# REVIEW

**by Prof. Galina Bogdanova-Todorova, PhD**
**Institute of Mathematics and Informatics, Bulgarian Academy of Sciences**

**on the competition for the academic position of "Associate Professor"**
**at the Institute of Mathematics and Informatics, Bulgarian Academy of Sciences**
**Area of higher education: 4. Natural Sciences, Mathematics and Informatics**
**Professional field: 4.6 Informatics and Computer Science**
**Scientific speciality: Informatics (Adaptive Educational Software Systems)**

This review has been prepared based on Order No. 88/08.09.2026 of the Director of the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences (IMI–BAS) and in accordance with the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for the Implementation of the LDASRB (RILDASRB) and the Rules for the Conditions and Procedures for Acquiring Academic Degrees and Holding Academic Positions at IMI–BAS (IMI–BAS Rules), regarding the competition announced for the academic position of "Associate Professor" for the needs of the Section "Software Technologies and Information Systems" (SofTIS) at IMI–BAS. Under this order, I was appointed a member of the scientific jury, and at the first meeting of the scientific jury, as per Protocol No. 1 (30.09.2026), I was elected as a reviewer.

## 1. General presentation of the competition, the materials received and the candidate

The competition for the academic position of "Associate Professor" in the area of higher education 4, professional field 4.6 and scientific speciality "Informatics" (Adaptive Educational Software Systems) was announced in the State Gazette, issue 63/10.07.2026, and on the IMI–BAS website. A single candidate, Dr Dessislava Dakova Vassileva, submitted documents for participation in the competition.

As a member of the scientific jury, I received the necessary administrative and scientific documents of the candidate in electronic form: an application to the Director of IMI–BAS for admission to the competition; a professional CV in European format; a copy of the higher education diploma (Master's degree); a copy of the diploma for the acquired educational and scientific degree of PhD; a general list of publications, inventions, and other scientific-applied research results; a list of publications submitted for participation in the competition; a hand-signed statement of the original scientific contributions in the works submitted for the competition; abstracts of the publications for the competition in Bulgarian and English; copies of the works and utility models submitted for the competition; a general list of citations; a list of citations for the competition; a copy of the State Gazette with the announcement of the competition; a certificate of professional experience in accordance with Art. 24, para. 1, point (2) of the LDASRB; a statement in the prescribed form on the fulfilment of the minimum national requirements under Art. 2b, paras. 2 and 3 and the requirements under Art. 2b, para. 5 of the LDASRB, as well as the minimum requirements of IMI–BAS; a declaration in the prescribed form; a declaration of consent to the storage and processing of personal data; and other documents of the candidate.

The documents submitted by Dr Dessislava Vassileva comply with the requirements of the LDASRB, the RILDASRB and the IMI–BAS Rules.

*Candidate details:*
*Education:* Dr Dessislava Vassileva completed her higher education at the Faculty of Mathematics and Informatics (FMI) of Sofia University "St. Kliment Ohridski" (SU) during the period 1996–2002, obtaining a Master's degree in Mathematics with a specialisation in Information and Communication Technologies. In 2011, she defended her doctoral dissertation entitled "Adaptive Software Systems for e-Learning" at FMI, SU (doctoral studies 2004–2011), and was awarded the educational and scientific degree of PhD in the Professional Field 4.6 Informatics and Computer Science. In the same year, she participated in the 7th CNRS School on

Technology Enhanced Learning (Game-Based Learning) in France.

*Research and teaching activity:* From 2001 to 2010, she worked as a programmer at IMI–BAS. She was a part-time assistant at FMI, SU, teaching the courses "Modern Markup Languages" (2005–2009), "Java Programming" (2008–2011) and "XML Technologies and the Semantic Web" (2010–2011). She was a research associate at the Scientific Research Department (SRD) of Sofia University "St. Kliment Ohridski" from 2008 to 2011 (SISTER, ADOPTA, LUDUS, OP HRD). From 2015 to 2018, she worked as an IT specialist on the RAGE and APOGEE projects at the SRD of SU. She was an R2 researcher at the Centre of Excellence (CoE) "Heritage BG" at Sofia University "St. Kliment Ohridski" (2020–2021).
*Industrial experience:* Dr Dessislava Vassileva has worked as a software engineer and team leader at Bonea (2002–2007) and Aemon (2007–2009), and as a senior software engineer at MB (2011–2012), Gravis Bulgaria (2012–2015), Divina Pastora (2018–2020), SQLI Group (2020–2024) and PayRetailers (since 2024).

