Review

**on a competition for the academic position "Professor"
professional field 4.6 "Informatics and Computer Science", specialty "Informatics"
with Candidate Assoc. Prof. Elena Petrova Somova PhD**

Reviewer: Prof. Radoslav D. Yoshinov, PhD.

In connection with the competition procedure at The Paisii Hilendarski University for the academic position "Professor" announced in the State University of 99/20.11.2020 by: Field of Higher Education 4. Natural Sciences, Mathematics and Informatics, Professional Department 4.6. Informatics and Computer Science (Informatics) and Order of the Rector of the General School - P33-74/12.01.2021 and in accordance with Article 4 of the Law on the Development of Academic Staff in the Republic of Bulgaria, Decree No26 of 19 February 2019, the Regulations on the Specific Conditions for Academic Position at Paisii Hilendarski University, I am appointed as a member of the scientific jury.

For participation in the competition for the academic position **"Professor"** professionally 4.6 "Informatics and Computer Science", specialty "Informatics" has submitted documents the candidate Dr. Elena Petrova Somova from the Plovdiv University “Paisii Hilendarski”.

As a member of the Scientific Jury, I have received:

1. Order of the Rector of the Pup - P33-74/12.01.2021;
2. Rules of Procedure for acquiring scientific degrees and for holding academic positions in the PU from 10.06.2019.
3. Copy of a Master's degree in Mathematics with a degree in Informatics from 10.07.1995;
4. Copy of the diploma of scientific and educational degree "Doctor" from 24.07.2003;
5. Copy of associate professor's degree from 03.01.2008;
6. Certificate of service;
7. Creative CV;
8. Declaration of originality and reliability;
9. List of all publications of Elena Petrova Somova;
10. List of the publications presented for the competition by Elena Petrova Somova;
11. Author's reference of Elena Petrova Somova;

12. List of quotes of Elena Petrova Somova;
13. Publications;
14. Additional documents

Note: all required documents in the competition were provided in electronic form
to https://drive.google.com/drive/folders/1CaDd53_xt5BmZw7yGqA0ZdWcEMwyW5DF

I have been selected as a reviewer under the procedure on the first meeting of the scientific jury.

According **to the Law on the Development of Academic Staff in the Republic of Bulgaria (LDASRB) of Art. 29(1)2,** the Rules of Application of the LDASRB, the Rules of Procedure for the acquisition of scientific degrees and for the holding of academic positions in the PU (PRASPU), as last amended by decision of the AC of the PU of 10.06.2019, candidates for the academic position "Professor" must meet the requirements described in Art. 76. (1) (amend. – 20.10.2014, Amend. – 15.10.2018) by the PRASPU, as well as the additional requirements adopted at a meeting of the Faculty Council of the Faculty of Mathematics and Informatics at Plovdiv University "Paisii Hilendarski", held on 14.11.2018 (Protocol No 34 of 14.11.2018) .

1. to meet the relevant minimum national requirements and additional faculty requirements;
2. have acquired a Doctor's OFFICE, as for specialties from regulated professions, it shall be of the same specialty;
3. have held the academic position of associate professor at the University or at another higher school or scientific organization for at least five academic years, or
4. not less than five years:

(a) have been lecturers, including honorees, or members of a research team at the University or at another higher school or scientific organization, or
(b) have pursued artistic activity, or
(c) have been specialists in practice and have proven track record in their field;

5. have submitted published monographic work and/or equivalent publications in specialized scientific publications (including their citations) or evidence of relevant artistic achievements in the field of the arts;
6. have submitted other original research papers, publications, inventions and other scientific and applied developments or artistic achievements which are assessed as a whole;
7. there must be no statutory plagiarism in scientific papers.

31 (2) (new - 20.06.2011) The materials under para. 1, item 4 and item 5 should not repeat others with which the applicant has participated in successful

