R E V I E W

By Prof. Kosta Andreev Garov, PhD
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In Relation with Participation in a Contest for Occupying the Academic Position of "Professor" at Plovdiv University "Paisii Hilendarski"
Under Higher Education Area: 1. Pedagogical Sciences,
Professional Field: 1.3. Pedagogy of Teaching
(Methodology of Teaching Primary School Mathematics)
Announced in State Gazette Issue № 31 of 12.04.2019

The current review is prepared on the basis of order № R 33 – 3697 of 10.07.2019 of the Rector of Plovdiv University 'Paisii Hilendarski' (PU). With this order I have been appointed as a member of the scientific jury in a contest for occupying the academic position of ***professor*** at PU under higher education area: 1. Pedagogical Sciences, professional field: 1.3. Pedagogy of Teaching (Methodology of Teaching Primary School Mathematics) announced in state gazette issue № 31 of 12.04.2019 for the needs of the Department of Primary School Pedagogy of the Faculty of Pedagogy. At the first meeting of the scientific jury I was elected a Chair and a reviewer in a contest under Protocol № 1 of 16.07.2019. The review is in accordance with Article № 29 (1) of the Law on the Development of the Academic Staff in the Republic of Bulgaria, Article 60 (1) of the Regulations on the implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria, and Article 79 (3) of the respective PU Paisii Hilendarski Regulations.

Only one candidate has submitted documents for participation in the contest announced: associate professor Vladimira Stefanova Angelova, PhD from the "Primary School Education" Department of the Faculty of Pedagogy at PU "Paisii Hilendarski". As a member of the scientific jury I received the documents presented by the candidate in paper and electronic form and I can certify that they comply with the Regulations on the Academic Staff Development of PU. The documents are **accurately prepared and organized in a systematic way** which allows a proper assessment of the results achieved by the candidate. As a reviewer I made a thorough inspection and I **can report about the regularity** of the presented **administrative documents and scientific publications.**

Vladimira Angelova has substantial mathematics and informatics education. She graduated from the Faculty of Mathematics and Informatics at PU "Paisii Hilendarski" in 1992 with master specialty "Mathematics and Informatics". She completed a Master's degree and obtained the qualification "a mathematician with specialization in informatics". In 1993 she did a postgraduate course "Methodology of Teaching Mathematics" and after finishing it successfully she received the qualification "Mathematics and Informatics Teacher'. In 2001 – 2006 she did a PhD programme "Methodology of Teaching Mathematics" at PU "Paisii Hilendarski". She successfully defended her dissertation paper entitled: "Acquiring Methods for Solving Mathematical Problems by Students Qualifying for Primary School Teachers". Thus Vladimira Angelova was awarded the educational degree "doctor" in the scientific field "Methodology of Teaching Mathematics". From 1996 to 1999 she worked as an assistant at the Department of Primary School Pedagogy of the Faculty of Pedagogy at PU. From 1998 to 2000 she was a

senior assistant and from 2000 to 2014 – she was an assistant professor at the same department. In 2014 she acquired the academic position of 'associate professor'. Since 2016 she has been the head of the Primary School Pedagogy Department of the Faculty of Pedagogy of PU. Vladimira Angelova has over 25 years of pedagogical experience. The educational qualification and professional experience of associate professor Vladimira Angelova logically direct her towards scientific research in the field of Methodology of Teaching Primary School Mathematics. She has participated in 12 scientific-research projects (as a researcher or coordinator). Vladimira Angelova has a solid theoretical and practical basis in mathematics and information technologies. She has teamwork skills as well as technical and computer skills.

