

# SUMMARY OF PUBLICATIONS

of Prof. Dr. Ivailo Ivanov Burov

for participation in the competition for the occupation of the academic position "professor" in the field of higher education announced by University of Shumen "Bishop Konstantin of Preslav" in the Official Gazette, no. 82/14.10.2022 1. Pedagogical sciences, professional direction 1.2. Pedagogy (Theory on the upbringing and didactics – Informational and communication technologies in training and work in digital environment).

## I. MONOGRAPHS:

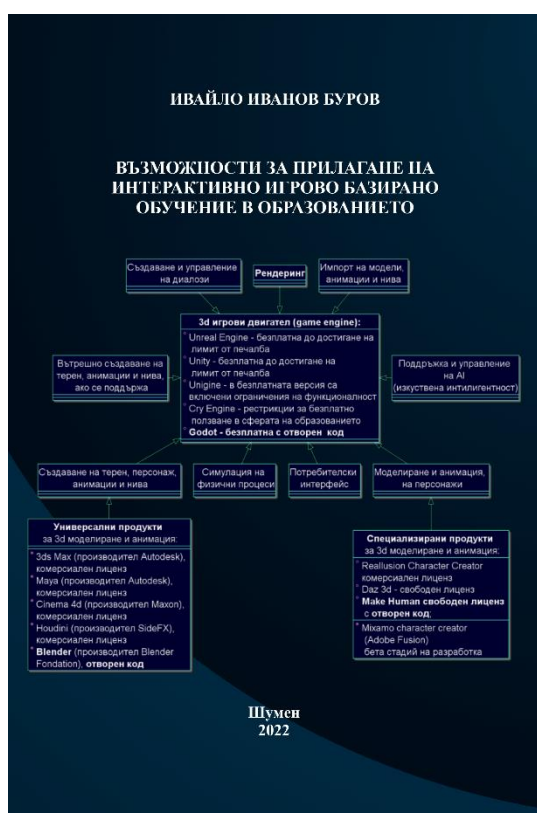
### 1. Habilitation work:

**Burov I.** *Possibilities for implementing interactive game-based learning in education.* UPH "K. Preslavsky 2022. ISBN 978-619-201-659-31 160 pages.

#### Summary:

The monographic work presents the results of research aimed at the possibility of applying interactive learning based on digital games and gamification in education. The results reported by various researchers have been systematized and analyzed, the principles and approaches in creating game content, the choice of software products and software solutions for its implementation have been examined, models for creating game content have been proposed. The factors hindering the successful application of game-based learning are analyzed. Own interactive game solutions and adaptation of existing ones are presented.

The specifics of these solutions and the code for their construction in an integrated package for 3D game training are the subject of consideration in the next monographic work "Building a digital environment for interactive 3d game training. Development and integration of interactive 3d solutions."



## 2. A published monograph that is not submitted as a major habilitation thesis

**Burov I.** *Building a digital environment for interactive 3D game learning. Development and integration of interactive 3d solutions.* UPH "K. Preslavsky 2022. ISBN 978-619-201-661-6, 152 pages.



### *Summary:*

The published materials in this monographic work are a natural continuation of the research presented in "Possibilities for applying interactive game-based learning in education" (Burov 2022). While in the previous research the focus was placed on the possibilities of applying interactive game-based learning in education, the materials published here are related to the presentation of own interactive game solutions and adaptation of existing open-source ones and specific approaches to their implementation and adaptation.

The concreteness of these solutions and the code to build them into an integrated package for 3D game training are based on open-source products, and the Godot Engine was chosen as the game engine - an open-source game engine and an MIT license that allows its use both in creating applications both open source and commercial solutions. The MIT license also allows free modification of the code of the game engine itself

for optimization or embedding of additional functionalities.

Although the general theme is pedagogically oriented, the main idea here is that the experimental results will benefit researchers familiar with IT technologies and focusing their attention on the creation of digital educational games. The presented solutions are free to modify, optimize and upgrade, with the aim of free and successful popularization of modern digital game approaches in education.

