REVIEW

by the Scientific Jury Member: Galin Borisov Tsokov, Ph.D.,
Professor at Plovdiv University "Paisii Hilendarski"
of the materials presented for participation in a competition
for holding the academic position of **'Professor' at Plovdiv University "Paisii Hilendarski"**
in the field of Higher Education 1. Education sciences;
professional field 1.3. Education in the scientific specialty Methods of teaching Physics, announced in the Official State Gazette, Issue No. 31 dated 12.04.2019 and on the website of
Plovdiv University "Paisii Hilendarski" for the needs of the Department of "Educational Technologies"
at the Faculty of Physics and Technology
The only candidate in the competition is Assoc. Prof. Zhelyazka Dimitrova Raykova, PhD

1. General Presentation of the Received Materials

By an Order of the Rector of Plovdiv University "Paisii Hilendarski" (the Plovdiv University) I have been appointed as a member of the Scientific Jury of a competition for holding the academic rank of 'Professor' at the Plovdiv University in the field of Higher Education 1. Education Sciences; professional field 1.3. Education in the scientific specialty Physics, announced in the Official State Gazette, Issue No. 31 dated 12.04.2019 and on the website of Plovdiv University "Paisii Hilendarski" for the needs of the Department of "Educational Technologies" at the Faculty of Physics and Technology. The following person has submitted documents for participation in the announced competition as the only candidate: Assoc. Prof. Zhelyazka Dimitrova Raykova, PhD.

The set of materials on paper presented by Assoc. Prof. Raykova is in compliance with the Internal rules and regulations of the development of academic staff of the Plovdiv University. The Candidate has enclosed the following for the purpose of participation in the competition: 55 scientific works: 1 Monograph, 8 books and educational materials, 46 articles, 7 of which published abroad, and 39 - in specialized educational journals – all of which reviewed. This scientific production has not been presented for the purpose of acquiring the academic degree of Associate Professor and the Educational and Scientific degree of "Doctor of Science". Therefore all 55 scientific works are accepted for review.

2. Brief Biographical Data of the Candidate

The only candidate in the competition for holding the academic position of Associate Professor - Raykova, PhD, was born in 1963. In 1985 she completed her higher education at Plovdiv University "Paisii Hilendarski" obtaining the degree "Master in Physics". In the period 1985-1987 the Candidate worked as a Teacher in Physics at "Geo Milev" Unified Secondary Polytechnic School, Radnevo, Region of Stara Zagora, and in 1987 held the position of a Teacher in Physics and Mathematics at "Knyaz Boris 1" Unified Secondary Polytechnic School, Assenovgrad. After winning a competition, in 1989 Assoc. Prof. Raykova started working as a full-time faculty teaching Physics at Plovdiv University "Paisii Hilendarski". Zhelyazka Raykova designed and in 2001 successfully defended her Ph.D. Thesis in the scientific specialty of ***Methods of Teaching Physics*** on the topic: "Study on the possibility for upgrading the knowledge in the Electroma-gnetic Phenomena of the

general mandatory minimum at the secondary school". In 2005, following a successful procedure of postdoctoral lecture qualification, she held the academic position of Associate
Professor. The academic career of the Candidate is also connected with holding various administrative positions, which Assoc. Prof. Raykova has held and is holding very successfully – Head of the Department of "Methods of Teaching Physics " (2008-2016), Deputy Dean of the Faculty of Physics (2008-2014), Dean of the Faculty of Physics (2014-2017), Head of the Department of "Educational Technologies" (2017- up to present), Deputy Dean of the Faculty of Physics and Technology (2019 – up to present).

3. General Characteristics of the Candidate's activity

Evaluation of the Candidate's teaching activity and preparation

Zhelyazka Raykova has rich pedagogical experience and 30-year teaching experience at Plovdiv University "Paisii Hilendarski". According to the presented documents, the required work load is present, as for the purpose of her participation in the advertised competition the Candidate has presented a reference from the Faculty of Physics and Technology of Plovdiv University "Paisii Hilendarski" regarding her working load, which was 638 hours in the academic year 2018/2019. The following facts evidence the high quality of the Candidate's teaching activity:

- the candidate has designed author's lecture courses in specialties in the Educational and Qualification Degree "Bachelor" and the Educational and Qualification Degree "Master"
- the candidate has taken part in the establishment of seven new specialties, namely: *Teacher in Engineering Disciplines (Master's Programme), Teacher in Physics (non-specialists) (Master's Programme), Teacher in Physics (specialists) (Master's Programme), Physics and English Language (Bachelor's Programme), Physics and Astronomy (Bachelor's Programme), Education in Physics (Master's Programme), Teacher in the subject "Man and Nature" (5. and 6.–grades) (Bachelor's Programme).*
- the candidate is a member of 17 scientific juries for defense of PhD Theses and for acquiring academic positions;
- the candidate has taken part as a member and head in 12 university, national and international educational and scientific projects;
- the candidate has done teaching mobility under the "Erasmus" and "Erasmus+" Programmes in Romania and Greece;
- the candidate is the Scientific advisor of a total of 4 Ph.D. students, both of whom with successfully defended theses;
- a member of a Commission at the Ministry of Education and Science for the execution of a National Plan for the application of a National Strategy for Development of Pedagogical Personnel (2014-2020);
- a member of a Commission at the Ministry of Education and Science for the execution of a Concept for teaching Physics and Astronomy in compliance with the new educational concept;

- Participation in a Group at the Ministry of Education and Science for the execution of Testing Tasks for the Examination Variants of the State school-leaving examination in Physics and Astronomy for the academic year 2010-2011.

