

REVIEW

by **Prof. Veska Ivanova Shivacheva** - University „Prof. Dr. Assen Zlatarov ”- Burgas

of the materials submitted for participation in the competition
for occupation of the academic position "**Professor**" at the **University of Paisii Hilendarski**

in the field of higher education 1. Pedagogical sciences,
professional field 1.3. Pedagogy of training in... (Methodic of Physics)

In the competition for professor, announced in the State Gazette, issue. 31 / 12.04.2019 and on the website of the Plovdiv University "Paisii Hilendarski" for the needs of the Department of Educational Technologies of the Faculty of Physics and Technology, **Assoc. Prof. Zhelyazka Dimitrova Raykova, PhD** is the only candidate.

1. General presentation of the received materials

By order NP33-2886 of June 11, 2019, from the Rector of the University of Plovdiv "Paisii Hilendarski", I was appointed as a member of the scientific jury of a competition for the professor academic position in the Higher Education field 1. Pedagogical sciences, professional field 1.3 .. Pedagogy of teaching of ... (Didactics of Physics), announced for the needs of the Department of "Educational Technologies" in the Faculty of Physics and Technology. In accordance with the decision of the first non-attendee meeting of the scientific jury (Protocol N1 / 20.06.2019 - 22.06 .2019), I have been assigned as a reviewer.

The set of materials, presented by Assoc. Prof. Zhelyazka Raykova, is in accordance with the Rules for Development of the Academic Staff of Plovdiv University and includes the following documents:

- Autobiography;
- List of scientific papers - 55 pcs. for professor, 40 pcs. - Associate Professor and 8 Ph.D.
- Declarations of co-authorship and originality of scientific contributions;
- Publications;
- Annotation of the materials under Article 76 (1), incl. self-assessment of contributions;
- Documents and statements for working experience, teaching hours, scientific research, etc.

In order to participate in the competition for the professor position, Assoc. Prof. Dr. Zhelyazka Raykova enclosed a total of 55 scientific works, of which 1 monograph, 17 articles in journals, 29 articles in proceedings, 4 aid materials and 4 books related to the results of scientific research. The submitted papers are different from publications for Associate Professor.

2. Brief biographical information

Zhelyazka Raykova was born on May 5, 1963. She graduated in Physics from Plovdiv University "Paisii Hilendarski" in 1985 with a Master's degree "Physicist. She is also a teacher in Physics and Mathematics". Since 2001 she has been a PhD in Methodic of Physics Education.

She started working as a physics teacher in 1985. Since 1989 she has been working at the University of Plovdiv as an assistant, chief assistant and associate professor. She was elected as a Head of the Methodic of Physics Department (2008 - 2016), Deputy Dean of the Physics Faculty (2008 - 2014), Dean of the Faculty of Physics (2014 - 2017), Head of the Educational Technology Department (2017 - present) and Deputy Dean of the Physics and Technology Faculty (2019 - present).

She holds a Certificate of Foreign Languages, a Level I Google Educator, additional teaching qualifications, and others.

The professional-pedagogical, academic and creative development of Assoc. Prof. Raykova is related to the profile of the competition. She is a well-known name among the specialized pedagogical areas. She participated in scientific juries for academic positions competitions and degrees. She is a member of the editorial board of the "Physics" Magazines , "Methodology of physics training and collections of scientific papers (physics) at the University of Plovdiv. The attached official statements and her participation in international, national, regional and municipal forums, prove that she is a well-established and respected professional.

2. General characteristics of the applicant's activities

3.1. Assessment of educational and pedagogical activity

Assoc. Prof. Dr. Raykova has significant 30 years of teaching experience in teaching students - future teachers in Physics and Astronomy. She manages master's and bachelor's programs for students in the professional field "Pedagogy of ...", develops curricula for 15 profile disciplines

related to school physics education and conducts relevant lectures. She is the author of e-courses for the Physics and Technology Faculty DIPSEIL platform and for the Plovdiv Electronic University MOODLE platform. She participates in the teaching of students of other faculties in the following disciplines: "Information and Communication Technologies" in Learning and Work in Digital Environment, "Presentation and Communication Skills of the Teacher", "Constructivist approach to science education ", "Methodology of educational research", "Methods and methodology of writing thesis and use scientific and technical literature", "Physics for children" and others.

She is the author of 4 textbooks (№ 48, 51, 53, 54), which are in accordance with the profile of the competition.

