

REVIEW

on a competition for the occupation of an academic position "Professor" in the scientific specialty of Informatics and Computer Science (Information Technologies), for the needs of Faculty of Mathematics and Informatics (FMI), Sofia University "St. Kliment Ohridski" (SU), declared in the State Gazette no. 74 of 21 August 2020 and on the websites of FMI and SU

**by Prof. Radoslav Dimov Pavlov
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Applicant: The only candidate for the academic position Assoc. Prof. Dr. Eliza Petrova Stefanova, FMI, SU.

This review is in accordance with the order of the Rector No. RD 38-496/19.10.2020 for the members of the jury for the present competition, and the decision of the scientific jury from 26.10.2020. It is made according to the Act for the Development of the Academic Staff in the Republic of Bulgaria, the Rules for its implementation and the rules on the Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at Sofia University "St. Kliment Ohridski".

As a member of the scientific jury, I have received all the required administrative and scientific documents from the candidate:

- an application for admission to the competition;
- a curriculum vitae;
- a diploma for educational and scientific degree "Doctor";
- a reference for completing the national minimum requirements;
- documents, certifying the fulfillment of the requirements of Art. 80, Art. 81 (para. 2 and para. 3) and Art. 84 (para. 2) of the Rules, regarding an undergraduate teaching load, publications of study materials, work with students, work on curricula, participation in research projects;
- a reference for original scientific contributions with the relevant evidence attached;
- a certificate for an internship in the field;
- an extensive list of scientific publications;
- a list of scientific publication relevant to the competition;
- a reference to the original scientific contributions in the publications; a list of quotations;
- the complete publications relevant for participation in the competition;
- other supplementary materials.

The submitted documents from the applicant comply with the requirements of ЗРАСРБ, ППЗРАСРБ and Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions "Professor" at Sofia University "St. Kliment Ohridski".

1. General principles and biographical information

Eliza Petrova Stefanova graduated in 1991 the Faculty of Mathematics and Informatics at Sofia University "Kl. Ohridski" as a master in Informatics and Computer Science. In 2012 she defended a dissertation on "Open virtual worlds for professional growth" and received the degree of "Doctor" in Professional field 4.6 Informatics and Computer Science, specialty "Informatics". Since 1999 she has been working at the Faculty of Mathematics and Informatics at Sofia University. Since 2014 he has been an associate professor of informatics (Information and communication technologies in education) at the Faculty of Science at Sofia University "Kl. Ohridski". Since 2015 he has been the Vice-Rector of Sofia University "Kl. Ohridski".

2. General characteristics of the scientific, applied and academic activity of the candidate

As part of his application for the competition, Assoc. Prof. Dr. Eliza Petrova Stefanova has presented the 21 publications, 12 of which are indexed in Scopus (7 have SJR), and 12 are indexed in Web of Science. Relevant evidence is provided for all referenced publications. All presented scientific publications are in Professional field: 4.6 Informatics and Computer Science (Information Technologies).

All are published after taking the academic position of "Associate Professor" and obtaining the educational and scientific degree "Doctor" and significantly exceed the minimum national requirements (Act for the Development of the Academic Staff in the Republic of Bulgaria, para. 2) for the total number of points on the respective indicators. The presented publications fully satisfy the additional requirements of Sofia University "Kl. Ohridski" for holding the academic position of "Professor" for the respective scientific field. Thus, the candidate meets all the minimum requirements for the academic position "Professor", as set by Act for the Development of the Academic Staff in the Republic of Bulgaria, the Rules for its implementation and Rules, Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions "Professor" at Sofia University "St. Kliment Ohridski". As already noted, they are published in the world-famous databases for scientific information Scopus, Web of Science.

The total number of scientific publications is 150, of which 26 textbooks and teaching materials. In all impact-rated publications, 16 are indexed in Web of Science and 37 in Scopus, 55 were cited 210 times, 26 are cited in 90 publications indexed in Web of Science and Scopus, 17 are in journals, 107 - in conference proceedings, of which 80 publications in proceedings of international conferences.

Eliza Stefanova's teaching activity is at the Faculty of Mathematics and Informatics Sofia University "Kl. Ohridski" and has the necessary and documented general internship in the specialty and a guaranteed amount of teaching for the academic position of "Professor" at Sofia University "Kl. Ohridski". A detailed report on the indicators under Art. 122, para. 2 of the Rules of the Sofia University "Kl. Ohridski", which shows that the applicant is a lecturer in 9-16 courses, in bachelor's and master's programs, full-time and part-time education, 4 of which are required and 5 are elective.

Eliza Stefanova is the author of a number of teaching materials, textbooks and manuals for higher and secondary education. She is a supervisor of 5 PhD students, one current, one defended and 3 expelled with the right to defend. She is a head of 45 successfully defended graduates. She has been involved in a number of educational and scientific projects - 10 international and 12 national.