procedures for acquiring the ONS "Doctor" and the National Doctor of Sciences and for holding the academic positions of "Chief Assistant" and "Associate Professor" – regardless of which scientific organization this has happened, as well as for holding an academic position "Professor" at the University.
(3) If applicants have not held the academic position of associate professor, they should
present another published monographic work or equivalent publications in specialized scientific publications or relevant evidence of artistic achievements in the field of the arts, which do not repeat
"Doctor of Science" and "Doctor of Science" presented for the acquisition of the NSA.
(4) (amend. – 15.10.2018) The faculties of the University shall have the right to lay down additional requirements, which shall be accepted on the FS and shall be deposited in the
Department. In determining the additional requirements, the faculties take into account the established indicators for evaluation and financing of the scientific and artistic activity of the state higher schools, as well as the indicators from the rating system of higher schools in Bulgaria.
The candidate Elena Somova has held the doctorate degree since 2003, as well as has held the position of Associate Professor at the University of Plovdiv since 2008.
According to the certificate of service issued by the University of Education, the candidate Elena Somova has an internship in the position of "Associate Professor" - 13 years, and has acquired the educational and scientific degree "Doctor" more than 18 years ago.
Table showing compliance by points of the requirements of the
Minimum required points by group of indicators for academic position "Professor" and their respective performance by the candidate Assoc. Prof. Dr. Elena Somova:

Ass.p. Dr. Elena Somova for compliance with the National Minimum Requirements for the acquisition of the academic position "Professor" under 4.6. Informatics and Computer Science			
Scoreboard of indicators	Required number of points	Indicator	Points
And	**50**		**50**
		A1. Dissertation on the award of educational and scientific degree "Doctor" (50 t.)	***50***
In	**100**		***162***

		B4. Rehabilitation work - scientific publications in publications that are referenced and indexed in world-famous databases of scientific information (Web of Science and Scopus)	***162***
D	**200**		***279***
		G7. Scientific publication in publications that are referenced and indexed in world-famous databases of scientific information (Web of Science and Scopus), outside of habilitation work	***204***
		G8. Published chapter of a book or collective monograph	***75***
E	**100**		***200***
		D11. Citations in scientific publications, monographs, collective volumes and patents referenced and indexed in world-renowned databases of scientific information (Web of Science and Scopus)	***200***
Is	**100**		**1209.88**
		E13. Guidance of a successful PhD student	**75**
		E14. Participation in a national scientific or educational project	***100***
		E15. Participation in an international scientific or educational project	***200***
		E17. Leadership of the Bulgarian team in an international scientific or educational project	***800***
		E18. Borrowings for projects led by the applicant	***21.55***
		E19. Published university textbook or textbook to be used in the school network	***13.33***
		Total	**1900.88**

All this proves that the candidate Elena Somova fulfills (exceeds) all the requirements of Art. 29(1)1 of the ERASBR, as well as all the requirements of Art. 76 of the PRASPU, with the included additional requirements of the FMI for participation in the competition.

Short biographical data about the candidate.

The candidate Elena Somova holds a Master's degree in Mathematics Specialty Informatics from Plovdiv University "Paisii Hilendarski". She worked at plovdiv University of basic employment contract with order No RD4-21/10.01.1996. as a

lecturer in the Department of Computer Informatics at the Faculty of Mathematics and Informatics and continues to work there and now.

The user profile of the applicant, Assoc.prof. Elena Somova has an index of 7.57 in Research Gate, (H-index 3), which indicates that she is an established scientist with international visibility.

General description of the presented materials of the competition.

The candidate Elena Somova has provided a complete list of 75 publications, and for the competition 45 scientific publications, participation in the writing of chapters in 5 books, 1 textbook and 12 e-courses in an e-learning environment.

The materials submitted by the candidate for the competition are as follows:

45 publications (+ 6 additional), with a minimum requirement for 25 publications;

Publications in magazines or in collections of international conferences – presented 37 with a minimum of 15 required. It's noticed. - They're on a separate list.

Publications in magazines – 25 publications are presented with a minimum of 10 required. It's noticed. - They're on a separate list.

Participation in 5 monographs and 1 textbook with minimum required 1 textbook or teaching aid is presented

He is the scientific leader of 1.5 protected PhD students when requiring at least 1 protected PhD student in FMI at the University of California, D.I.

Presented: 25 of the publications are in journals, 9 of which are indexed in web of Science and/or SCOPUS (of which 3 with SJR), with a minimum requirement for 10 publications in journals;

Evidence has been submitted of 125 citations (26 in publications indexed on the Web of Science, Scopus, ACM), of which 3 with SJR, with a minimum of 20 citations required;

Projects – proof of participation in 36 projects, more than 10 of which the applicant was a leader, was presented.

The candidate is a participant in program and organizational committees of scientific events (20), has given lectures on invitation to 6 universities, as well as reports in international and national scientific forums (56), participates in the editorial of a scientific edition, is a reviewer in more than 10 scientific journals. She's training three PhD students.