Assoc. Prof. Raykova is the scientific adviser of 4 PhD students, one of whom has successfully defended her PhD degree, two of them were given the right to defend their PhD and one is continuing her studies in the doctoral program "Methodic of Physics Education".

She has participated in ERASMUS + programme as a lecturer at the universities in Craiova (2019) and in Patra (2010), in national forums with teachers from the country (under the Chain Reaction project) and in the physics teachers training in Plovdiv and its region. She conducts education of the Department for Qualification and Professional Development of Pedagogical Specialists at the University of Plovdiv.

3.2. Evaluation of scientific and applied science activities

The works, which Assoc. Prof. Raykova presents for the competition, are in the field of physics education in different years and stages in school. Scientific production meets the criteria of the University. The scientific works for the competition (55) can be ranked as: **1 independent monograph** (no. 55), **17 articles in specialized scientific periodicals** (no. 1, 6, 8, 13, 15, 18, 19, 21, 22, 26, 29, 32, 33, 37, 40, 41, 42), **29 articles in collections of scientific forums**, **4 books of a monographic nature related to the results of scientific research** (Publication Nos. 47, 49, 52, 54) and **4 study aids** (Publication Nos. 48, 50, 54, 53). The number of publications in which Assoc. Prof. Raykova is the sole author is 13 (№ 1, 8, 15, 16, 27, 18, 31, 42, 45, 48, 51, 53, 55). Published papers in scientific conferences (international and national) are in full text in reviewed journals, scientific publications, identification number and name of publisher.

I consider that the submitted scientific publications are on the profile of the announced competition and the analysis of their content justifies the grouping in the following relatively different **directions** to be:

- Research on the state and trends in school physics education and innovative approaches to methodological support

In the monograph "Modern Trends in Physics Education" (2019) the results of a long-standing study have been analyzed. Trends, ideas and innovative methodological solutions tested in the practice with a scientific contribution are highlighted. The author defends her views on *constructivism* in physics education, which she also bases in other publications (Nos. 5, 6, 7, 15, 26, 48). The publications emphasize the role of the teacher in creating a supportive constructivist environment and provide specific methodological developments on the topics of the teaching content.

The monograph work and a large number of publications (Nos. 13, 17, 27, 28, 29, 30, 31, 35, 41, 44, 54) indicate a tendency to enhance the *research approach in science education*. The results of the studies are linked to motivation to study and with specific experimental activity in studying optics in 7th grade, mechanics in 8th grade, environmental lighting, mechanical vibrations and waves in 9th grade, particle physics in 10th grade and more.

Assoc. Prof. Dr. Raykova links well the state of education in "Physics and Astronomy" and in "Man and Nature" with the phenomenon of students' *scientific literacy*. The results of the studies have been thoroughly analyzed in the cited monograph and in the scientific reports (Publications Nos. 1, 19, 33, 47, 48, etc.). Methodological prerequisites for formation of students' scientific literacy in physics education and in the preparation on the problem of future teachers are presented.

A significant amount of scientific output reflects of the application of *information and communication technologies in education and in the work in digital environment*. Research has been carried out for elementary, lower and upper secondary school levels with innovative methodological provision of "augmented reality" technology, mobile technologies, internet-based resources and more. (Nos. 4, 8, 9, 10, 11, 12, 23, 24, 32, 34, 36). The capabilities of the online training resources are also discussed (Publication Nos. 39, 40, 42, 43).

- ***Research on the effectiveness of Physics and Astronomy education***

The research of Assoc. Prof. Raykova, PhD is aimed at motivation the methodic prerequisites for the effectiveness of physics education and achieving the expected results. The author defends ideas for the contemporary *model of teaching content* for school physics for different ages of students with its basic elements for knowledge, skills, relations by areas of competence (Publication Nos. 1, 10, 18, 20 and 33). The studies are benefited by her participation in a project team for preparation of the new 9th and 10th grade curricula.

Most of the scientific works prove the possibilities of a tried and tested methodological toolkit for teaching topics in the content of Physics and Astronomy (7th - 10 th grade) for different types of schools (Publications Nos 2, 6, 13,17, 18, 21, 25, 26, 28, 29, 30, 35, 39, 44, 51,52, 53 and 54). The described good practices in the study of transformers, atomic nucleus, mechanics, elementary particles and more are interesting. The author rightly links the effectiveness of physics education with the application of the *integral approach* and with the opportunities for forming an ecological culture of students (Publications No. 22, 45, 46).

