REVIEW

Regarding the competition for holding the higher academic post of **Professor** in Higher Education Area 1 *Pedagogical Sciences*,
1.3 Professional Field *Pedagogy of Mathematics and Informatics Education*,
Scientific Specialty *Geometry*, Academic Courses in Mathematics I, Mathematics II, Mathematics III.
Applicant: Associate Professor Veselin Nenkov Nenkov, PhD.
Assessor: Prof. Petar Dikov Petrov, PhD in 1.2 Professional Field of Pedagogy, Scientific Specialty *Theory of Education and Didactics*, Member of the Academic Board and Assessor, Retired from Sofia University *St. Kliment Ohridski*.
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1. Description of the scientific output

Associate Professor Veselin Nenkov Nenkov, PhD is the only participant in the competition for holding higher academic post of Professor at Nikola Vaptsarov Naval Academy in Varna. He has presented a chronological list of authored publications as follows: 1991: 001; 1995: 002-006; 1996: 007-012; 1997: 013-017; 1998: 018-024;1999: 025-029; 2000: 030-031;2001: 032-034;2002: 035-043; 2003: 044-045; 2004: 045; 2005: 046-049;2006: 050; 2007: 051-056;2008: 057-061;2009: 062-065; 2010: 066-074;2011: 075-084;2012: 085-104; 2013: 105-125;2014: 126-156;2015: 157-183;2016: 184-205;2017: 206-234;2018: 235-263;2019: 264-280.

In the abovementioned list, I dare to include the single-authored latest monography *Enhancing Mathematical Competencies Using Dynamic Geometry,* published by Archimedes 2, Ltd, Sofia, ISBN: *978-954-779-291*, which I assess as exceptionally high achievement.

The main conclusion that can be drawn is that the applicant is a very productive author, who follows the latest trends and new ideas in the area of pedagogical sciences, especially in Pedagogy of Mathematics and Informatics Education. It is worth considering his earlier articles published in specialised magazines, such as *Teaching and Learning in Mathematics and Informatics, Mathematics*

and Informatics, Mathematical Forum, Mathematics, etc. He has been a single author for many years (up to 2005) while the publications after 2005 are mainly co-authored with well-known Bulgarian scientists, such as Academician S. Grozdev, V. Hadjiiski, S. Doichev, Zh. Zhelev and so on. Since 2010, the number of his articles has increased rapidly similar to a geometric progression.

Assoc. Prof. V. Nenkov, PhD has submitted, accurately and precisely, separate lists of publications for the participation in the competition for holding the post of Associate Professor and for the acquisition of the postgraduate doctoral degree as well as his works and publications for taking part in this competition, including his participation in research projects. From the submitted statements and declarations meeting the terms and minimum national requirements for earning doctoral degree and for holding the academic post of Professor, it is evident that he has a greater number of points than necessary in all indicators. For example, for Indicator G he has 275 points, for Indicator D -160 points, for Indicator E -113 points.

2. General characteristics of the applicant science and research applied activities

The science and research applied activities as well as the teaching activities of Assoc. Prof. V. Nenkov, PhD are entirely in the context of the announced competition. The applicant has indicated a total of 18 publications related to the topic of his thesis paper (1.1.1-1.1.18) and 27 publications, associated with this competition (2.1.1.-2.1.6; 2.2.1-2.2.21). The scientific and research applied contributions could be hypothetically summarized in the following major problem areas, which are not only closely interconnected but also intertwined.

- **Development of methodology for teaching and learning second-order growth curves.**
- **Development of methodology for applying various analytical methods in studying and proving geometric claims.**
- **Summarizing a number of concepts and theorems in the geometry of triangles and inscribed polygons.**
- **Discovery and proof of new mathematical statements.**
- **Investigation of geometric locations of the roots of the derivatives of some polynomials.**

3. Main science and research applied contributions

As I have already stated, the science and research applied contributions of Assoc. Prof. Dr. Nenkov, PhD are entirely in the context of the announced competition.

In the last two decades of the 21st century there has been an intensive development of classical pedagogy. Subjected to the terms of modernization, it has gradually turned from mostly empirical to system-theoretical science. The research approach, the competence approach, the synergetic approach, the activity theory and personality-centered approach, etc., are becoming more widely used in general didactics and in private didactics, reasonably and gradually turning into pedagogies of education.