The submitted materials for the competition do not repeat others used in the procedures for acquiring an educational and scientific degree "Doctor" and for holding academic positions "Chief Assistant" and "Associate Professor". I have not noticed plagiarism in the materials.

Scientific results and contributions.

According to its content, the scientific papers submitted for participation in the competition can be classified in the following scientific fields:

I. *Technologies, models and systems for e-learning* – 18 scientific publications and 3 monographs;

II. *Models and systems for learning –* 7 scientific publications;

III. *Mobile* learning **technologies** – 7 scientific publications;

IV. *Automated generation of metadata for digital documents and artifacts* – 7 scientific publications and 2 monographs;

V. *Textbooks and teaching aids – 1 textbook.*

In topic - I. TECHNOLOGIES, MODELS AND SYSTEMS FOR E-LEARNING, One part of the presented studies in this section are a continuation of the work of the author of the doctoral thesis related to the development of e-learning (e-learning).

This strand covers - E-learning in the information society, presented through the monographs [9, 21, 22], where a systematic presentation of the field of e-learning and distance learning has been carried out, as well as the sub-directions - conduct and methodology of e-learning [1, 5, 18, 25, 29, 33]; e-learning and e-assessment systems [3, 19, 23, 27, 42, 44]; administration systems[11, 12, 14, 15, 28] ;

In topic - II. TRAINING GAME MODELS AND SYSTEMS

This strand covers the use of the elements and techniques of electronic games by all groups of learners by applying the game methodology for learning purposes to achieve higher motivation in learners and includes publications [24, 26, 30, 31, 37, 40, 43].

In topic - III. MOBILE LEARNING TECHNOLOGIES

This strand covers the use of a centralized platform environment to a variety of elements to support and enrich interactions between learners and training materials and includes publications [20, 32, 34, 35, 36, 38, 41] .

In topic - IV. AUTOMATED METADATA GENERATION FOR DIGITAL DOCUMENTS AND ARTIFACTS

This strand covers - specifications and standards in the e-learning and digitization of cultural and historical heritage and includes publications [2, 4, 7, 8, 13, 16, 39]; This section presents contributions using standards in the field of training, e-learning and scientific publication.

In topic – V Textbooks is presented a textbook on object-oriented design and programming (with examples of C#) [45]

The five strands examined can outline the following main contributions, which we can divide into approaches, models and methods:

Approaches have **been proposed** to:

- playing in a traditional e-learning environment using appropriate elements and techniques from e-games; [24, 26, 30, 31, 37, 40]
- creating, accompanying and tracking interactive learning activities in an independent mobile environment based on the xAPI standard; [32, 34, 38, 41]
- invariant teaching and learning of computer programming, regardless of the specific programming language; [19, 23, 27]
- automatic generation of multiple different test questions from one accumulating test question; [3]
- creating mobile games to support the training of students in mathematics in primary school based on a variety of game types and with a game-based methodology applied; [36]
- standardization of e-learning in Bulgaria by creating an integrated national information environment for e-learning and automated creation of digital repositories based on standards, specifications and e-learning models; [2]
- ensuring interoperability of a specific university information system with relevant European standards; [4]
- carrying out portability of museum metadata to Europeana by selecting and matching metadata in order to create a regional aggregator; [7, 10, 16]
- description and publication of scientific content based on structured data (metadata of relevant standards) to increase the visibility of scientific articles published on the Web through social media integration; [39]
- development of green software for mobile devices by localization of mobile applications; [35]
- ensuring noSQL database protection by encrypting and configuring services; [28]

Models **of:**

- the process of playing e-learning based on game elements, techniques and actions from e-games that are suitable for e-learning; [24, 26, 30, 31, 37, 40]

- the process of tracking interactive learning activities carried out in different educational environments, based on the xAPI standard; [32, 34, 38, 41]
- e-learning (incl. training course) based on information and evaluation units and logical links between them; [9, 21]

Methodologies **are proposed** for:

- creating a game-playing e-course from any subject area in an e-learning environment (including according to the learners' game type); [24, 26, 30, 31, 37, 40]
- face-to-face co-training supported by a cloud environment; [43]
- collaborative and project-based e-learning based on the diverse and controlled engagement of learners throughout the learning process by using a variety of learning resources and activities in an e-learning environment; [18, 25, 29]
- classification of syslog messages based on message classification rules in a tree hierarchy of regular expressions; [12, 17]
- Classifications have been made, in order to implement the relevant systems, of:
- the basic template algorithms (invariant) that are taught during computer programming training; [19, 23, 27]
- the game types suitable for mobile realization and mathematics training in primary school; [36]
- the main types of accumulating test questions to automatically generate multiple different test questions from them; [3]

The reviewer accepts these contributions as formulated.

