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GAMIFICATION IN UNIVERSITIES – STUDENTS' SATISFACTION AND ASSURANCE OF LEARNING

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Abstract. Modern education systems are facing new opportunities to implement innovative technological solutions in education that promote adaptive learning systems. Games provide information that students can use to develop their knowledge and skills, as well as stimulate direct student involvement in the learning process. The model's effectiveness is measured by students' success in the course and their satisfaction with the delivery system. The purpose of the paper is to determine the main trends, challenges and opportunities in the application of gamification in higher education. The methodological approach of the present study includes a literature review on the benefits of using games in universities, as well as to present an analysis of how satisfied students are with their use. The results of the research confirmed the importance of using gamification approaches in university education and confirm the hypotheses related to the satisfaction of the students with the learning process and follow-up evaluation of the obtained learning results. According to research carried out by FEBA, in courses where simulation games were used, students obtained an average mark of m = 5.52 as the results achieved by them at the end of the semester.

Keywords: game; universities; assurance of learning; students' satisfaction

I. Introduction

Ahmed and Wias (2012) investigated the reasons of the low level of students' academic achievement among high schools' students form the students and teachers' perspectives. The study showed that there are many reasons that negatively affect students' achievement such as low motivation, lack of attention and the existence of distractions. The study recommended that teachers should attract students' attention by games and other educational methods to increase their motivation. Hence, they will learn better and achieve better (Kobari et al. 2022). Game-based pedagogy is connected with the definitions of game-based learning through play emphasize above all that it is a type of game with defined learning outcomes. Business games, also called as business simulation game refers to simulation games that are used at an

educational tool for teaching business. Business games may be carried out for various businesses training such as: general management, finance management, organizational behavior, Human Resource Management, operations Management etc. here often the term Business simulation is used with the same meaning. Business games are used as a teaching method in universities and more particularly in business schools but also for executive education. Simulations are considered to be an innovative learning method and are often computer based (Steenkamp et al. 2009).

The most common concept of gamification is the use of game mechanics to involve students in the educational process and digitally inspire them to achieve their goals by making tasks more like games and incorporating parts of certain games into the process (Gachkova et al. 2020). Gamification is the application of game elements and mechanisms in a digital educational context in a way that draws attention and encourages more intense participation in the sharing of knowledge, as well as student interest in the learning process in a fun way (Yamani 2021). Educational games could potentially provide high-quality, inexpensive, flexible, portable, and relaxing educational services, which could increase interactions between learning materials, students, and teachers (Gentry et al. 2019).

II. Methodology

The methodology used in the present study is based on general scientific methods of scientific knowledge - analysis, synthesis, induction and deduction, as well as on specific methods, specifically applying the systematic approach. The information base of this study is the results of research in Sofia University on development on education and the implementation of games on higher education. The obtained results represent the verification of two hypotheses:

1. To investigate student satisfaction with the use of gamification in university teaching.
2. To determine the assurance of learning outcomes through the use of gamification. What is the effect of using gamification insrtuments in teaching on students' achievement?

III. Literature review

Games are effective educational strategies that create a communicative learning atmosphere. Besides, they foster problem-solving skills and strengthen students' engagement and involvement. Hence, students will be fully motivated during the process of learning. Hadfield (2002) stated that education games are divided into two types. First, competitive games. They give the opportunity to play and compete in order to be the first person who reaches the goal. Second, co-operative games. They give the opportunity to the players to work together toward the mutual goal.

Digital learning games, in contrast to the larger genre of general computer "games", have an explicit educational focus. They are virtual worlds or designed

experiences (Burns 2011)1) in which learners "play at" some role as they solve problems and make connections by learning to "think like" scientists, historians, journalists, soldiers, diplomats, or any other group that employs systematic methods of inquiry and problem framing in order to investigate the world. There is some long-term research on the benefits of digital learning games for students. Digital games in general have been linked to the acquisition of computer literacy, improvement of cognitive and attention skills, and development of positive attitudes toward technology. Recent theories and empirical research on learning with games have focused on games as tools with which to develop conceptual thinking by interacting with and manipulating complex systems and as alternate, virtual environments in which learners outfit themselves with virtual identities or avatars in order to practice ways of knowing within a situated, authentic context. The digital learning games are optimal learning tools for the following reasons:

– Games are built around problem solving: Players must use facts, artifacts, and evidence to make decisions.