Associate professor Vladimira Angelova, PhD complies with the requirements of Article № 29 (1) of the Law on the Development of the Academic Staff in the Republic of Bulgaria, Article 60 (1) and Article 61 (1) of the Regulations on the implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria, and the respective PU Paisii Hilendarski Regulations for acquiring the academic position of 'professor'. She was awarded the educational-scientific degree "doctor" in 2006 and has been an associate professor for over 5 years. Vladimira Angelova meets the minimum national requirements for scientific activity and can participate in a contest for acquiring the academic position of "professor' under higher education area: **1. Pedagogical Sciences**, **professional field: 1.3. Pedagogy of Teaching.**

Under index **A** associate professor Vladimira Angelova, PhD has **50** points out of **50** minimum required. Under index **C** the minimum required points are **100** and associate professor Vladimira Angelova, PhD has **100** points. Under index **D** the minimum required points are **200** and associate professor Vladimira Angelova, PhD has **275** points. Under index **E** the minimum required points are **100** and associate professor Vladimira Angelova, PhD has **210** points. Under index **F** associate professor Vladimira Angelova, PhD has **573** points out of **100** minimum required. The minimum **total** number of the required points is **550** and the candidate has a total sum of **1208 points**.

Vladimira Angelova submitted 44 scientific papers for the participation in the contest: 2 monographs, 1 studio research paper, 15 scientific articles – 10 of which are in Bulgarian language and 5 in English, 1 resource book for university students, 4 methodological handbooks for teachers, 8 mathematics textbooks for primary school students, 13 mathematics activity books for primary school students. All of them are developed and published after acquiring the academic position "associate professor".

The close inspection of the presented publications reveal the fact that after acquiring the academic position of 'associate professor' Vadimira Angelova's publishing activity sharply increased. The textbooks and activity books for primary school mathematics written by Vladimira Angelova independently or in co-authorship are exceptionally original and of a very high quality. At that period she started rendering methodological assistance to 25 graduates from bachelor's and master's degree programmes at the Faculty of Pedagogy. She has been a scientific supervisor of one PhD student. She provided methodological guidance to the students and published some works in co-authorship with the PhD student. All these publications are related to the topic of methodology of teaching mathematics and information technologies.

The result of Vladimira Angelova's research resonated in the specialized scientific literature – she presented a list of **31** citations of her publications.

Associate professor PhD Vladimira Angelova's publications can be grouped in the following **basic** thematic research areas:

1. **Publications related to the development of innovative technologies applicable in Mathematics education in primary school level**

The publications in this area reflect the applicability of innovative technologies in Mathematics education in primary school level. The monograph **"Pedagogical technology for teaching word problems in primary school"** is focused on the educational technology for mathematical modelling of specific practical problems. It presents the theoretical background of word problems and an innovative variation for teaching them. Some strategies are developed for comprehending, planning and solving word problems and they bridge the connection between theory and practice. The monograph **"Diophantine equations and systems of Diophantine equations – theoretical aspects and methodological projection in primary school education"** is focused on the Diophantine equations and the systems of Diophantine equations and includes the theoretical foundations of this type of problems as well as the methodological options for teaching this topic in mathematical classes. A technological variation is created for mastering problem solving with Diophantine equations or systems of Diophantine equations and its implementation in those forms of teaching mathematics that allow its integration: elective classes, facultative classes, school mathematics study groups, etc. The studio research paper **"Didactic technology for understanding the concepts area of rectangle and the units of measurement for area in primary school teaching of mathematics"** presents the didactic technology for understanding the concept of *area of a rectangle, the units of measurement for area* and their application for solving mathematical and practical problems. This technology of education is an innovation in exposing the presented issues for the fourth grade of primary school education. Other publications in the same research thematic area are: **"Alternative didactic technology for clarification of the process for solving problems by using set theory models", "System and technology for studying word problems in the first grade of primary school", "Application of some set theory tools in elementary mathematics education".**

2. **Creation of 1^{st} – 4^{th} grade Mathematics textbooks and resource books**