The presented materials reflect designed and realized tools, systems and visualizations - panoramic and 3D.

- tools (plugins) for playing a course in an e-learning environment by achieving a game view and using specific game elements; [24, 26, 30, 31, 37, 40]
- tool (plugin) for automatic creation (from e-course) of an interactive e-book in EPUB format to accompany and track interactive learning activities, regardless of the learning environment used; [32, 34, 38, 41]
- an invariable programming training system involving tasks from different cognitive levels of Bloom taxonomy; [19, 23, 27]

- e-learning environment based on information and evaluation units and logical links between them; [9, 22]
- S-Syslog system (server application, web-based application and RESTful API for communication between them), as well as cloud-based CloudLog system for working with logs from multiple sources using syslog protocol, based on syslog message classification methodology; [12, 17]
- a system accompanying the process of administration of bachelor's or master's thesis based on a system for modeling business processes; [14, 15]
- a system for administering electable courses at different stages of their existence; [11]
- a system implementing metadata retrieval from photo image files in order to find information about the content and context of raster images; [6, 10]
- two virtual walks of the Ethnographic Museum in Sofia Plovdiv – panoramic and 3D, as well as a 3D model of the museum; [8, 13, 16]

Experiments **and analyses of the results obtained have been** carried out, demonstrating the applicability of the proposed approaches, methods and methodologies, from:

- game training in an e-learning environment with and without the use of realized plugins for gaming, as well as in traditional face-to-face training supported by a cloud environment; [30, 40, 43]
- training through interactive e-book and m-learning supported by cloud technologies; [20, 41]
- joint and project-based e-learning; [18, 29]
- pilot e-trainings with different e-courses. [1, 5]

A textbook on object-oriented programming is presented in heading five. On this topic also fall the presented chapters of monographs.

Audience employment, participation in scientific projects and in the organization of scientific forums

As associate professor and head of the Department of Computer Informatics, Dr.Elena Somova performs her auditorium and non-audience employment over the assigned annual normative, lectures in the field of informatics and information technology in master's programs.

The candidate is a participant in international, national and university projects in the field of information technology, distance learning, the creation of software

platforms for distance learning, virtual training courses, etc. Coordinator of international educational projects for comparability, comprehensibility, correctness and sustainability of the software. Coordinator of an international program for the exchange of teachers and students in an Informatics network for more than 14 years

Critical notes.

It makes an impression on the very good organization and good quality of the candidate's materials, both as content and as shaping. The reviewer noticed only some minor technical inconsistencies and spelling errors. All this does not diminish the large volume of research, scientific and scientific practical work of the candidate, shaping him as an established scientist.

Makes a pleasant impression of the relatively high quote ability in indexed publications. The reviewer accepts the distribution of publications thus made on the five thematic strands presented by the applicant, although they flow into each other and no clear boundary can be drawn between them. It would be good to show the impact of these posts on more than one strand, as seen in their reading. This would show the interaction of the thematic strands presented in their dynamics and would more focus on the theme of the competition.

It is clear from the submitted documents that the applicant has already proven his/her teamwork opportunities (participant in international, national and university projects and collectives, of nearly a third of whom, as a leader).

Conclusion

The requirements, conditions and criteria of the Law on the Development of Academic Staff in the Republic of Bulgaria (LDASRB), the Rules for Implementation of the LDASRB and the Rules of Procedure for acquiring scientific degrees and for holding academic positions at Plovdiv University "Paisii Hilendarski" are fulfilled and I give a strongly positive conclusion for the selection of Assoc. prof. Dr. Elena Petrova Somova on competition for "Professor" in professional field 4.6. Informatics and Computer Science.

By expressing a positive opinion on the presented materials, I propose that the honorable Scientific Jury unanimously vote on a proposal to the Faculty Council of the FMI of the University of Plovdiv to elect Assoc. prof. Elena Petrova Somova PhD for the academic position "Professor" in professional field 4.6 "Informatics and Computer Science", specialty "Informatics"

05.03.2021 Reviewer:

Radoslav Yoshinov