- ***Studies on the modern university training of future teachers in physics and astronomy***

In most of the papers, relatively distinguishable in the above mentioned directions, Assoc. Prof. Raykova presents various aspects of the preparation of the students - future educators and justifies the carried out practical activity. The results of the studies are applied when updating curricula, syllabuses, bachelor's and master's teaching aids. Innovations in the methodological provision of classroom and extracurricular activities with students future teachers and interaction with mentor teachers are also discussed in publications Nos. 47, 48, 49, 50, 51, 52, 53, 54.

The accomplished research activity Assoc. Prof. Raykova, PhD is bound with the participation in 12 research projects.

3.3.Contributions and citations

The substantive analysis of the scientific production of Assoc. Prof. Raykova, PhD makes it possible to highlight the scientific, scientifically applied and methodological *contributions* that, in my opinion, relate to:

- Modern tendencies in the teaching of the sciences have been identified and models of teaching physics and astronomy at school with innovative approaches to its implementation have been

scientifically substantiated. The theoretical and methodological foundations, which have been identified and approbated into practice, are original methodological solutions for constructivism, conducting motivational research in physics, forming students' natural literacy, applying information and communication technologies and working in digital environment with non-traditional technologies. "Augmented reality", mobile technologies, internet-based resources, etc., which extends the scientific knowledge and practice of Pedagogy of science education.

- Methodical prerequisites for improving the effectiveness of Physics and Astronomy education are empirically proven. Specific models of educational content are substantiated with appropriate methodical tools for teaching topics of study material, which enriches the scientific and practical aspects of the Methodics of physics and astronomy education.

- The system of preparation of students - future teachers of physics and astronomy with conceptual solutions and methodical developments for applying innovations in the classroom and extra-curricular activity is scientifically grounded.

- The experimentally proven teaching models are applicable in the educational practice of other higher education institutions, which prepare specialists in the professional field "Pedagogy of Education in" and are useful as ideas for science teachers.

The quotations of her works, noted so far by the candidate, as number, content, periods and years meet the criteria. The citations are in works related to the Methodic of science education.

4. Assessment of the personal contribution of the applicant (s)

I consider that the contributions formed and the results obtained are a personal merit to Assoc. Prof. Raykova. The basis for this assessment is the analysis of the scientific production, professional-pedagogical, academic and overall creative development, the accompanying official statements, documents, applications and the response among the pedagogical college. In most of the joint published scientific papers, the candidate was ranked first in the author team.

5. Recommendations

The absolute and significant contribution character of the research carried out by Assoc. Prof. Raikova is a reason to recommend that her future publishing activity should be more focused on specialized foreign periodicals.

6. Personal impressions

I know Assoc. Prof. Raykova from her publications and participations in national forums on the theory and methodology of science education. The procedure materials, the statements she received about her involvement in research and education projects, reinforce my personal impression of the importance of her research. I propose that her future studies related constructivist theories to person-centered schooling.

CONCLUSION

I consider that the documents and materials presented by Assoc. Prof. Raykova, PhD meet the requirements of the Academic Staff Development Regulation of the Republic of Bulgaria, the Regulations for the implementation of this law, the corresponding Regulations of the University of Plovdiv "Paisii Hilendarski" and the specific requirements of the Faculty of Physics and Technology. The candidate submitted a sufficient number of scientific papers, published after the materials used in the competition for Associate Professor. There are original scientific and applied contributions in the works that have received international recognition, as a significant part of them have been published in journals and scientific proceedings, published monographs and books. Theoretical and methodological developments have practical applicability and are oriented towards the education of students in school and in university. The scientific and teaching qualification and experience of Assoc. Prof. Raykova is in the profile of the competition.

After getting acquainted with the materials and scientific works presented in the competition, analysis of their importance and the scientific, applied and applied contributions contained therein, I find it justifiable to give my **positive assessment and to propose to the Scientific Jury to prepare a report proposal to the Faculty Board of the Faculty of Physics and Technology for the selection of Assoc. Prof. Zhelyazka Dimitrova Raykova, PhD at the Academic Position "Professor" at the Plovdiv University "Paisii Hilendarski" in professional field 1.3. Pedagogy of education in... (Methodic of Physics).**

02.10. 2019

Reviewer: ..

/ Prof. Dr. Veska Ivanova Shivacheva /