Associate professor Vladimira Angelova, PhD is the main author in the collaborative team of authors of the "Prosveta Plus" Publishing House responsible for the creation of 1^{st} - 4^{th} grade Mathematics textbooks and resource books, approved by the ministry of Education. All the textbooks are designed in two variations – in paper and electronic form. The complete resource pack contains activity books which ensure additional workload for the school students. For each grade the author produced practice books which are designed for additional work in mathematics classes, for homework and assessment of students' knowledge and skills. The problems in it consolidate the acquired knowledge and skills and practice their application. The activity books "Mathematics with Matt and Emma" for 1^{st}, 2^{nd}, 3^{rd} and 4^{th} grades are designed for the elective mathematics classes. The topics included in it contain problems and exercises distributed in three levels of complexity: for knowledge and skills consolidation; for knowledge and skills practical application; for improvement and development of logical thinking, observation skills and creative imagination. I know the above mentioned textbooks and resource books in detail and I can state that they are fully compliant with the curricula of the Ministry of education and contribute to the improvement of the quality of mathematical education in primary school.

3. **Publications related to the methodological preparation of university students and teachers**

This thematic area includes publications dedicated to discussions of methodological issues in the mathematics education. The book **"State Exam Resource Book on Methodology**

of Education in the Kindergarten and the Primary School" is designed for university students preparing for state exams on methodology of education in the kindergarten and the primary school**. "Math teacher's handbook for 1st grade ", "Math teacher's handbook for 2nd Grade ", "Math teacher's handbook for 3th grade "** and **"Math teacher's handbook for 4th grade"** are methodological manuals for teachers who teach mathematics from 1st to 4th grades using the mathematics resource pack of "Prosveta Plus". These books present the authors' methodological and conceptual ideas and they are compliant with the specifics of mathematics education in the respective grades. For each lesson the author specifically defined: the objectives, the competencies as expected learning outcomes and the new concepts. Sample lesson descriptions are included as well as other variations and ideas for their execution; ideas how to work with the workbook. The handbooks provide extra exercises, guidelines related to the homework to be assigned, additional teacher resources as well as answers to some of the questions and problems.

The other publications that associate professor Vladimira Angelova, PhD submitted for review are focused on: the educational platform mozaBook and its potential for creating electronic educational content in mathematics for the second grade; problem-based education as an alternative for activating students' thinking when studying primary school mathematics; opportunities and alternatives for training students in using mathematical proof in primary school; aspects of teaching mathematics to gifted students in the context of inclusive education, etc.

The reviewer **acknowledges** the following **basic** research and applied research contributions of the candidate:

1. A didactic technology is developed for teaching word problems from 1st to 4th grade. This technology includes a wide and systematic range of problems accompanied by a relevant and innovative methodology for teaching and learning. Different problem situations are designed which are related to the solution of word problems.
2. An innovative didactic technology is developed which is focused on the education of fourth graders. It is directed towards mastering of knowledge and skills related to area of rectangle and the units of measurement for area and their application for solving mathematical and practical problems. An original technology for understanding the concepts geometric shape and perimeter of a triangle, a rectangle, and a square is created and their application for solving geometric and practical problems.
3. A model is presented for mastering tabular multiplication and division by second grade students. A system of problems is developed and it is richly illustrated and supported by electronic resources. Detailed instructions for using the methodological system of problems are presented.
4. Some strategies are developed for non-standard multiplication with the numbers: 5, 50, 500; 25, 250; 125 and the numbers 11 and 101. Original and effective rules for quick calculations are formulated.
5. Set theory tools and visual strategies are developed and they aid: the mastering of knowledge related to the qualitative meaning of numbers; understanding the use of the arithmetic operations – addition, subtraction, multiplication and division; acquiring the algorithm for calculations.
6. Educational technologies are created that develop students' logical-mathematical thinking and their skills to solve non-standard types of problems. Selected topics from

the Number theory are explored and they are related to solving Diophantine equations and systems of Diophantine equations.

