSRB and the relevant Regulations of the Paisii Hilendarski University of Plovdiv.

The dissertation shows that doctoral student Keti Agop Angelova **possesses** in-depth theoretical knowledge and professional skills in the scientific specialty of Mathematics Teaching Methodology, **demonstrating** qualities and skills for independently conducting scientific research.

Considering the above, I confidently give my **positive assessment** of the research conducted, presented in the dissertation, the abstract, the achieved results and contributions.

I propose to the esteemed scientific jury to award the educational and scientific degree "Doctor" to Keti Agop Angelova in the field of higher education 1. Pedagogical Sciences, professional field 1.3. Pedagogy of Education in..., doctoral program "Methodology of Education in Mathematics".

10.11.2025

Prepared the opinion:.....

(signature)

(Prof. Kalina Aleksieva, PhD)