3. Evaluation of the scientific and practical results and contributions in the submitted publications

Eliza Stefanova has presented a detailed authorship on the scientific and applied results obtained in the publications submitted for participation in the competition. It accurately reflects the scientific achievements and practical results of the publications. The results of the publications are structured in the following three fields:

- application of ICT in education (methods of training based on competencies, new methods for assessing learning, application of virtual reality in education, application of web services in education).
- analysis of data sets in education (collection and analysis of large data sets in training systems, methods and tools for analysis and processing of large data sets).
- training of teachers for application of inquiry-based learning (IBL) (methods and models for application of scientific approach in education, methods and approaches for training of teachers for application of IBL, pilot experiments for implementation of IBL in Bulgarian schools).

The presented scientific publications are related to the implementation of several successful European research projects:

- FP7-ICT-2011-8-318499 weSPOT: Working Environment with Social and Personal Open Tools for inquiry based learning (2013-2015)
- 2016-1-E101-KA201-023647-ELITe: Enhancing Learning In Teaching via e-inquiries (2016-2019)
- 2019-1-TR01-KA203-074482 CATCH-21: 21st Century Skills: Changing the Approach to Teaching in Higher Education (2019-2021)

In the first field "Application of ICT in education (methods of training based on competencies, new methods for assessing learning, application of virtual reality in education, application of web services in education)" articles with numbers 3, 4, 7, 9, 10, 12, 13, 14, 16, 20 are included.

A new method, prototype and architecture for service composition platform, that should support education, has been developed (9, 20).

An application model of the "Flipped classroom" is developed. It includes active use of e-learning environment is presented as the focus is on the application of inclusive education knowledge in mathematics, informatics and information technologies (14).

Virtual Reality (VR) technology is developing very actively last few years. VR devices are more and more accessible, affordable and recognizable by youngsters in school and university. A methodology and 8 scenarios for the application of virtual reality technology in education have been created (16, 18). Paper (18) presents several possible applications of VR technologies in class, which expects new, enriched IBL process, provides new possibilities for collecting data for learning process, and analyzing data, make the process more effective.

Paper (4) presents a research aiming to design and develop a new Learning Analytics (LA) solution which uses the existing LMS as distributed systems and storages of data through user-oriented services. It integrates the best features from LA and data visualization applications, from service composition platforms empower users to build complex business processes. The paper describes the new approach and functionalities of this solution and ends with some challenges and conclusions.

In the second field "Analysis of data sets in education (collection and analysis of large data sets in training systems, methods and tools for analysis and processing of large data sets) - articles with numbers 4, 5, 6, 8 are included. Articles (4, 6) explore how the learning analysis methods (e-Analytics) can be used to improve e-learning outcomes. The new method for collecting data from multiple systems is implemented in a newly designed e-Analytics system.

Article (8) presents a research done during a pilot of the inquiry-based learning model and by the means of European project *Working Environment with Social and Personal Open Tools*. The focus is put on approbation of available data analytics methods supporting young researchers in their desktop and mobile activities. Results and analysis are discussed, recommendations for the system improvement are given. Different methods for data visualization based on specific analyzes are proposed in article (5).

In the third field "Training of teachers for application of inquiry-based learning (IBL) (methods and models for application of scientific approach in education, methods and approaches for training of teachers for application of IBL, pilot experiments for implementation of IBL in Bulgarian schools)" - articles with numbers 1, 2, 3, 4, 8, 11, 15, 17 18, 19, 21 are included.

Article (1) presents the implementation of an IBL scenario for teachers' competence development aiming to overcome students' and their parents prejudice for

scientists and scientist's profession, and to encourage them to get interested in STEM career.

In paper (2) it has been applied modern methods and tools for teaching and learning science, technology, engineering and mathematics (STEM) by combining traditional tools (paper star maps), inquiry- based learning platform (DojoIBL system), virtual reality (Google Cardboard glasses), and interactive tool (interactive white board).

Paper (17) presents a scenario, named "Neither seen nor heard, but succeed /researchers with special educational needs (SEN) in school/", which aims to apply the research approach in the education of disadvantaged children. The scenario has been successfully implemented in schools and is successfully applied in the learning process for the training of future teachers.

Articles (11, 19) have validated STEM methods and practices.

The results shown are up-to-date and in fields, related to the contemporary developments in information technologies and their applications in e-learning practices. They completely meet the requirements of the competition for the academic position "Professor" at Sofia University "St. Kliment Ohridski".

I have many positive impressions from the research and teaching work of Eliza Stefanova, as well as from her scientific and administrative work. It should be noted her high research and publishing activity in prestigious publications and their relevance to the social needs.

4. Comments and recommendations

I have no remarks and recommendations.

5. Conclusions

Based on the comments above, concerning the submitted materials, scientific publications, their significance, and the scientific and practical contributions they offer, and the candidate's academic activity and work with students, it is my opinion that Associate Professor Eliza Petrova Stefanova, PhD satisfies all the requirements of ЗРАСРБ, ППЗРАСРБ and Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions "Professor" at Sofia University "St. Kliment Ohridski" in the professional field 4.6 Informatics and Computer Science (Information technologies). **I give a positive assessment** of the candidate. **I recommend** that the scientific jury propose to the competent body for the selection of the Faculty of Mathematics and Informatics at Sofia University "St. Kliment Ohridski" to choose Assoc. Prof. Eliza Petrova Stefanova to take the academic position of "Professor" in the professional field of 4.6 Informatics and Computer Science (Information technologies).

24.11.2020
Sofia

Reviewer:
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