

## REVIEW

regarding a competition for the selection of a professor  
in the Field of Higher Education: 1. Pedagogical sciences  
Professional direction 1.3. Pedagogy of teaching in ...  
Methodology of teaching mathematics in elementary grades  
for the needs of "Konstantin Preslavsky" University of Shumen,  
Faculty of Pedagogy, Department of "Preschool and Primary School Pedagogy"

**Author of the review: Sava Ivanov Grozdev,**  
Professor, Doctor of Mathematics, Doctor of Pedagogical Sciences

### 1. General presentation of the procedure

This review was prepared on the basis of Order No. RD-16-293/05.12.2022, by the Rector of the "K. Preslavsky" University of Shumen - Prof. Georgi Kolev, DSc in accordance with Art. 80, para. (1) and para. (2) of the Regulations for the development of the academic staff at the "K. Preslavsky" University of Shumen, Art. 57 and Art. 62 of the Regulations for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), art. 29a, on the basis of a decision taken during faculty council of the Faculty of Pedagogy of the University of Shumen (Protocol No. FD-02-03/22.11.2022) and in connection with a report of the dean of the Faculty of Pedagogy at the University of Shumen. In the State Gazette, b p. 82 of 14.10.2022, a competition was announced for the needs of the "K. Preslavsky" University of Shumen, Faculty of Pedagogy, in connection with occupying the academic position of "professor" in the Field of Higher Education 1. Pedagogical sciences; Professional direction 1.3. Pedagogy of teaching in ... (Methodology of teaching mathematics in elementary grades). The only candidate in the competition is Associate Professor Kalina Ivanova Aleksieva, PhD from the "K. Preslavsky" University of Shumen. No procedural violations were found.

As a member of the scientific jury, I got access to the documents of Associate Professor Kalina Ivanova Aleksieva, PhD which include:

1. Application by Assoc. Prof. Kalina Ivanova Aleksieva, PhD for participation in the competition for the academic position of "professor" announced by the "Konstantin Preslavsky" University of Shumen;

2. Professional biography of Prof. Kalina Ivanova Aleksieva, PhD;

3. Diplomas for completed higher education and academic position:

3.1. Higher Education Diploma No. 4678/22.05.1987, ed. from "K. Preslavsky" University of Shumen in Mathematics (teacher of mathematics) major, educational qualification degree "master";

3.2. Higher Education Diploma No. 45264/02.02.2015, ed. from "K. Preslavsky" University of Shumen in the "Pedagogical rehabilitation of mental retardation" major, educational qualification degree "master";

3.3. Diploma No. D-172/10.10.2018, ed. from "K. Preslavsky" University of Shumen for the acquired educational and scientific degree of "doctor" in Teaching Methodology in Mathematics and

Informatics, Field of Higher Education 1. Pedagogical sciences, Professional direction 1.3. Pedagogy of teaching in ..., Doctoral program "Methodology of teaching mathematics and informatics";

3.4. Document for awarding the academic position of "associate professor" in Field of Higher Education 1. Pedagogical sciences, Professional direction 1.3. Pedagogy of teaching in... (Methodology of teaching mathematics in the initial stage of education), by decision of the Faculty Council of the Faculty of Education No. FD-02-10/26.05.2020, ed. from "Konstantin Preslavsky" University of Shumen;

4. Certificate of fulfillment of the minimum national requirements under Art. 2b, para. 2 and 3 of ZRASRB;

5. Citation Reference;

6. Statement of Authorship;

7. Statement of Credibility;

8. Reference to original scientific contributions;

9. Reference for the additional indicators under Art. 61, para. 3 of LDAZSB;

10. Abstracts of publications;

11. List of publications and the publications themselves.

## **2. General presentation of the candidate**

The only candidate in the competition, associate professor Kalina Ivanova Aleksieva, PhD, is known among the mathematics board and to pedagogy specialists as a proven specialist with qualifications and qualities in the field of Mathematics teaching methodology in elementary grades. The documents for participating in the competition support this assessment. They are designed with care and provide an opportunity for objectivity and full confirmation of the assessment in accordance with the requirements of LDASRB and the Regulations for its application, as well as the Regulations of the University of Shumen and the Faculty of Pedagogy.