– Games inherently require and assess 21st century skills: Games require players to collaborate, modify the game, map out complex variables and find solutions to challenging problems. All of these skills can be classified as 21st century skills.

– Games track information across time: Games are developmental in nature and are thus designed in terms of levels. For a player to go from one level to another, he/she must have mastered a certain set of skills.

– Games integrate learning and assessment: Learning and formative and summative assessments are "inseparable" in games. Players are provided feedback on what worked and what didn't and are informed about their progress.

– Games can be collaborative and social: In multi-user games, learners play "against" or "with" other players simultaneously and often must collaborate as part of the game itself.

– By design, games can be higher-order learning tools: Games embody adaptable challenges, clear criteria, personalized feedback, and a broad range of challenging topics as intrinsically motivating ideas (Prensky 2001 cited in Gee & Shaffer 2010). Furthermore, games can serve as "entrypoints" into conceptually complex content in ways that lead learners to investigate a concept further through immersion in the process.

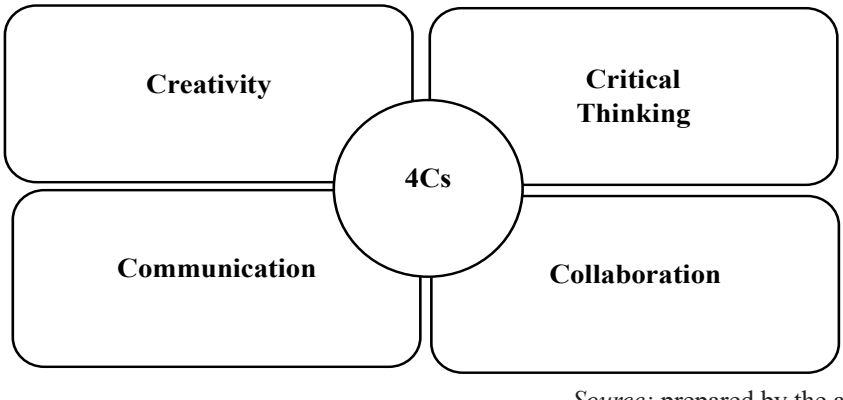
– Games provide information that players can use to improve their knowledge and skills: Games often provide "actionable" information to players so players can make decisions about what to do to improve and succeed. As such, players know where they've succeeded, where they've failed and can take corrective actions in order to succeed (Velinova-Sokolova 2022).

The games are created on a problem based learning pedagogy, characterized by simulating real situations adapted in order to develop learning. This pedagogy highlights the importance of questioning allowing students to select and filter the

essential information for decision making. This competence is underdeveloped in higher education but it is crucial in order to be successful. The students work as a team during the semester just like entrepreneurs who constantly meet to solve real-world business problems. As for games, many advantages have been explained which appears in various fields. Some of the major advantages are referred to in the following. (1) The closer the games resembles a learner's actual environment, the greater the retention. (2) Games provide a safe environment in which to make mistakes. (3) Creating the simulation games can help to streamline the processes that are being taught. (4) Well-designed games often reduce the learning time significantly (Mahboubian 2010).

The use of gamification in education has gained significant attention in recent years. It offers a promising approach to enhance student engagement and motivation in learning processes. Additionally, it is of interest to identify the main incentives and barriers for the implementation of gamification as a philosophy, approach, and toolset (Krasteva and Potebnya 2023). When games are used in the learning process, it is related to the profile and attitudes of the teachers. The value profile of the teachers generally coincides with that of the general population. The results of the research (Davidkov and Tsvetanska 2023) allow to draw conclusions about the value dimensions of the teacher's work. The data verifies certain recent patterns of a growing interest in teaching jobs due to competitive advantages of the teaching profession.