## II. ARTICLES:

1. **Burov I.** Digital game-based learning as part of computer-based learning or as computer-assisted learning, UPH "K. Preslavsky", In: "The competence approach as an alternative to the challenges of the 21st century", 2022, ISBN 978-619-201-677-7, pp. 52 - 54.

*Summary:* This article presents research data related to game-based learning. Digital game-based learning, its origins and distribution are examined. Adapted into Bulgarian is "An Integrated Design Framework for Game-Based Learning", originally created by Plass, Homer, Kinzer in 2015.

2. **Burov I.** More for adaptation of interactive game elements in a three-dimensional environment for educational purposes. Yearbook of "K. Preslavsky" University of Shumen, Faculty of Pedagogy, vol. XXVI D, 2022. ISSN 1314 - 6769, pp. 346 - 352. and in the E-magazine

"Education and Development" ISSN 2603-3577 Issue 8, 12.2021, with 11,-117 (online).

**Summary:** *This article is a continuation of the article "Development and adaptation of interactive game elements in a three-dimensional environment for educational purposes" and shares experiences related to the adaptation of existing interactive solutions in 3D environment for educational purposes. The presented material can be useful for developers, teachers, PhD students and students who have accepted the challenge of working in an area requiring experience in a range from 3D modeling and animation to programming in a chosen environment.*

**3. Burov I.** How digital game-based learning is different. Why most educational games are not as engaging as entertaining video games. UPH "K. Preslavsky", In: "The competence approach as an alternative to the challenges of the 21st century", 2022, ISBN 978-619-201-677-7, pp. 55-58.

**Summary:** *The object of research in this article is learning based on digital games. Featured are popular learning resources focused on interaction, multimedia, and game-based learning. A brief analysis was made of those resources claiming to be gaming. The missing factors present in standard video games and simultaneously absent in educational games are analyzed. Observational experience, common and individual, is shared.*

**4. Burov I.** From Bartle's taxonomy to algorithmical determination of player type in educational games. E-magazine "Education and Development" Issue 9, 12.2022 ISSN 2603-3577, pp. 153-158 (online).

**Summary:** *Leaders in the gaming industry have reached great heights in their understanding of player retention in their gaming platform, something that cannot be said for digital educational games. In commercial game products, this is done to promote the game, gather more players, keep them longer on the game platforms, many of which also offer for purchase artifacts, weapons and resources that help to complete the mission successfully. In contrast to these commercial game platforms, in learning-oriented digital games, the main goal is to keep the learner's attention on the game-based learning content. This article examines techniques used in commercial game products that can be applied when creating game content for educational purposes.*

**5. Burov I.** Guidelines for the creation of plot and scenario in the development of serious educational games. E-magazine "Education and Development" Issue 9, 12.2022 ISSN 2603-3577, pp. 146-152 (online).

**Summary:** *One of the main gaps that is noticeable in a large part of the existing digital games aimed at learning is the partial or complete lack of plot and scenario. The creation of a plot and scenario requires the knowledge of rules already established in practice, awareness of successful plot implementations in the game industry, investment of time and human resources in their creation and the availability of relevant opportunities for their implementation. The realization of successful storylines and scenarios is a difficult challenge for small teams or individual developers of educational software, which is why in most cases storylines and corresponding scenarios are either ignored or reduced to a simplified implementation that the young generation accustomed to modern entertainment games has a mostly negative attitude to.*

*In this article, the necessary steps for the creation of a plot and its corresponding scenario in the construction of game learning content are sequentially described, based on existing practices in the cinematography and game industry.*

**6. Burov I., Burova I.** Building the experimental model for the development of learning content for active interaction as a bridge between interactive methods in learning and digital

gaming solutions. UPH "K. Preslavsky", In: "The competence approach as an alternative to the challenges of the 21st century", 2022, ISBN 978-619-201-677-7, pp. 59-68.

*Summary:* This article covers materials that are the result of joint research during the construction of a doctoral project with the development of game solutions aimed at the field of entrepreneurship subject in junior high school stage 5-7 grades, laid down in the tasks of the research. From the point of view of the acquired experience related to the development of software in the field of education, the principle of universal application of software solutions beyond the specifics of entrepreneurship is observed, with the aim of using them in other educational areas as well.

