

REVIEW

under the procedure for acquisition of the educational and scientific degree “Doctor”

by candidate **Albena Emilova Antonova**

of the PhD Thesis entitled: Smart Services for Development of personalized and adaptable educational video games

In the Scientific field: **4. Natural Sciences, Mathematics and Informatics**

Professional field: **4.6. Informatics and Computer Sciences**

Doctoral program “**Information Technologies**”

Department „**Information Technologies**“

Faculty of Mathematics and Informatics (FMI)

Sofia University St. Kliment Ohridski (SU)

The review has been prepared by **Prof. Eliza Petrova Stefanova, PhD**, Sofia University, as a member of the scientific jury for the defense of this PhD thesis according to Order № ПД-38-115/07.03.2023 of the Rector of the Sofia University. The presented set of materials is in accordance with the regulations on the terms and conditions for acquiring scientific degrees and holding academic positions in Sofia University St. Kliment Ohridski.

1. General characteristics of the dissertation thesis and the presented materials

The dissertation contains 141 pages main text and 29 pages with appendixes. The main text includes Introduction, five Chapters (Critical Analysis of Smart services and Educational videogames domains, Approaches and models for adaptation and personalization of the educational games, Smart services modelling for the development of the enriched maze educational video games, Design and Pilot Implementation of the platform, and Evaluation and Validation of the experimental software system), Conclusion, Author reference (Contributions, Publications, Participation in research projects, Declaration of originality) and Bibliography containing 138 titles. There are five appendixes. Dissertation includes 55 Figures and 10 Tables, as well as Glossary of terms and abbreviations.

2. Short CV and personal impressions of the candidate

I know the candidate in person for many years and I have excellent opinion about her abilities as scientific explorer, lecturer and very reliable person. She is very active in all kind of scientific activities and especially working in research projects, where she demonstrated in-depth knowledge, excellent communication skills and very successful team work. This is proved both from the quality of her scientific publications, which are inter disciplinary, covering broad scientific domains and are quite precise and in depth, as well as from her reputation among our international scientific partners from several large international projects.

She started her scientific and teaching career at the Faculty of Economics and Business Administration at Sofia University St. Kliment Ohridski, where she was the main driving force of the new Master of Science Program “Management Information Systems“. In the mean time she worked in international research projects in the Centre for Information Society Technologies, established as a part of the Faculty of Mathematics and Informatics, Sofia University St. Kliment Ohridski. In the last years her scientific interests shifted to the field of Informatics and Computer Science. She moved to the position of Assistant Professor at FMI, SU at the Information Technology Department.

I know in details the scientific work of Albena Antonova from our joint participation in many international research projects, as well as her active participation in the education activities at the Information Technology Department, where I would outline the course “Using serious games in Education”, which was completely prepared from Albena and she is teaching it successfully several years at Faculty of Mathematics and Informatics.

3. Content analysis of the scientific and applied achievements of the candidate, contained in the presented PhD thesis and the publications to it, included in the procedure

After careful analysis of the results presented from the candidate, we can summarize the following main scientifically applied contributions in her dissertation:

- On the base of the critical comparative analysis of the smart services potential to support educators in the process of creating personalized and adaptable educational video games, a model is proposed to support teachers for implementation and development of educational video games conforming to the specific learning scenarios.

- Using comparative analysis of the approaches for learning personalization and adaptation through active learning methods, including game-based learning, the needs to support teachers for their implementation are identified.
- A specialized smart service model is proposed for supporting the design and development of educational enriched maze video games, based on the basic smart service model.
- Pilot implementation of the specialized smart service model for creating educational enriched maze video games used for the development of specific educational games.
- Design of the methodology for evaluation and validation of smart services usage in education.
- Practical testing and validation of the pilot smart service platform and evaluation of their impact for supporting teachers to create educational enriched maze video games.

4. Approbation of the results

The candidate presents seven scientific peer-reviewed publications which include most of her main scientific results described in her dissertation. Two of them are in distinguished international and four are published in the proceedings of prestigious international conferences, which is a guarantee that main research results achieved by Albena Antonova are well known to the world scientific community. Five of these publications are in scientific editions with impact rang (SJR).

All publications are mainly with one author Albena Antonova, or co-authored with her scientific advisors. This fact confirms the main contribution of Albena Antonova to all of her scientific results described in the dissertation.

The national and international projects, in which Albena Antonova is participating, played a major role for the approbation of the scientific results, presented in the dissertation, because they are direct application from the research done in these projects. The success of all these projects also proves the importance, impact and application of her scientific efforts into the practice.

The presented scientific publications not only conform to the minimal national requirements and the rules and practice at the Sofia University, but substantially exceed

all of them. They do not repeat any of her previous publications, and especially these used in other procedures.

There are no evidences for plagiarism in the presented scientific publications.

5. Qualities of the abstract

The Bulgarian and English abstracts meet the requirements' volume and content for accurate, complete, and concise coverage of the dissertation.

6. Critical notes and recommendations

I do not find any gaps in the structuring of the content, the accuracy and completeness of the description, as well as in the design of the presented documents for the dissertation work. The documents show a successful and productive research activity of Albena Antonova.

I recommend the doctoral student to continue the research by expanding the applicability of the results of the dissertation work.

7. Conclusion

Having become acquainted with the PhD thesis presented in the procedure and the accompanying scientific papers and on the basis of the analysis of their importance and the scientific and applied contributions contained therein, I confirm that the presented PhD thesis and the scientific publications to it, as well as the quality and originality of the results and achievements presented in them, meet the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria, the Rules for its Implementation and the corresponding Rules at the Sofia University St. Kliment Ohridski for acquisition by the candidate of educational and scientific degree "Doctor" in the Scientific field 4. Natural Sciences, Mathematics, and Informatics, Professional field 4.6. Informatics and Computer Sciences. In particular, the candidate meets the minimal national requirements in the professional field and no plagiarism has been detected in the scientific papers submitted for the competition.

Based on the above, **I strongly recommend** the scientific jury to award **Albena Emilova Antonova**, the educational and scientific degree “Doctor” in the Scientific field 4. Natural sciences, mathematics and informatics, Professional field 4.6. Informatics and computer sciences, Doctoral program “Information Technologies”.

20 May 2023

Reviewer:

(Prof. Eliza Stefanova, PhD)