I do believe that the pedagogical experience and the academic prestige of the Candidate in the scientific community and government institutions meet the criteria for holding the academic rank *Professor*, as adopted at Plovdiv University "Paisii Hilendarski".

Evaluation of the Candidate's research and applied work

Assoc. Prof. Raykova has applied for the advertised competition with 55 scientific works, namely: 1 Monograph, 8 books and teaching materials, 46 articles, 7 of which published abroad.

Assoc. Prof. Raykova has positive general characteristics of her research and applied work. The Candidate in the competition is the author of a number of significant scientific works in the field Methods of Teaching Physics.

The submitted Monograph entitled *"Modern Trends in Teaching Physics ", Paisii Hilendarski University Publishing House, 2016, ISBN 978-619-202-441-3* presents a significant scientific study, the main purpose of which is to reveal the contemporary condition and some of the topical trends in methods of teaching physics in secondary schools. Thus Assoc. Prof. Raykova has focused her scientific efforts at clarification of the topics of the constructivism paradigm in methods of teaching physics and its application in Bulgarian schools, of the natural science literacy, as a topical trend in the study of Science (NST) –in the modern school. The issues thus outlined are quite topical and significant not only in regards to the theory of education and teaching methods, but also have their own projections concerning the current condition of the Bulgarian educational system. This is so due to the fact that the issues connected with the application of the research approach and learning by doing (hands-on approach) are some of the most important ones regarding the possibilities for modernization of the process of instruction in Bulgarian schools. In view of the above, the topic developed by the author is characterized with a very high scientific value – both in theoretical and practical perspective. As a whole, the Monograph makes points with its positive characteristics and contribution parts, which may be summarized as follows:

1. Significance and relevance of the problem developed in work

2. The author's achievement is characterized with the objective presentation of the new possibilities for enriching the theory and practice of teaching Physics, through the description of results from research carried out by the author and sharing of good practices from her experience.

3. From a theoretical point of view, there is a complex analysis made of the Constructivist Theory in Pedagogy and its application in teaching Physics in particular.

4. There is a serious research made on the topic of the natural science literacy, including the points of view of scientific methodology and philosophy. The presentation of this topic in the book is consistent with Teaching Physics in secondary schools at present.

The most important emphases in the books and teaching materials presented by Assoc. Prof. Raykova are as follows:

• *Raykova, Zh., (2008). Development Procedural Skills in Science Education – Constructivist Approach, Plovdiv University Press, Plovdiv, ISBN 978-954-423-483-6.*

The book is both in English and Bulgarian language, thus providing an opportunity to address foreign students taking part in the exchange under the "Erasmus" Programme. The main purpose is to support the holding of classes by applying constructivism methods and to efficiently organize the independent work of students.

• *EU TRAIN towards a Common Curriculum for the Teaching Practice of Science Teachers, ed. by Lampiselka, J. Raykova, Zh. (2008). Plovdiv University press, Plovdiv, ISBN 978-954-451-5*

The book contains a description of the systems of carrying out a pedagogical practice of students, future teachers in Physics and Chemistry in Finland, Poland, Estonia, and Bulgaria. There is a comparison of the systems for organization and holding of the pedagogical practice at universities

- *Raykova, Zh. (2014). Guide on Teaching Methods for Solving Physics Tasks, "Paisii Hilendarski" University Publishing House, Plovdiv, ISBN: 978-954-423-930-5.*

The book represents a teaching material for the course " Methods of teaching how to solve Physics Tasks." There is consideration of the structure of the lesson for solving *Physics Tasks* and their classification, algorithms for solving different types of physics tasks.

- *Raykova, Zh. (2017). Guide on Teaching Methods for Solving Physics Tasks, Part Two, "Paisii Hilendarski" University Publishing House, Plovdiv, ISBN 978-619-202-221-1*.

The Guide is Part Two of the teaching material described above on the methods of teaching how to solve Physics Tasks. There are tackles tasks from the Sections "Mechanical Vibrations and Waves", "Magnetic Field", "Optics", "Atomic and Nuclear Physics".

The main scientific and research emphases in the articles in scientific magazines, scientific-methodical magazines and collections of articles are as follows:

- Research and development connected with the grounding of a didactic model for the use of the technology "Augmented Reality (AR)" via mobile devices in teaching Physics;
- Research and development connected with the application of the research approach in the context of the formal and informal training in Physics;
- Research and development connected with the grounding of a model of learning mechanical vibrations and waves in secondary schools;
- Works connected with the Integrative Approach in Teaching Physics and some modern methods of teaching and assessment;
- Works connected with the development of the integral approach in learning Physics and the philosophy of the formation of natural science literacy.