**7. Burov I., Burova I.** Popularity of interactive methods in the bulgarian school - research data. UPH "K. Preslavsky", In: "The competence approach as an alternative to the challenges of the 21st century", 2022, ISBN 978-619-201-677-7, pp. 69-74.

*Summary:* The object of research in this article is the popularity of the application of interactive methods in the Bulgarian school. The results of research by authors in the subject area are presented and the barriers preventing the application of interactive methods in school are analyzed. Recommendations are made to help overcome these barriers.

**8. Burov I.** Solutions for non-linear branched dialogue suitable for integration in a three-dimensional game environment for educational purposes. E-magazine "Education and Development" ISSN 2603-3577 Issue 8, 12.2021, pp. 118-131 (online).

*Summary:* In this article, a study was conducted on existing solutions for creating branched nonlinear dialogues in order to integrate them into a built 3d game environment for educational purposes using the Godot game engine. A report includes: implemented and missing functionalities in the tested solutions, the possibilities for integration, the degree of complexity in their implementation. The published results can be useful for researchers who have focused on creating modern 3d game solutions in education.

**9. Burov I.** The game as an interactive pedagogical method. E-magazine "Education and Development". Issue 7, 02.2021 ISSN 2603-3577, pp. 73-82. (online)

*Summary:* The article examines different approaches to play in learning: from the physiological to the social. The views of numerous authors and researchers in the field of pedagogy are shared. The effects of the game on the formation of the child's personality and his socialization are considered. The influencing components of role play and their role in child development are examined.

**10. Burov I.** Lip synchronization of game characters in digital educational games (lipsynch). E-magazine "Education and Development". Issue 7, 02.2021, ISSN 2603-3577, pp. 83 - 90 (online).

*Summary:* The paper reviews existing solutions for lip-syncing 3D characters with audio speech recordings. The advantages and disadvantages of the different solutions are analyzed. The results of observations with a proprietary solution based on real-time formant recognition are published and the noted shortcomings of this approach are addressed. A brief exposition of the theoretical part relating to formants is made.

**11. Burov I.** Multimedia and interactivity in learning from the perspective of technological development. Education and Development E-Journal Issue 2, 07.2018 ISSN 2603-3577, pp. 83 - 93 (online).

**Summary:** The article examines multimedia, interactivity and their applicability in learning from the point of view of technological development allowing their integration. Edgar Dale's "Cone of Experience" concept and related mis-distributed and misinterpreted percentage data missing from the original model are also discussed. Definitions of concepts such as multimedia and interactivity are presented and their meanings are analyzed.

**12. Burov I.** Computer-assisted and computer-based learning. E-magazine "Education and Development" Issue 2, 07.2018 ISSN 2603-3577, pp. 94 – 98 (online).

**Summary:** The article examines computer-assisted and computer-based learning. Although, in most cases, computer-based learning is considered as the successor of the computer-assisted, it is necessary to make a correct assessment regarding the application of one or another type of learning, depending on the specific pedagogical conditions. In this regard, it focuses on the advantages and disadvantages of this type of learning. Criticisms of researchers in this area are presented.

**13. Burov I.** Learning based on digital games and gamification in learning. Similar and simultaneously diametrically opposite concepts. E-magazine "Education and Development" Issue 3, 03.2019 ISSN 2603-3577, pp. 73 – 78 (online).

**Summary:** Gamification in learning is often confused with digital game-based learning. Although the concepts are similar, in practice they are diametrically opposed. In addition to presenting these concepts, the article also discusses basic principles for implementing digital games in learning, based on the research of James Paul Gee.

**14. Burov I.** Analysis of factors inhibiting digital game-based learning. E-magazine "Education and Development" Issue 3, 03.2019 ISSN 2603-3577, pp. 79 – 88 (online).

**Summary:** The main factors hindering learning based on digital games - pedagogical, technological and organizational - are presented in the article. Samples for the US and EU are presented. An analysis was made of the inhibiting factors and their causes



Prepared by: .....  
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