In 1979 Kalina Aleksieva graduated from "Ivan Vazov" Mathematical High School, in Dobrich. In the period 1986 – 1994, she was a technical associate at the Faculty of Public Professions; in the period 1994 - 2006, after a competition, she was successively a part-time assistant in the formation of elementary mathematical concepts and ideas, an assistant-expert in student affairs, the main coordinator in the Faculty of Pedagogy of the "K. Preslavsky" University of Shumen and the Pedagogical College in Dobrich, and in the period since 2006, she has been successively an assistant, chief assistant, senior lecturer and associate professor in the Faculty of Pedagogy and the Faculty of Mathematics and Informatics of the University of Shumen. She was a member of the Methodical Council of the University of Shumen, a member of the Management Board in the "Proletna Duga" kindergarten in Shumen, a participant in the organizing committee and jury of the municipal "Mathematics' Holiday" for children from preparatory groups with a pronounced interest in mathematics, course leader of courses in the specialty Preschool and Primary School Pedagogy and Preschool Pedagogy in the "bachelor" degree; course leader of majors from master's programs: *Innovations in preschool and primary education*; *Innovations in primary education* ; organizer of educational practices - observation, ongoing pedagogical and internship practice in kindergarten and primary school for students from the PP

and PPP, INO, IPO, IPNO majors, taught in "Bachelor's" and "Master's" educational degrees. Currently, associate professor Kalina Ivanova Aleksieva, PhD is the head of the "Preschool and Primary School Pedagogy" Department at the Faculty of Pedagogy of the University of Shumen. She is a member of the Board of Directors of the University of Shumen, the Faculty Council of the Pedagogical Faculty of SHU and the Council of DIKPO, as well as the Board of Directors of DIKPO.

Kalina Aleksieva graduated from the "Ivan Vazov" Mathematics High School in the city of Dobrich (Tolbukhin) and later obtained two master's degrees at the University of Shumen: in 1986, Mathematics (teacher of mathematics) major and in 2014, Pedagogical rehabilitation of mental retardation (teacher of children with special educational needs) major. As of September 28, 2018, she holds the educational and scientific degree of "Doctor" in Field of Higher Education 1. Pedagogical sciences, Professional direction 1.3. Pedagogy of teaching in ... (Methodology of teaching mathematics and informatics). Kalina Aleksieva defended her dissertation on the topic "The ideas of Alexander Madzharov in the context of modern mathematics education" at the "K. Preslavsky" University of Shumen. In 2020, she was elected as an associate professor at the "K. Preslavsky" University in Field of Higher Education 1. Pedagogy, Professional direction 1.3. Pedagogy of teaching in... (Methodology of teaching mathematics in the initial stage of education) .

### **3. Presentation of the candidate's scientific output**

The scientific interests of Assoc. prof. Kalina Aleksieva, PhD are in the field of the Methodology of teaching mathematics in primary stages of education, the Methodology for the formation of mathematical concepts and representations in kindergarten; The methodology of teaching mathematics for children with special educational needs and Information technologies and communications. Her scientific output is considerable. She is the author of 3 independent monographs: *The mathematical preparation of seven-year-old children for school*. Shumen: University Publishing House "K. Preslavsky", 2020, 230 pages, ISBN 978-619-201-369-1; *Didactic-methodical technologies for the formation of initial mathematical concepts*. Shumen: UPH "K. Preslavsky", 2022, 182 p., ISBN 978-619-201-644-9 and *Modeling and clarity in creative work in mathematics*. Shumen: UPH "K. Preslavsky", 2022, 176 pages, ISBN 978-619-201-645-6. The second and third monographs are submitted for participation in the competition for "professor", and the third is a habilitation work for holding the academic position of "professor". She is also the independent author of a *Guide for seminars and practical exercises on the methodology of teaching mathematics in elementary grades*. UPH "K. Preslavsky", 2019, 179 pages, ISBN 978-619-201-328-8. This guide is also submitted for entry into this contest. It is used in the school network.

The scientific output of Assoc. Prof. Kalina Ivanova Aleksieva, PhD includes another 45 articles, studies and published conference reports, 15 of which are in Bulgarian and participate in the competition for the academic position of "Professor". It should be noted that of these 15 scientific publications, 14 are independent, except for one, which is co-authored, with Assoc. Prof. Aleksieva being the first author. Seven of the 15 are published online at SocioBrains, [www.sociobrains.com](http://www.sociobrains.com). Of the remaining 8, one is from the Traveling Seminar "Innovations in Education" of Faber Publishing House, and the others are published by UPH "K. Preslavsky" (some of which are in the Yearbook of the University of Shumen), 3 of which are indexed in CEEOL.

