

ATTITUDE

**on the procedure for defense of a dissertation on the topic:
"INSTRUMENTS FOR MANAGEMENT AND EVALUATION APPLYING A
USER-CENTERED APPROACH FOR THE DESIGN OF VIDEO GAMES
FOR EDUCATION"**

**to acquire
educational and scientific degree "doctor"**

from

candidate: **Yavor Ivanov Dankov,**

Field of higher education: **4. Natural sciences, mathematics and informatics /**

Professional field: 4.6. Informatics and computer science

Doctoral program: **"Computer Science", Department: "Computing Systems (temporarily
attached to the Department of Mechatronics, Robotics and Mechanics"),**

Faculty of Mathematics and Informatics (FMI),

Sofia University "St. Kliment Ohridski" (Sofia University)

The opinion was prepared by: Assoc. Prof. Dr. Desislava Antonova Ivanova, Technical University of Sofia, Faculty of Applied Mathematics and Informatics (FPMI), Department of Informatics, in my capacity as a member of the scientific jury, according to Order № RD-38-170 / March 30, 2022, by the Rector of Sofia University.

1. General characteristics of the dissertation and the submitted materials

The PhD Thesis consists of an introduction, four chapters, a conclusion, a list of the author's scientific publications on the topic of the PhD Thesis, a bibliography, one appendix, and is in a volume of 134 pages. It includes a section of the main contributions of the PhD Thesis, a statement of originality and guidelines for future development. The list of the bibliography used consists of 130 quoted sources. The PhD Thesis contains 24 figures and 17 tables. The numbers in the figures and tables in the abstract correspond to those in the PhD Thesis.

In the dissertation the video games for education are considered. The need for tools and platforms for automated construction of video games for education is presented. The *first chapter* presents video games for education and their role in the modern world. The design of video games for education, the tools for managing the design of video games for education and the analytical tools and the definitions related to them have been studied and analyzed. *The second*

chapter presents the challenges and principles in the development of taxonomy. A general taxonomy of software tools for managing and evaluating the design of video games for education has been designed. Based on it, a specialized TIMED-VGE taxonomy of software tools for management and evaluation of video game design for education has been developed, which can be used for all types of video games of the educational maze type.

In chapter 3 is presented the use of the specialized TIMED-VGE taxonomy for the design of software instruments for management and evaluation of maze video games for education in the APOGEE platform. The platform is presented and the designed functionalities of the software instruments are described in detail. An analysis and description have been made of the business processes of using the designed software instruments for management and evaluation, applying user-centered approach for the design of maze video games for education in the APOGEE platform. The software architecture of the APOGEE platform has been designed, which includes the designed software instruments and the architecture is used for the practical creation of the platform within the APOGEE project.

In chapter 4 is presented a methodology for validation of designed software instruments in the APOGEE platform, based on their practical use. The experimental video games for education are described - "Assenevtsi", "Valchan Voyvoda" and "Let's save Venice" which were created using the designed software instruments for management and evaluation of the design of video games for education in the APOGEE platform. The analysis of the results of the practical use of video games for training is presented. The tools are validated based on the assessment of the user experience of the users in the experimental games. At the end of the dissertation, the contributions of the dissertation are presented, which are of scientific, scientific-applied and applied nature and a summary of the dissertation research is made and the guidelines for future development are outlined.

The presented dissertation is in a current and rapidly developing field related to the design and development of video games for education, which in the last few years is one of the world's leading industries, which generates multimillion-dollar revenues each year.

2. Data and personal impressions of the candidate

Yavor Ivanov Dankov began his work on the dissertation in 2016 as a doctoral student at FMI at Sofia University "St. Kliment Ohridski". In 2017, Yavor Dankov, together with his research work, began active teaching in the beginning as a part-time lecturer and continues to teach as an assistant at FMI. Impressive is the large number of disciplines in which Yavor

Ivanov Dankov teaches as an assistant: XML technologies for semantic WEB, Software architectures and software development, Introduction to software engineering, Object-oriented analysis and design of software systems, etc.

I have no personal impressions of the PhD student, but the materials presented for review in the dissertation show that Yavor Dankov has excellent knowledge in the field and well knows the problem area.

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

The publications presented by Yavor Dankov included in the procedure, as well as the exposition and the conclusions made in the dissertation give me grounds to accept the contributions formulated in the dissertation determined by scientific, scientific-applied and applied nature, as I believe that contributions 4.3 and 4.4 can be combined as follows: "Conducting practical experiments with the created video games for education and analyze the results."

4. Approbation of the results

Yavor Dankov presented 6 publications related to the dissertation. All publications are presented at renowned scientific forums. Five of the publications are indexed in the global scientific database Scopus. In addition, citations of the dissertation's publications related to the dissertation have been noted. *The publications presented by Yavor Ivanov Dankov fully cover the requirements for obtaining the educational and scientific degree "Doctor" in professional field 4.6 Informatics and Computer Science.*

5. Qualities of the abstract

The abstract meets the requirements and contains the basic information and accurately and clearly reflects the contributions to the dissertation.

6. Critical remarks and recommendations

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

7. Conclusion

After getting acquainted with the dissertation presented in the procedure and the accompanying scientific papers and based on the analysis of their significance and the scientific and applied contributions contained in them, **I confirm** that the presented dissertation and scientific publications to it, as well as the quality and originality of the results and achievements presented in them, meet the requirements of the Law on the Protection of Human Rights and Fundamental Freedoms, the Regulations for its application and the respective Regulations of Sofia University "St. Kliment Ohridski" for obtaining by the candidate the educational and scientific degree

“Doctor” in the scientific field 4. Natural Sciences, Mathematics and Informatics and Professional Field 4.6 Informatics and Computer Science. In particular, the candidate satisfies the minimum national requirements in the professional field and no plagiarism has been established in the scientific papers submitted at the competition.

Based on the above, **I recommend** the scientific jury to award Yavor Ivanov Dankov educational and scientific degree "Doctor" in scientific field 4. Natural Sciences, Mathematics and Informatics, professional field 4.6 Informatics and Computer Science.

31.05.2022

Signature:

(Assoc. Prof. Dr Desislava Ivanova)