The focus of expertise in the 21st-century education sector currently includes creativity, critical thinking, communication, and collaboration (4Cs). What is shown in Fig. 1 can require them to be able to possess these skills, if not supported by teachers and lecturers? They must also have strong core competencies and have soft skills in 4Cs. The role is expected to strengthen character, provide passion, and inspire (Velinova-Sokolova 2022).



Source: prepared by the author.

Figure 1. Skills in the digital era

Actually, many studies demonstrated the effect of using games in teaching on students' achievement. For instance, Lin et al. (2019) explored the effect of using games in teaching science on students' achievement and motivation. The researcher used the experimental design by implementing the pre- and post-test design. The experimental group contained 25 students while the control group contained 26 students. The experiment used 12 lessons. The results showed that using games in teaching science affected students' achievement and motivation positively. It also enhanced the work of their memory, understanding and problem- solving skills.

IV. The importance of students' satisfaction

Student satisfaction is an important indicator of the quality of learning experience. It is worthwhile to investigate student satisfaction in online settings because new technologies have altered the way that students interact with instructors and classmates. The quality of interaction in game settings may depend to a large extent on the technology tools utilized during learning. Lack of confidence in using information and communication technology (ICT) may decrease students' satisfaction during online instruction and in turn lower their performance (Kuo et al. 2013).

The framework of students' satisfaction is based on the interaction model developed by Moore (1989) with the addition of potential variables including Internet self-efficacy and self-regulated learning. Moore contended that the process of effective learning is "the mutual action between teachers and students, in environments whose uniqueness is separation from each other, and as a result exhibit unique behavior patterns of education". The students' satisfaction is related to the process of interaction. Interaction is a communication and cooperation among all elements in the community. In the classroom, students can establish interaction with other students, teachers and learning materials. Students' interaction is establishing a welcome and good communication and response among learners and between learners and teacher and learners and contents (Zainuddin 2018). In teaching by using games, interaction is a very significant element to strengthen social communication among students and the instructor whether in the class or outside the class using various technologies tools. Moreover, the interaction would also be well-established between students and contents which means that the students are able to engage with the content in an interactive way. Learner-learner interaction refers to two-way reciprocal communication between or among learners who exchange information, knowledge, thoughts, or ideas regarding course content, with or without the presence of an instructor. Effective learning is based on sharing the experience of the trainees, using all acquired skills and knowledge. This, in turn, leads to obtaining maximum results from the students, and they are achievable when each of them is able to reflect the educational reality, draw conclusions, and apply their

knowledge in practice. An example of a decision matrix of game, when using Moore's model in the connection with students' satisfaction shown in table1.

Table 1. An example of a decision matrix of using game

Context (Kurtz and Snowden)	Paradigm (Cronje)	Methods	Technologies
Know	Injection	➢ Lecture ➢ Reading ➢ Tutorial ➢ Drill	➢ Book, e-book, PDF ➢ You Tube video ➢ Drill software
Knowable	Integration	➢ Puzzle and Quiz ➢ Discussion ➢ Debate ➢ Game	➢ Games, physical and digital ➢ Discussion tools: simulation games, business games, etc.

Source: prepared by Author on the based-on Cronje 2021.

The principle behind the matrix is that the type of knowledge, be it known, complex, knowable or chaotic, would predict the underpinning learning paradigm. Within the paradigm an appropriate learning design could be selected, such as a lecture, essay, games, quiz or field trip. Thus, the use of technology, games and Education 5.0 learning skills in teaching language is highly recommended to produce autonomous learners, critical thinkers, information seekers, disciplined, logical and analytical, curious, open and highly motivated, interdependent and interpersonally competent, persistent and responsible, creative, knowledgeable and skillful about the learning process. In today's digital world, the teachers are demanded to employ different games that allow students to have strong motivation, self-directed learning skills, and interactions in their learning.