7. A complete technology is developed for mastering the solving of the Diophantine equations and the systems of Diophantine equations in mathematics education.
8. A methodological system of exercises is developed and it is designed to teach students how to solve non-standard problems by using set theory models. This category of problems is solved with schematic models such as Euler-Venn diagrams.
9. The educational platform mozaBook is presented as well as its potential for creating electronic educational content in mathematics for the second grade. Original electronic resources are created and they are integrated in the educational content and guarantee effective education in a digital environment.
10. Mathematics textbooks are developed for primary school education and they guarantee detailed and systematic approach to developing the competencies defined in the 1^{st} – 4^{th} grade mathematics curriculum standards. They are compliant with the new normative documents, reforming the Bulgarian education. The educational technology developed in the mathematics textbooks is personalized and aids the formation of mathematical literacy and key competencies. The author created and added some original educational games and sample project tasks in the mathematics textbooks that allow team work.
11. Electronic mathematics textbooks are created for primary school students from 1^{st} - 4^{th} grade. They are a universal device for organizing the technological education in a new information environment. The electronic educational resources include single- and multiple-choice problems and exercises, chains, tables, games, animations, etc.
12. Mathematics practice books are developed and they are compliant with the current primary school mathematics curriculum standards. The educational technologies in these practice books are personalized and aid the mastering of key competencies and the development of creative thinking.
13. Activity books are designed for the elective classes from 1^{st} to 4^{th} grade. The activity books contain curriculum and instructional resources division on mathematics for the elective classes for 1^{st} – 4^{th} grade and there the educational objectives, content and learning outcomes are defined.

Associate professor PhD Vladimira Angelova's pedagogical work is very diverse. She developed new educational programmes, new lecture courses, tutorials and laboratory classes in different disciplines such as – "Methodology of Teaching Mathematics – Part I", "Methodology of Teaching Mathematics – Part II", "Mathematic Activities with Talented and Gifted Students from 1^{st} to 4^{th} Grade", "Multimedia in Teaching Mathematics", "Teaching Mathematical Modelling in Mathematics Education"; "Educational Technologies for Teaching Mathematics in Primary School", different kinds of pedagogical mathematical practicums, etc.

My personal impressions from Vladimira Angelova are very good. I've known the candidate for the position of 'professor' for over 10 years. She is a well-respected instructor, a scientist with a high degree of professional expertise and a reliable colleague. My recommendations for her future research work are to continue to develop the elements of the methodology of teaching mathematics with the help of the contemporary information and communication technologies and to present the results from her work in front of the scientific audience on national and international level with greater confidence.

Vladimira Angelova **has observed the rules of the scientific ethics** – she never published the same manuscript in different editions and never used the technique **"copy-paste"**. I have no doubts for **plagiarism** in the submitted scientific work. After reviewing the presented materials it becomes obvious that the candidate **has met the minimum national requirements** for scientific activity and for participation in a contest for acquiring the academic position of "professor' under higher education area: **1. Pedagogical Sciences, professional field: 1.3. Pedagogy of Teaching.**

My assessment for associate professor PhD Vladimira Stefanova Angelova's pedagogical and scientific work is **high**. She has a real contribution for the development of the methodology of teaching in primary school. Vladimira Angelova complies with all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations on its implementation, and the respective PU Paisii Hilendarski Regulations for participation in a contest for acquiring the academic position of "professor'.

All of the aforesaid constitutes valid grounds for giving my **positive assessment** to recommend associate professor Vladimira Stefanova Angelova, PhD to the academic position **"professor"** at PU Paisii Hilendarski under professional field 1.3. Pedagogy of Teaching (**Methodology of Teaching Primary School Mathematics**).

I recommend to the Scientific Jury to prepare a report-proposal to the Faculty of Pedagogy Council **to appoint** associate professor Vladimira Stefanova Angelova, PhD to the **academic position "professor"** at PU Paisii Hilendarski.

14.08.2019 **Reviewer**: ……...

Plovdiv Prof. Kosta Andreev Garov, PhD