As a whole, research and applied works in the field of Methods of Teaching Physics presented by Assoc. Prof. Raykova may be highly ranked.

Main scientific and applied contributions and citations

The contributions of Assoc. Prof. Raykova may be reduced to the following:

A. Theoretical Contributions

- There is a complex analysis made of the modern trends in the teaching of Physics at school connected with constructivism, active learning and formation of procedural skills, reasonable use of the Information and Communication Technologies in Teaching Physics;
- There is clarification made on the contents and specifics of the issue about the formation of natural science literacy in Teaching Physics by making recommendations regarding strategies for its improvement at the Bulgarian school;
- Presented are works of the research approach to build motivation in students to study Natural Sciences (NST);
- Presented is a study on the issue of adapting the learning process in Physics to the contemporary technological requirements and capacities by reasonably applying the latest Information and Communication Technologies.

B. Scientific and Applied Contributions

- There is a proposal made for specific solutions upon preparing syllabi, tests and a learning and testing programme for the State school-leaving examinations in Physics and Astronomy;
- There is a model developed for the preparation of online Physics Training Courses;
- There are electronic courses and training materials developed in separate academic disciplines in support of the academic preparation of future Teachers in Physics.

In support of the present overall assessment of the scientific contributions, we may also point out the fact that works by Assoc. Prof. Raykova have been specified as significant and cited in a number of issues – Monographs, textbooks, articles, and teaching materials. There are 32 established citations and references on works, 19 of which are in another language.

4. Assessmnent of the Candidate's Personal Contribution

There is the undoubtful significance of the scientific and scientifically applied contributions of the presented works of the Candidate for the competition for "Professor" - Assoc. Prof. Zhelyazka Raykova, PhD. A great part of her works are a very good combination of an analysis of the new and classic principles and approaches in Methods of Teaching Physics, thus making her works distinguished in the pedagogical community /lecturers, researchers, teachers and students – future teachers/ in Bulgaria and abroad. The Monograph entitled "Modern Trends in Teaching Physics " is a serious study of a very high scientific value – both from a theoretical a scientific point of view.

5. Critical Notes and Recommendations

There are some recommendations that could be made concerning the scientific and teaching activity of the Candidate, namely:

- In her future researches the Candidate could develop – based on the constructivist approach of teaching, an overall model of efficient teaching of STEM at the Bulgarian school.

- Assoc. Prof. Raykova is to focus her scientific and research efforts even more on the issue of realizing modern training in Natural Sciences (NST) in primary education.

6. Personal Impressions

My personal impressions are based on the researched and presented scientific materials for the Candidate's activity, as well as on my professional acquaintance of many years with Assoc. Prof. Raykova. Based on these impressions, I may state that the scientific, teaching and administrative activity of the Candidate are well-known and well-accepted both in Bulgaria and abroad. She is a professor abiding by the modern trends in training and striving at high quality of the methodological preparation of future teachers at the Bulgarian school. In her capacity as a scientist and researcher, Raykova has always abided by high scientific criteria as evidenced not only by her scientific work, but also by her participation in scientific and research projects. Assoc. Prof. Raykova has organized and participated in a number of national and international educational and scientific-research conferences. The Candidate has a very successful administrative career.

CONCLUSION

The documents and materials presented by Assoc. Prof. Zhelyazka Dimitrova Raykova, Ph.D. meet all requirements of the Development of the Academic Staff Act of the Republic of Bulgaria, the Regulation on the application of the Development of the Academic Staff Act of the Republic of Bulgaria, and the respective Regulations of Plovdiv University "Paisii Hilendarski". She has presented a sufficient number of high-quality scientific works published after the materials used upon holding the scientific position of Associate Professor. The Candidate's works are characterized with original scientific applied contributions, subject to national recognition. The theoretical works have practical applicability, as a part of them are directly oriented at instruction. The scientific and teaching qualification of Assoc. Prof. Zhelyazka Dimitrova Raykova, is beyond any doubt.

The Candidate in the competition fulfills the respective minimum national requirements for holding the academic rank of "Associate Professor". I have no doubt about any plagiarism found in the scientific publications presented for review.

Upon getting acquainted with the materials and scientific works presented in the competition, an analysis of their significance and the scientific and applied contributions contained in them, I find it well-grounded that I make my **positive conclusion** and recommend to the Scientific Jury to prepare a Report-Proposal to the Faculty's Council of the Faculty of Physics and Technology for the election of Assoc. Prof. Zhelyazka Dimitrova Raykova, PhD, for holding the academic rank 'Professor' at Plovdiv University "Paisii Hilendarski" in the professional field of 1.3. Education in the scientific specialty of Methods of teaching Physics.

05.10. 2019

Reviewer:

/Prof. Galin Tsokov, Ph.D./