The first hypothesis, connected to investigate student satisfaction with the use of games in university teaching, was tested by surveying 162 students in Faculty of economics and business administration[2] (FEBA) in Sofia University[3]. The main goal of the conducted research was assessment of the usefulness and satisfaction of games in education in universities. In a research in year 2023 from a number of students, they were asked if they had benefited from using games during their studies in 5 subjects such as "Principals of taxation", "Capital markets and risk management", "Derivatives financial instruments", "Analysis of Financial Market" and "Managerial Accounting".

Hence, the purpose of this part of study was to investigate the extent to which the potential variables – interaction, game self-efficacy, and self-regulation – predict student satisfaction in using the games in universities. With the permission

of and assistance from the instructors who agreed to have their students participate in the study, an online survey link was distributed to 5 courses from the disciplines (mentioned above). Table 2 indicates the details of this research.

Table 2. What are the benefits for students with regard to the business game(s) in FEBA?

№	Benefits for students	N	%
1	To give students decision-making experience	85	52.5
2	To integrate theory with practice	70	43.2
3	To have students experience teamwork	58	35.8
4	To have students engage in critical thinking	52	32.1
5	To interest and motivate students	49	30.2
6	To measure comprehension and understanding	36	22.2
7	To have students develop communication skills	32	19.7
8	To introduce students to planning	27	16.7
9	To have students experience business competition	25	15.4
10	To have students experience uncertainty/pressure	18	11.1
11	No benefits	3	1.8

Source: prepared by the author.

In addition to the data indicated in the table. 2 for the assessment of student satisfaction, other studied indicators such as innovative approach, negotiation skills, soft resources and etc. In this connection according to the participants surveyed, the particularly significant for the student's satisfaction are: innovative approach and creativity (96%), determination in achieving business goals (92%), abilities concerning managing soft and hard resources (90%) and negotiation skills (93%). The following features were also found significant: financial orientation (86%), increasing incomes (81%), willingness to take risk (198%) and needs connected with the professional career (57%).

Of the 162 enrolled students from 5 courses, 142 completed the survey, concerning self-efficacy, a return rate of 88%. This study explained game self-efficacy and self-regulation instruments created by prior researchers. The measure of interaction and satisfaction was modified from an existing instrument in a game learning environment. There were eight items in the learner-learner interaction subscale, six items in the learner-instructor interaction subscale, and four items in the learner-content interaction subscale. Table 3 presents average scores for three researched instruments for satisfaction.

Table 3. Average scores for researched instruments for satisfaction

Instruments	Range	Mean	SD
Learner-learner	1-6	3.93	1.69
Learner-instructor	1-6	4.78	0.93
Learner-content	1-6	4.98	1.07
Game self-efficacy	1-8	7.02	1.46
Self-regulated learning	1-8	5.11	0.84
Satisfaction	1-6	5.07	0.99

Source: prepared by the author.

The results confirmed the importance of using games in university education and confirm the first hypothesis. All three types of interaction were significantly correlated with student satisfaction. Learner-content interaction was the strongest predictor of student satisfaction. Learner-learner interaction was not a significant predictor for student satisfaction. Given the results, it may be helpful for institutions to provide appropriate training regarding game and technologies skills to improve students' game self-efficacy before using the game in courses are implemented. In terms of effective learning, the students' mean rankings progressively increased as the satisfaction of learning objectives, assessment plans, online platforms, webinars, and tutorials are high. Thus, this indicates that participants perceived the game learning platforms as experiential and constructive learning environments.

On the basis of the conducted research on student satisfaction with the use of games as didactic tools, the following key dependencies can be indicated:

– interesting way of learning, because the students may gather or examine the knowledge while playing the game,

– acceleration of the learning process through the active individual engagement of players,

– possibility to observe progress in the development of skills and improvement of qualifications,

– connecting the knowledge from different areas of business,

– strong motivation of the game participants towards active learning instead of passive receipt of lectures' content,

– shaping the skills of knowledge usage in practice, interactive character that enables players to quickly obtain information about the results of their decisions.