One of the main goals of mathematics education in elementary grades is the formation of basic concepts. The contribution of Assoc. Prof. Kalina Aleksieva, PhD in this direction is the development of didactic-methodological technologies in the context of modern educational paradigms. The candidate for the position of “professor” analyzes known mathematical systems and, based on comparative characteristics, deduces trends in the improvement of the educational content in terms of volume and content in grades I–IV in connection with the concepts of number and the corresponding arithmetic operations. Assoc. Prof. Aleksieva researches the relationship of mathematical modeling to mathematics education in connection with the realization of the principle of clarity. She managed to derive basic requirements and rules for building systems of tasks for the development of mathematical abilities. Didactic modeling is a leading method of knowledge, and the construction of didactic models creates prerequisites for expanding and enriching the knowledge and experience of students - future teachers, in the formation of new concepts and methods of elementary school mathematics. Based on the results of a theoretical-systemic study through the holistic, competence-based and integrative approach, Assoc. Prof. Kalina Aleksieva, PhD develops an author's concept for experimental-research activity. The concept has been tested in a real educational process and the results allow for the updating of the university courses for "bachelor's" and "master's" degrees in the disciplines *Current problems in teaching mathematics in the initial stage of education* and *Elective teaching in mathematics in the initial stage of education*. In terms of contributions of experimental research, Assoc. Prof. Kalina Aleksieva, PhD creates systems of tasks on 6 main topics from the field of structural and structural-functional modeling in creative work: Modeling of mathematical and practical tasks with Euler-Venn diagrams, Modeling with box and arrow diagrams, Modeling with lines and graphs, Modeling and visualizing the solution of Diophantine equations using matrix diagrams, Modeling logic problems using matrix diagrams, and Modeling combinatorial problems using tree diagrams. In a practical and applied plan, Associate Professor Aleksieva develops systems for creative exercises when working with ready-made models of text tasks in connection with the training of students - future teachers, exercises on building models of text tasks and options for composing text tasks: abbreviated record, schematic model, graphic model, tabular data, etc. The systems have been approved, which makes it possible to update the content of the university course for "bachelor's" and "master's" degrees on *Methodology of teaching mathematics in primary school* and in particular the section *Creative work on text tasks in mathematics in I - IV grades*. In order to update the discipline the *elective lesson in the initial stage of education*, systems of variant tasks have been developed for the application of modeling and visualization as leading innovative approaches in relation to: the inversion method and the properties of reciprocal arithmetic operations; solving Diophantine equations and set theory problems with Euler-Venn diagrams. To the contributions of Assoc. Prof. Kalina Aleksieva, PhD should be added the author's comparative content analyses of the mathematics textbooks for the 1st - 4th grades in relation to the individual components of the educational content, including: text tasks in the initial stage, creative exercises on text tasks in mathematics in the 4th grade and the indirect text tasks in the 3rd grade. This makes it possible to update and enrich the content of the university course for "bachelor" and "master" degrees in the discipline *Methodology of teaching mathematics in primary school*. With the help of the author's toolkit and verification indicators, Assoc. Prof. Aleksieva examines mathematical competence in relation to knowledge of numbers and

actions with them, quantitative representations, measurement, geometric figures and shapes, logical tasks. The drawn conclusions and recommendations serve as a guide in building a correct methodology for the formation of the basic mathematical concepts and the optimal structuring of the learning content in the 1st grade.

The scientific contributions of Assoc. Prof. Kalina Aleksieva, PhD cover the requirements for occupying the academic position of "professor" with a total of 865 points according to the various indicators. Evidence of high quality is the significant number of noticed citations - a total of 47, of which 36 are related to the scientific production of the competition for "professor". The latter include 1 in a journal that is referenced and indexed in Web of Science, 29 in peer-reviewed monographs and collective volumes, and 6 in non-refereed publications. The data outlines the candidate as a highly rated academic researcher.

