

STATEMENT REPORT

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. Kl. Ohridski” (SU),

The statement report has been prepared by: **Assoc. prof. Desislava Stoyanova Atanasova, PhD**
– **University of Ruse “Angel Kanchev”,**

as a member of the scientific jury for the defence of this PhD thesis according to Order № ПД 38-115/07.03.2023 of the Rector of the Sofia University.

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

The dissertation consists of an introduction, five chapters, a conclusion, an author reference (including a list of the author's scientific publications on the topic of the dissertation and a list of projects in which he participated), a bibliography, five appendices, and is 170 pages long. Dissertation contributions, a declaration of originality and directions for future development are added to the work. The bibliography consists of 137 cited sources. The dissertation contains 55 figures and 10 tables.

In the dissertation, intelligent services are considered, the need for models and tools for personalizing and adapting the games used for training to the learners is determined. In the first chapter, an overview of the main concepts, elements and characteristics of intelligent services is made, as well as an analysis of the use of games in education. The main problems and limitations faced by teachers in creating and implementing educational video games are analysed. In the second chapter, the approaches and models for personalization and adaptation of the learning process are presented. Based on this analysis, a Conceptual model of intelligent services has been developed to help teachers to create personalized and adaptive learning scenarios. In the third chapter, two smart service models are proposed to support teachers in creating educational video games - basic and specialized. The developed specialized intelligent service model, mainly designed for rich maze-type educational video

games, is integrated to the APOGEE educational video game development platform. In the fourth chapter, a pilot practical implementation of intelligent services is considered, based on the specialized model developed in the APOGEE platform. The main characteristics and requirements for the functionality and practical implementation of intelligent services are defined. A recommendation system was also developed when developing an educational game on the APOGEE platform, thus facilitating the work of educators who would use it. In the fifth chapter, the main indicators and indicators for evaluating intelligent services are given, as well as the experimental testing and validation of the developed approaches and models for creating personalized and adaptive games are described. At the end of the note, basic guidelines for future development are given and the scientific, scientific-applied and applied contributions of the development are indicated.

The presented dissertation is in an up-to-date and rapidly developing field related to the adaptation of educational services to learners, by means of video games, which in the last few years has been one of the leading directions in the development of education.

2. Short CV and personal impressions of the candidate

Albena Emilova Antonova works at SU "St. Kliment Ohridski" from 2017, and from 2019 he became an assistant in the Department of Information Technologies. Since the end of 2019, she has been enrolled as a doctoral student of independent training at the same department.

I know Albena Antonova from our joint work on several projects and I consider her to be a very good professional and colleague.

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

The publications presented by Albena Antonova included in the procedure, as well as the exposition and the conclusions drawn in the dissertation give me the reason to accept the contributions formulated in the dissertation as scientific, scientific-applied and applied contributions.

4. Approbation of the results

Albena Antonova has presented 7 publications related to the dissertation. All publications are presented in reputable scientific forums or publications. Four of the publications are in impact-ranked journals. She has one independent publication, and five of the others are with her scientific supervisors. *The publications presented by Albena Emilova Antonova fully cover the minimum national requirements for obtaining the educational and scientific degree "Doctor" in PN 4.6 Informatics and computer sciences.*

5. Qualities of the abstract

The abstract meets the requirements, contains the main necessary information and accurately and clearly reflects the contributions in the dissertation work.

6. Critical notes and recommendations

I have no critical remarks. The dissertation is written at a sufficiently high level.

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” (FMI-SU) 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*.

Date: 18.05.2023

Signature:

/Assoc. Prof. Desislava StoyanovaAtanasova, PhD/