

RECENSION

by Prof. Nikolay Stoyanov Kolishev, D. Sc.

on the theoretical and practical contributions in the publications of Assoc. Prof. Ph. D. Ivaylo Ivanov Burov, participant in a competition for holding the academic position of “Professor” in the field of higher education 1. 1.

Pedagogical sciences, professional field 1.2. Pedagogy (Theory of Education and Didactics – Information and Communication Technologies in Learning and Working in a Digital Environment), published in the State Gazette, issue No. 82/14.10.2022

I. Biographical Info

Assoc. Prof. Dr. Ivaylo Burov was born on 02.04.1964. In 1988 he graduated in Radio and Television Engineering, Electronics and Automation at the Higher Institute of Electrical and Electronics Engineering, Varna. In 2014 at Shumen University "Bishop Konstantin of Preslav" he defended his doctoral dissertation on the topic “Application of Interactive Multimedia Methods in Learning”.

In the period 1988 – 1990, he worked as a constructor and research associate at the Technical Institute of Automotive Engineering in Shumen. From 1991 to 2018 he worked consistently as a research assistant, assistant, senior assistant, and chief assistant at Shumen University "Bishop Konstantin of Preslav" . In 2018, he won a competition for the academic position of “Associate Professor” at the same university where he works until now.

Prof. Ph. D. Ivaylo Burov's research activity is focused in the following areas: information and communication technologies in training, multimedia technologies in training, interactive methods in training, training based on digital games and gamification in training, development and integration of educational software, neural networks and systems with AI.

1. General characteristics of scientific production.

The applicant has submitted for review a scientific output of 17 publications, including 2 monographs (1 habilitation work and 1 monograph that is not presented as a main habilitation work), 14 articles and reports published in non-referenced peer-reviewed journals or published in edited collective volumes, 1 university textbook.

In the candidate's habilitation paper “Opportunities for application of interactive game-based training in education”, the results obtained by different researchers are systematized and analyzed, the principles and approaches in the creation of game content, the choice of software products and software solutions for its realization are considered, models for creating game content are proposed. The factors hampering the successful implementation of game training are analyzed. Their own interactive game solutions and adaptation of existing ones are presented.

In the monograph “Building a digital environment for interactive 3D game learning. Development and integration of interactive 3D solutions” are presented author's interactive game solutions and adaptation of existing open source and specific approaches to their implementation and adaptation. The specification of these solutions and the code for their construction in an integrated package for 3D game training are based on open-source products, with Godot Engine being chosen as the game engine, which is an open-source game engine and MIT license, allowing its use both in the creation of open source applications and in commercial solutions. The MIT license also allows free code modification of the game engine to optimize or embed additional features.

The university textbook “Information Technologies in Teaching Methodology, Theory and Practice” has been developed at a high professional level regarding all three mandatory didactic components, namely: basic text, assimilation apparatus and orientation apparatus.

As common characteristics for all presented publications, we can highlight the following: the actuality of the subject matter; logical structure; precision in the definition and use of basic concepts; competent systematization and analysis of significant literary sources; justification of productive practical ideas; highly professional language and style of exposition.

2. Evaluation of scientific and theoretical contributions.

The presented contributions correspond to the content of the submitted publications and indicate a good level of professional reflection. As particularly important for the application of information and communication technologies in learning and working in a digital environment, I would point out the following four contributions:

1. Theoretical principles and approaches for the creation of game content for training purposes have been developed.
2. An approach has been developed for an optimal combination between the application of interactive learning methods and those used in digital games.
3. A didactically based model for constructing and applying learning content for active interaction has been developed. The effectiveness of the model has been proven by a properly organized and conducted experiment.
4. A concept of delayed interactivity has been developed, in which interactive interaction manifests itself not as an immediate response to one choice at a time, but as a complex response defined by the accumulation of multiple choices over time.

The following theoretical contributions to the candidate's publications have been realized as a result of in-depth analytical work in the following directions: analysis of the factors that impede the application of interactive methods in training; analysis of the concepts of training based on digital games and gamification in training; systematization and analysis of research results devoted to models of training based on digital games; analysis of the factors that impede the successful implementation of training based on digital games.

5. Evaluation of the practical and applied contributions.

The content of the presented publications testifies to the developed ability of theoretical formulations to become adequate practical solutions, the realization of which will lead to an effective application of information and communication technologies in training. As particularly significant, I would point out the following practical-applied contributions:

1. A selection of software products suitable for creating three-dimensional interactive learning content has been made. The selection was made on the basis of the analysis of the existing pedagogical conditions. The effectiveness of the application of the software products has been experimentally proven.
2. Developed are author interactive solutions and methods for adaptation of such open source, tailored to the specifics of the material studied.
3. A method for lip synchronization of a virtual character with audio recording of speech and subtitles has been developed, the advantages and disadvantages of this approach being analyzed in the framework of experimental verification.

4. A three-dimensional interactive game environment has been implemented for the purposes of the training.
5. Specific for the purposes of the training, author interactive game solutions have been implemented and the code for their realization has been published:
 - Characters for active interaction with the learner and with the elements of the virtual environment, including branched dialogue systems and lip synchronization with spoken language, control algorithms and AI.
 - Interactive graphical dashboard for test tasks in a three-dimensional environment.
 - Interactive three-dimensional puzzle.
 - Digital (in-game) camera.
 - Driving of virtual vehicles.
 - Interactive and physical interaction with virtual vehicles in the gaming environment.
 - Traffic system.
6. Interactive open source solutions have been adapted and new functionalities have been added. The code adapting them to requirements arising from the specifics of the subject area in the training is published:
 - Inventory system (adapted).
 - Physical interaction of inventory items (added).
 - Interaction of the inventory with multiple objects intended for the specific type of inventory (added).
 - Inventory and price reporting system (added).
 - Interactive 3D book (adapted).

6. Teaching activity

I have no immediate impressions of the teaching activity of the candidate, but the presented textbook attests to its high quality. It is distinguished by competently systematized theoretical and practical information, with reasonable accents on the essential, language and style of exposition available for the specific readership group, and an intriguing way of presenting the curriculum appropriate for the academic motivation.

7. Conclusion.

In conclusion, I can say that **I positively appreciate** the quality of the systematization of theoretical information in the presented publications and the practical solutions for the realization of interactive game-based training. The scientific-theoretical and practical-applied contributions in the candidate's publications are at a level that fully meets the legal requirements for occupying the academic position of "professor" in professional direction 1.3. Pedagogy (Theory of Education and Didactics - Information and Communication Technologies in Learning and Working in a Digital Environment).


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