#### **4. Presentation of the candidate's educational activity**

The educational activity of Assoc. Prof. Kalina Aleksieva, PhD is also very diverse. It is related to the disciplines for the "Bachelor" degree: *Methodology of teaching mathematics in primary school* (lectures and exercises), "Preschool and primary school pedagogy" and "Primary school pedagogy with a foreign language" majors, III year, regular education; *Observation and Current pedagogic practice in Primary schools and Kindergartens*, in "Preschool and primary school pedagogy", "Primary school pedagogy with a foreign language" and "Preschool pedagogy" majors, regular education; *Internship practice at Primary schools and Kindergartens, State Practical-Applied Exam* - specialty "Preschool and primary school pedagogy", "Primary school pedagogy with a foreign language" and "Preschool pedagogy" majors, IV year, regular education; *Theory and methodology of teaching mathematics for children with Special Educational Needs* (lectures) - specialty "Special Pedagogy", III year, regular education. And with the disciplines for "master" degree, the educational activity of the candidate is related to: *Methodology of teaching mathematics in Primary Stage of Education* (lectures and in exercises), specialty "Preschool and primary school pedagogy", master's program "Innovations in primary education", correspondence education; *The educational content of the education in mathematics in PSE* (lectures), specialty "Preschool and primary school pedagogy", master's program "Innovations in primary education", correspondence education; *Current problems of teaching mathematics in PSE* (lectures and exercises), specialty "Preschool and primary school pedagogy", master's program "Innovations in primary education", correspondence education; *Elective training in mathematics in the PSE* (lectures and exercises), specialty "Preschool and primary school pedagogy", master's program "Innovations in primary education", correspondence education; *The creative work on text tasks in PSE* (lectures and exercises), specialty "Preschool and primary school pedagogy", master's program "Innovations in primary education", correspondence education; *Current problems of teaching mathematics in kindergarten and primary school* (lectures and exercises), II year, specialty "Preschool and primary school pedagogy", master's program "Innovations in preschool and primary education", "Innovations in preschool education", correspondence education; *Diagnostics of mathematical knowledge in kindergarten* (lectures and exercises), specialty "Preschool and primary school pedagogy", master's program "Innovations in preschool and primary education", "Innovations in preschool education", correspondence education; *Internship, State Practical-Applied Exam*, specialty "Preschool

and primary school pedagogy", master's program "Innovations in primary education", correspondence education.

Assoc. Prof. Kalina Aleksieva, PhD participated in: 6 publishing teams of scientific publications; an expert group for higher education in mathematics for the IV grade at the Ministry of Education and Culture (2020-2021); the organizing committee and jury of the municipal "Mathematics' Holiday" for children from preparatory groups with a pronounced interest in mathematics; she was a member of scientific juries, author of reviews and opinions. She participated in the development of curricula, lecture courses, seminars and laboratory exercises in a face-to-face and distant environment of postgraduate education - Additional professional qualification (APQ) in the disciplines: *Methodology of teaching mathematics in primary school; Methodology of teaching mathematics for children with SEN; Internship in primary school; Current pedagogical practice in primary school*. She also participated in the development of curricula for the "Bachelor's" and "Master's" specializations administered by the "Preschool and primary school pedagogy" department. Assoc. Prof. Aleksieva actively works with students and doctoral students, specialists, teachers to acquire a professional qualification degree (PQD). She was the scientific supervisor of 1 successfully defended thesis in the Bachelor's degree, 4 theses in the Master's degree, and 5 theses for the acquisition of professional qualification degrees. Currently, she supervises two doctoral students at the "K. Preslavsky" University of Shumen with working topics *Interactive resources in mathematics education of 5-7 year old children* and *Integration of multimedia resources in the creative work on text tasks in mathematics education (III - IV grades)*.

In conclusion, the educational and teaching activities of Assoc. Prof. Kalina Aleksieva, PhD are significant and of high quality. This activity meets the requirements for holding the academic position of "professor".

#### **5. Presentation of the scientific and applied activity of the candidate**

Associate Professor Kalina Aleksieva, PhD has participated in 8 national projects as a trainer or expert: *Supporting the educational process of children with special educational needs in the municipality of Kazanlak*, financed under the OP "Development of Human Resources" with contract BG051PO001-4.1.04-0027 - Municipality of Kazanlak and Department of "Special Pedagogy" at the Faculty of Pedagogy of the "K.Preslavsky" University of Shumen (2012); *Training and preparation of teachers and specialists with pedagogical functions for assessing and meeting the educational needs of children with SEN* under contract BG051PO001-4.1.04-0131 - Municipality of Veliko Tarnovo and Department of "Special Pedagogy" at the Faculty of Pedagogy of the "K. Preslavsky" University of Shumen (2012); *Training and qualification of teachers from Dobrich "Come into my world"* with contract BG051PO001-4.1.04-0019, financed under the OP "Development of human resources" - Municipality of Dobrich and the department of "Special Pedagogy" at the Faculty of Pedagogy of the "K. Preslavsky" University of Shumen (2012); *Qualification of pedagogical specialists " Training of pedagogical specialists from kindergartens and primary schools to work with children with special educational needs"* with contract BG051PO001-3.1.03-0001 (2013); *We invest in our future* with contract BG051PO001-4.2.03-1010, implemented with the financial support of the Operational Program "Development of Human Resources" (2007-2013), co-financed by the European Social Fund of the European Union; *Student practices* under contract BG051PO001-3.3.07-0002, carried out with the

financial support of the Operational Program "Development of Human Resources", co-financed by the European Social Fund of the European Union (2013-2014); *Student internships Phase 1 of the Ministry of Education and Culture* under contract BG05M2OP001-2.002-0001, funded by OP NOIR (2016–2017); *Student internships Phase 2* with contract BG05M2OP001-2.013-0001, financed under the Operational Program "Science and Education for Smart Growth" 2014-2020. In the period 2021–2022, Assoc. Prof. Kalina Aleksieva, PhD participated as a researcher in 5 intra-university projects.