*Projects, conferences and other activities:* Dr Vassileva has an active project record (12 projects), including participation in projects under FP6 (2005–2009), FP7 (SISTER, 2008–2011), the South East Europe Programme (2009–2012), Horizon 2020 (RAGE, 2015–2018), Erasmus+ (2020–2023), OP HRD (2009–2011), CoE "Heritage BG" (2020–2021), and ADOPTA (Ministry of Education and Science, 2009–2011), as well as projects funded by the Bulgarian National Science Fund: SUGrid (2005–2008), APOGEE (2017–2021), APTITUDE (2018–2020), and MOTIVATE (KP-06-N85/2, 2024–2028). She is a member of the programme committees of 7 international scientific conferences: Applied Computing (2014–2026), ICEduTech (2014–2026), e-Society (2016–2026), e-Learning (2014–2022), e-Learning and Digital Learning (2023–2026), STEMedu, IMI–BAS (2025–2026), and Automatics and Informatics, Sofia (2014–2015). She was honoured with the Best Paper Award at the CompSysTech 2009 conference (Ruse) and won second prize for the best e-learning platform at the Science Education EXPO 2007. Additionally, she is a reviewer for the journal Scientific Reports (Springer Nature) and of Master's theses.

The submitted documents show that Dr Dessislava Vassileva meets the requirement of Art. 24, para. 1, point (2) of the LDASRB for at least 2 years of professional experience. Her total experience at the SRD of SU as "Research Associate III degree" (10.2008–09.2011) and as "Information Technology Specialist" in the research projects RAGE and APOGEE (10.2015–12.2018), and as an "R2 Researcher" at CoE "Heritage BG" (08.2020–09.2021), amounts to more than 7 years.

## 2. Data and analysis of the materials submitted for the competition

For participation in the competition, Dr Dessislava Vassileva, in accordance with Art. 24, para. 1, points (3) and (4) of the LDASRB, has submitted 22 publications in scientific journals and in proceedings of international conferences, as well as two utility models.

- All 22 publications submitted for the competition (out of a total career output of 59 publications) span the period 2009–2026, and the two utility models were registered in 2019 and 2023. Among these, 7 publications belong to the 2009–2012 period (software systems for adaptive e-learning), 8 are from 2016–2019 (emotional adaptation, playing styles, APOGEE), and 7 are within the 2021–2026 timeframe (serious games, virtual players, systematic review). Pursuant to Art. 24, para. 1, point (3) of the LDASRB, candidates must present a published monograph or equivalent publications in specialised scientific editions that do not replicate those submitted for the educational and scientific degree of PhD, the scientific degree of Doctor of Sciences, or for assuming the academic position of Associate Professor. In fulfilment of this requirement, 4 publications (Group B) have been submitted as a habilitation thesis. The remaining 18 publications are classified under Group G, and none of the 22 publications have been utilized in previous academic advancement procedures.

- No data or indications concerning plagiarism or unreliability of the presented scientific results by the candidate have been identified within the meaning of Art. 24, para. 1, point (5) of the LDASRB.

- All submitted materials (22 scientific works and two utility models) are within the subject area of the competition.

*Compliance with the minimum national and specific requirements:*

According to the statement submitted (Table 1), the candidate has accumulated the following points across indicator groups: A — 50; B — 130; G — 346; D — 150; E — 170; making a total of 846 points, which exceeds the minimum national requirements.

- Group B (habilitation thesis) comprises 4 publications (130 points), all within the field of adaptive educational video games: B1 [12] (Q1) 50 + B2 [19] (Q2) 40 + B3 [9] (SJR) 20 + B4 [22] (SJR) 20. This exceeds the minimum requirements outlined in the IMI–BAS Rules (100 points).

Table 1: Fulfilment of the minimum requirements by the candidate in the competition for the academic position of "Associate Professor" at IMI–BAS.

| Group of indicators | Minimum national requirements | Candidate's points | Note |
|---|---|---|---|
| A – dissertation | 50 | 50 | PhD (2011) |
| B – habilitation thesis | 100 | 130 | 4 publications |
| G – publications and utility models | 220 | 346 | 18 publications |
| D – citations | 70 | 150 | 25 citations in Scopus |
| E – projects, etc. | 20 | 170 | 7 national and 5 international |
| **Total** | | **846** | |

Fulfilment of the additional specific requirements of IMI–BAS for candidates for the academic position of "Associate Professor" under Art. 3 of the IMI–BAS Rules:

The candidate fully meets these requirements (see Table 2 below). Having compared the applicable minimum national and specific requirements of IMI–BAS in Table 2, I accept that the requirements are met.