In agreement with these innovative educational paradigms, learning has become a process of actively 'constructed' knowledge from each learner. Instead of mechanically storing new information, a process of building and reconstructing the already acquired cognitive structures takes place. Thus, new knowledge is gradually integrated into the existing structures of knowledge and meaning. Personality-centered approach puts the learner at the center of the educational process, reflection, self-reflection and motivation playing an important role in the overall process of education.

Already in his doctoral dissertation, based on his extensive experience as a teacher and tutor, Assoc. Prof. V. Nenkov, PhD substantiates and implements an innovative system for the formation of positive motivation for learning, for raising students' interests in mathematics and information technology.

It can reasonably be argued that the most important achievement of the applicant is creating the necessary conditions in order to turn the computer into an effective tool to insure students' motivation to learn. The GEOMETER, S SKETCHPAD, an interactive and dynamic computer program, is a kind of apex of the applicant achievements in this respect.

This program, as the author himself points out in his preface to his monograph "Enhancing Mathematical Competencies Using Dynamic Geometry", enables one to "look" differently at mathematical concepts and statements. It does not only record separate, fragmented facts, but deepens the clustering of relevant data in order to extract common laws, rules and conclusions. The program

provides the conditions for creating a cohesive picture that includes the emergence and development of ideas. It can be used not only to make speculative observations, but also to carry out conscious learning through experiments, to formulate hypotheses and their verification. Thus, acquisition of mathematical knowledge opens into conducting experimental studies, typical for Physics, for instance.

In general terms, the applicant formulates modern approaches to solving mathematical problems and on this basis comments on the heuristic possibilities of the GSP program. He rightly argues that Poy's inductive approach is effective when coupled with rigorous mathematical proof. On this basis, various geometrical statements can be summarized.

The aforementioned allows me to emphasize that the whole scientific production of Assoc. Prof. Nenkov, PhD undoubtedly demonstrates his gradual growth as a very good teacher and subsequently a scientist-researcher and creator who practically realizes the modern concept of the new culture of learning (LWL) combining the competence and cognitive approaches.

As the long time leader of Bulgarian students in the prestigious annual MITE (Methodology Information Technologies in Edication) International Project, he contributes to obtain very high results. His science and research applied activities have a wide range:
- **Research and application of various analytical and projective methods in researching and proving geometric assertions (the monograph is full of such examples which support this conclusion.)**
- **Summarising a number of geometric statements that lead to the creation of new theorems in Euclidean geometry. (For example, the summary of Tebo's theorem, described in the monograph.)**
- **Application of elements of the theory of polynomials for studying the number of some curves of the second degree and the determination of equilateral triangles. Thus, a bridge connecting different mathematical fields is naturally constructed. (This is noticed in the last part of the monograph).**

(The examples are related to the monograph because it describes a major part of the MITE project activity.)

All mentioned science and research applied contributions are personal and independent work of Assoc. Prof. V. Nenkov, PhD. His publications have been cited both at home and abroad. According to Indicator E, he has achieved a total of 160 points (150 + 10).

4. Evaluation of the applicant pedagogical training and activities

I do not personally know Assoc. Prof. Veselin Nenkov, PhD, but I do know some of his co-authors, such as Academician S. Grozdev, who has assured me that the candidate is very well prepared in this specialty and is able to involve high school students and university students in all the subjects taught by him in an accessible and interactive way. Currently, he is also a doctoral adviser of a PhD student, Stanislav Stefanov, who is an assistant professor at the Technical University and is addressing his PhD defense. As a part-time professor at the same university, I have spoken to Stanislav on his dissertation.

5. Critical remarks and recommendations

I have no significant comments and recommendations to Prof. V. Nenkov regarding his publications. He is a proven and recognized specialist not only in our country but also abroad. He is also known for his authorship of original competition and Olympics mathematical problems.

6. Conclusion

Based on the analysis of the total scientific and applied research output, the rich professional experience, the pronounced quality of innovation, I declare to vote positively and I expect all honorable members of the Academic Board to vote positively for Associate Professor Veselin Nenkov Nenkov, PhD to be appointed as Professor.

I am fully convinced that all honorable members of the Academic Board should offer to the members of the Faculty Board of the Faculty of Engineering at Nikola Vaptsarov Naval Academy Associate Professor Veselin Nenkov Nenkov, PhD to be elected to hold the academic post of Professor in Professional Field 1.3. Pedagogy of Mathematics and Informatics Education.

Assessor: ....(Prof. Petar Petrov, PhD)