V. Assessing student learning and measuring learning objectives

Assurance of Learning (AoL) is a systematic and ongoing process that assesses and evaluates student learning outcomes to guarantee educational excellence. Assurance of learning refers to processes for demonstrating that students achieve learning expectations for the programs in which they participate. Universities use

assurance of learning to demonstrate accountability and assure external constituents such as potential students, that the school meets its goals. By measuring learning the universities can evaluate its students' success at achieving learning goals, use the measures to plan improvement efforts, and (depending on the type of measures) provide feedback and guidance for individual students. Quality assurance processes ensure that content aligns with established educational standards, ensuring that the materials are relevant, appropriate, and effective for the intended audience. This study aims to evaluate the effectiveness of student learning outcomes through the use of games through the methodology of the AoL.

The second goal of the conducted research was assessment of the assurance of learning refers to the sudends in the use of games in university education and proving the second hypothesis. In this regard, the success rate of the students can be determined based on the obtained grades and results at the end of the respective course by using the following function:

$$AoL = f(R, M, K, P\_I) \tag{1}$$

where: AoL – Assurance of Learning
R – result
M – motivation
K – knowledge
P – practice experience
I – interdisciplinary knowledge

If using the game is understood as a feature, then the student's individual is characterized by need of success, inner controllability and high intellectual capabilities (Wawer et al. 2022).

These are the potential results of game participation for the students assurance of learning, which are related to (1) evaluation of the correctness of business solutions (business decisions) or verification of the theoretical knowledge in practice, sensitivity evaluation of game outcomes on changes of business decisions taken, (2) knowledge gathering during playing, and (3) the usage of knowledge from different areas of business (e. g. finance, marketing, human resources, other resources) (Wawer et al. 2022).

However, if the game is supposed to verify possessed knowledge, possibility of its implementation or other skills such as analytical thinking or working against the clock, it should be used at the very end of the education process. The knowledge and skills gained from the application of this approach by the students can be systematized in the following way: (1) the usage in practice of the business rules known from the theory, (2) strategic and analytical thinking, (3) ability to work in a team, (4) interpersonal communication, (5) working in the conditions of hard competition and under time pressure, (6) effective activity in the situation without full information.

According to the research carried out by FEBA, simulation games were given an average mark of m = 5.52 with a standard deviation σ = 0.37 compare with traditional lecture (m = 4.32 and σ= 0.67). In the period before the use of games in the teaching process, most students were not very interested in the learning process. They lacked motivation to learn, as well as the desire to participate in lectures and seminars. This was one of the main reasons for the lower results achieved at the end of the semester. In this regard, it was necessary to change the used teaching methods and techniques. I started using games and other innovative techniques during lectures in 2023 and 2024. They are associated with active learning. These methods ask students to engage in their learning by thinking, discussing, investigating, and creating. In class, students practice skills, solve problems, struggle with complex questions, make decisions, propose solutions, and explain ideas in their own words through writing and discussion. As a result, students became more active in the learning process, which in turn made them more motivated.

When assessing the results of simulation games, the respondents' evaluation of conscious broadening of knowledge, confronting it with practice, implementing it in various fields of business and transferring it among the game participants (indications between 81% and 92%) reached very high, almost identical, scores.

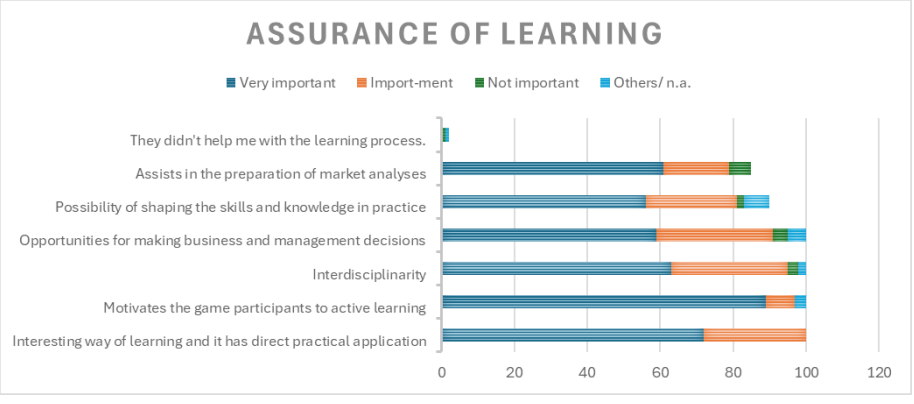
The participants also indicated the importance of games to student success (table 4). The maximum score (100%) was gained by the statement that games are an interesting form of education, and the resulting knowledge has direct practical application. The remaining indicated indicators were also: interdisciplinarity (95%), possibility of gaining fast feedback about results of decisions made (91%) as well as recognition of market rules (79%) and possibility of shaping the skills and knowledge in practice (81%). Motivation of the participants for active learning during simulation games reached the score of 97%.