Table 2: Additional requirements of IMI–BAS (Art. 3 of the IMI–BAS Rules)

| Requirements for the publications submitted for the competition | No. | Publications |
|---|---|---|
| Art. 3, para. 1, point (3) – at least 7 publications in journals with IF or SJR | 14 | [3], [4], [5], [8], [9], [12], [14], [16]–[22]; 2 with IF ([12], [19]) |
| Art. 3, para. 3 – at least half of the publications required under para. 1 (i.e. at least 4 of the 7 with IF or SJR) after the last procedure (i.e. after obtaining the PhD degree in 2011) | 11 | In total, 16 of the 22 publications are from 2012–2026 ([7]–[22]), of which 11 have an IF or SJR – [8], [9], [12], [14], [16]–[22]. |

*Assessment of the candidate's scientific and scientific-applied activity and achievements:*
The submitted materials are analysed in detail in Table 3. Based on the analysis, the scientific works submitted by the candidate for the competition can be classified as follows:
- by type – 4 articles in peer-reviewed scientific journals and 18 papers in the proceedings of international conferences;
- by significance – 14 publications are in publishing venues with a SCImago Journal Rank (SJR), 2 of which also hold an Impact Factor (IF);
- by quartile rank – one publication is in quartile Q1, one in quartile Q2, two in quartile Q3 and four in quartile Q4;
- by number of co-authors – 3 sole-authored publications, 8 with one co-author, and 11 with two or more co-authors. Dr Dessislava Vassileva is the first author of 6 of the scientific publications submitted for the competition. While most of the submitted works are co-authored, I have no doubt regarding the candidate's personal

involvement and contribution to the presented results.
- Utility models – co-authorship and participation in the development of two utility models officially registered with the Patent Office of the Republic of Bulgaria.
- Projects – the competition materials highlight the candidate's active participation in 12 research and educational projects (both national and international).

- Academic activity – Dr Dessislava Vassileva demonstrates broad academic engagement within the scientific community through membership in the programme committees of 7 international scientific conferences, peer-reviewing activity (as a reviewer for Scientific Reports), and substantial university teaching experience at SU across various courses in informatics.

Table 3: Analysis of the materials submitted for the competition.

| Characteristic | Number | Information on scientific editions and indexing |
|---|---|---|
| Journal articles | 4 | Computers in Human Behavior (IF 4.306, Q1) – [12]; Applied Sciences (IF 2.9, Q2) – [19]; Interactive Technology and Smart Education (SJR, Q3) – [9]; Serdica Journal of Computing (MathSciNet) – [7] |
| Papers and chapters in proceedings of international conferences | 18 | Of these: 11 with SJR; 1 in Q3 (SJR/Scopus) – [21]; 4 in Q4 (SJR/Scopus) – [16], [17], [20], [22]; 6 without a quartile – [3], [4], [5], [8], [14], [18]; 7 without SJR, indexed in WoS, Scopus or ACM DL – [1], [2], [6], [10], [11], [13], [15] |
| With impact factor (IF) | 2 | Computers in Human Behavior (IF 4.306, Q1) – [12]; Applied Sciences (IF 2.9, Q2) – [19] |
| With impact rank (SJR), incl. those with IF | 14 | (Q1 – 1, Q2 – 1, Q3 – 2, Q4 – 4) |
| Indexed in Web of Science or Scopus | 21 | (all except [7] – indexed in MathSciNet) |
| Single-authored | 3 | [6], [7], [15] |
| First author | 6 | [1], [2], [3], [6], [7], [15] |
| With two authors | 8 | [1], [2], [3], [5], [8], [9], [10], [11] |
| With three or more authors | 11 | [4], [12], [13], [14], [16]–[22] |
| Utility models | 2 | No. 3234 U1 (2019) and No. 4406 U1 (2023) at the Patent Office of the Republic of Bulgaria |

## 3. Contributions (scientific, scientific-applied, applied) and citations

The author's statement of research results gives a detailed description of the original scientific contributions of the publications on the list submitted for the competition. I accept the scientific contributions as defined by the candidate. According to the statement of scientific contributions, they can be grouped into four thematic areas (the publication numbering follows the list of scientific publications):
A. Adaptive educational systems and e-learning (publications: 1, 2, 3, 4, 5, 6, 7, 14);
B. Adaptation based on emotional state and recognition of behavioural patterns in educational games (publications: 8, 9, 10, 11);
C. Game-based learning and serious educational games (publications: 12, 13, 15, 16, 17, 18, 19, 20, 21, 22);
D. Tools for measuring emotional state (utility models No. 3234 U1 and No. 4406 U1).
The candidate's main contributions fall into three categories: scientific, scientific-applied and applied. The scientific contributions are as follows:
- Formalisation of an adaptive hypermedia system using predicate logic – three types of adaptive rules

(initial, navigational and for updating the learner model), separated from the business logic and implemented with Drools and SWRL – publication [1].

- A two-layer hierarchical model extending the AHAM reference model: three sub-models (learner, content, adaptation), each with three secondary ones – publication [2].
- An algorithm for selecting an optimal learning path by maximising the scalar product of the weight vector and the learning style vector – publication [7].
- Introduction of a new family of four playing styles – Competitor, Dreamer, Logician and Strategist – based on Kolb's experiential learning theory and corresponding to the Honey and Mumford learning styles (Activist, Reflector, Theorist and Pragmatist, respectively), together with a validated 40-item questionnaire for measuring them – publication [12].
- A taxonomy of adaptive mechanisms in educational video games based on a PRISMA systematic review of 246 publications from Web of Science and Scopus – publication [22].