Regardless of their type, all projects are related to the implementation and realization of pedagogical experience. Their goal is to carry out in-depth scientific studies in the field of teaching methodology. In some of the projects noted above, the results of the scientific publication activity of Assoc. Prof. Kalina Aleksieva, PhD and her rich experience in her educational and teaching activities were used.

### **CONCLUSION**

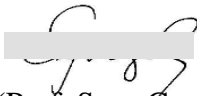
From the above, it can be seen that associate professor Kalina Ivanova Aleksieva, PhD is a proven specialist in mathematics teaching methodology in elementary grades with considerable experience in this field. Its output fulfills the minimum national requirements for Field of Higher Education 1. Pedagogical sciences, Professional direction 1.3. Pedagogy of teaching mathematics in elementary grades. Her works have been cited many times. There is no reason to believe that they are not her personal work, which excludes plagiarism. This gives me reason to conclude that the scientific, scientific-applied, teaching activity and its qualities satisfy the requirements of LDASRB, the Rules for its implementation, as well as the Rules of "Konstantin Preslavsky" University of Shumen for the development of the academic staff, presented to candidates for obtaining the academic position of "professor". The achievements of Assoc. Prof. Kalina Ivanova Aleksieva, PhD are not accidental. They are in the spirit of the long-standing traditions in the field of the Teaching Methodology in mathematics, informatics and information technologies, created at the "K. Preslavsky" University of Shumen. It is enough to mention: the name of Prof. Natalia Hristova Pavlova, DSc and the strategy she developed for creating didactic materials with the help of software technologies, her conceptual model for the formation of skills for didactic design and its technological implementation, the "Order" method, as well as the didactic scenario in the teaching of mathematics; the name of Prof. Rusanka Georgieva Petrova, PhD and her research on the influence of computer educational games on the development of the logical thinking structures "seriation" and "classification", which enrich the sensory experience in emotional and volitional development; the name of Prof. Anton Ivanov Mollov, PhD, related to his contributions to the formation of the necessary literacy of primary teachers in the field of information technologies, as well as his evidence, co-authored with Biserka Yovcheva and Petar Petrov, that the transformation of mathematical tasks into informatics and conversely, it is fruitful not only in a conceptual but also in a practical context; the name of Prof. Ivan Stefanov Ivanov, PhD and the strengths of his work in relation to the philosophical-methodological aspects of mathematics education, with Friedman's modified model of the mathematical task and the introduction of the concept of "operator cell" in relation to the structural element "assignment operator"; the name of Assoc. Prof. Liliana Metodieva Karakasheva-Yoncheva, PhD, who introduced the new didactic concept of "worksheet with tasks" and an

organizational model of seminar exercises for students; the name of Assoc. Prof. Krasimir Valentinov Harizanov, PhD and again that of Prof. Nataliya Hristova Pavlova, DSc in connection with the developed technologies for describing the lesson in mathematics, informatics and information technologies education; the name of Prof. Borislav Stanishev Borisov, PhD and his joint contribution with Prof. Nataliya Hristova Pavlova, DSc for the interdisciplinary scenario in the fields of astronomy, physics, mathematics and information technologies, developed on the basis of the method of learning by inquiry. The name of Prof. Borislav Stanishev Borisov, PhD as well as that of Prof. Rusanka Georgieva Petrova, PhD, are also associated with contributions to the education of bilinguals. The Shumen School is proud of its young representatives, Albena Dimitrova Ivanova-Nedelcheva, PhD and Angel Stoyanov Angelov, PhD, who in the secondary school "Sava Dobroplodni" in the city of Shumen apply respectively the logical-reproductive model in the training of mathematical talents, based on the Bloom's taxonomy and the model for developing students' computational thinking. The list of prominent representatives of the Shumen school could be continued. In this list, the name of Associate Professor Kalina Ivanova Aleksieva, PhD stands out.

Therefore, I give a positive conclusion regarding the election for the academic position of "professor" and allow myself to suggest to the honorable members of the Scientific Jury to support the candidacy and to make a proposal to the Faculty Council of the Faculty of Pedagogy to elect associate professor Kalina Ivanova Aleksieva, PhD as a "professor" on the methodology of teaching mathematics in the elementary grades with the conviction that she deserves it.

Sofia, Dec 30, 2022

Reviewed:

  
(Prof. Sava Grozdev, DSc)