Scientific-applied contributions:

- A workflow methodology for an adaptive system (link hiding and annotation, weight calibration after assessment) in ADOPTA – publication [2].
- Two methods for constructing a narrative graph (strongly connected and with two parallel branches), compared through a survey among instructors – publication [3].
- A lightweight semantic model of learning content based on UML and a four-layer framework for logic games – publication [4].
- Adaptive assessment combining tests with games, essays, projects, and self- and peer assessment according to the Honey and Mumford styles – publication [5].
- Experimental validation of ADOPTA with 84 students: mean score 77.89% vs. 67.14% in Moodle, variance 1.51% vs. 2.23% – publication [6].
- A mechanism for adaptation based on emotional state and performance ("Rush for Gold"), with an experiment involving 30 participants – publications [8], [9].
- Real-time recognition of learning curve patterns using a RAGE (H2020) component in a 3D driving game – publications [10], [11].
- Identification of teachers' requirements for authoring platforms for educational games – publication [13].
- Architecture and formal descriptive model of the APOGEE platform: design, validation and generation of games by non-programmers – publication [14].
- A system for analysis and visualisation of learning and game data – publication [16].
- Virtual players with a conversational agent and adaptive emotional behaviour (neural networks) – publication [20].

The applied contributions are:

- The ADOPTA and APOGEE platforms.
- Educational maze games on history, carpet-making and cultural heritage, including "The Heritage of Valchan Voivoda" and "Let Us Save Venice", and on heritage resilience to climate change ("Vulnerability") – publications [17]–[19], as well as games for measuring and mitigating racial bias [15] and for entrepreneurship and strategic management [21].
- Two utility models of devices for measuring skin conductance and assessing individual emotional arousal, applicable in the studies [8], [9], [12].

The subject matter of the candidate's scientific works is undoubtedly highly topical, and the scientific, scientific-applied, and applied contributions lie in a dynamically developing interdisciplinary field with a significant social impact. Dr Vassileva's research is in priority areas and in line with current international research in adaptive educational systems and e-learning.

The significance of the candidate's research results is also evidenced by their impact on the international scientific community. For the competition, Dr Dessislava Vassileva has submitted a list of 25 citations (excluding self-citations) of 9 publications in scientific editions refereed and indexed in Scopus. The candidate has 150 points and significantly exceeds the minimum requirements for Indicator Group D (Table 1). The most cited is publication [7] (10 citations), followed by [12] (4 citations) and [8] (3 citations). The candidate's publications have been cited in high-ranking Q1 journals, including *Future Generation Computer Systems, Educational Technology Research and Development, Telematics and Informatics, International Journal of*

*Educational Technology in Higher Education, and IEEE Access*. Over her entire research career, the candidate has a total of 73 citations excluding self-citations: 48 in scientific editions indexed in Web of Science or Scopus, and 25 in other peer-reviewed scientific editions.
Dr Vassileva has an h-index of 7 in Scopus, 5 in Web of Science, and 13 in Google Scholar. The analysis of the candidate's contributions and of her scientific and scientific-applied activity shows that she is an established scientist with significant research achievements and a strong presence in the international scientific community. This leads to the conclusion that the candidate fully meets the requirements for holding the academic position of "Associate Professor" in Professional Field 4.6.

## 4. Critical remarks and recommendations

I have no critical remarks or recommendations regarding the materials submitted by the candidate.

I have known Dr Dessislava Vassileva for several years through shared academic meetings and conferences in Bulgaria and abroad. She is a recognised authority in the field of adaptive educational software systems and e-learning, and impresses with her interdisciplinary knowledge and her particularly extensive research experience in serious games. I recommend that in the upcoming years she becomes even more actively involved in the development of national interdisciplinary networks, computing societies, and scientific editions in these priority areas for Bulgaria, passing on her expertise to colleagues and early-career researchers.

## CONCLUSION

The documents and materials submitted by Dr Dessislava Vassileva comply with all requirements of the LDASRB, the RILDASRB, and the corresponding internal rules of BAS and IMI–BAS for the announced procedure. I categorically give my positive assessment and recommend that the Scientific Jury submit a proposal to the Scientific Council of IMI–BAS for electing Dr Dessislava Vassileva to the academic position of "Associate Professor" at IMI–BAS under the Area of Higher Education 4. Natural Sciences, Mathematics and Informatics, Professional Field 4.6 Informatics and Computer Science, Scientific Speciality "Informatics" (Adaptive Educational Software Systems).

30.10.2026 Reviewer: .....

(Prof. Galina Bogdanova-Todorova, PhD)