Table 4. The indicators showing the evaluation of student assurance learning connection with the use of games as a didactic tool in FEBA? (%)

№	Indicators	Very important	Import-ment	Not important	Others/ n.a.
1	Interesting way of learning and it has direct practical application	72	28	0	0
2	Motivates the game participants to active learning	89	8	0	3
3	Interdisciplinarity	63	32	3	2
4	Opportunities for making business and management decisions	59	32	4	5
5	Possibility of shaping the skills and knowledge in practice	56	25	2	7
6	Assists in the preparation of market analyses	61	18	6	0
7	They didn't help me with the learning process.	0	0	1	1

Source: prepared by the author.

The obtained results are summarized and presented in fig. 2.



Source: prepared by the author.

Figure 2. Indicators for assurance of learning

Today, the strategic task of educators-innovators is the effective educational motivation for students, which will remove the teaching strain, create the bilateral teacher-student contact, assist to practically assimilate the acquired theoretical knowledge, increases the students' self-confidence. We believe that the effective motivation first of all is the correct selected education methods, which encourage students for teaching and effective usage of their knowledge.

VI. Discussion

This study aims is to determine the main trends, challenges and opportunities in the application of gamification in higher education. The research also analyses the role of perceived seriousness and playfulness in the learning process of participants who actually experience multiple simulation games in different courses in FEBA. Given that there are increasing interests in use of gamification instruments in education/training context. This study tries to identify the the use of innovative mechanisms of learning process in the context of gamification-based learning. By adopting the existing theories related to the game process and individual motivation, This study confirmed the two hypotheses to investigate student satisfaction with the use of gamification in university teaching and to determine the assurance of learning outcomes through the use of gamification.

The results of the research confirmed the importance of using gamification approaches in university education and confirm the hypotheses related to the satisfaction of the students with the learning process and follow-up evaluation of the obtained learning results. According to research carried out by FEBA, in courses where simulation games were used, students obtained an average mark of

m = 5.52 as the results achieved by them at the end of the semester. A methodology is proposed to assurance of learning, considering the relationship between result, motivation, knowledge, practice experience and interdisciplinary knowledge.

We found that games have positive effects on students' motivation and achievement. Besides, the process of using games in the classroom should take the following steps into consideration respectively. First, determining the aim of using gamification. Second, playing the business game by yourself. Third, ensuring it meets external expectations. Fourth, creating sufficient. Fifth and last, assessing the participants' reactions and progress throughout the play.

VII. Conclusion

Digitization and virtualization in education are motivating, inspiring and potentially broad challenges for individuals and societies. Smart and intelligent educational tools and resources should allow individuals to develop more complete expertise, knowledge and skills and unleash their innovative prospective.

The place of games in the area of education depends on the purpose of their usage. Should the game be used to arouse students' interest in a given subject and indicate the most important issues from a selected area of knowledge, then it is necessary to start implementing it from the very beginning of the education process. Nowadays, the use of interactive teaching methods and in particular the "game" is becoming a central element of these systems and a major tool for obtaining competitive advantages in the market of educational services. Research on modern students' education methods and techniques proves that education based on practical usage of knowledge and training in a target activity environment is the most effective. Depending on the discipline, an environment can have real character, i. e. it exists in reality, or a virtual character, i. e. it comes into being through simulation of real phenomena. Research on the usage of simulation games in students' education proves that a well-designed game should actually reduce the class time needed to teach a particular concept.

The use of technology and game learning in higher education has increased in recent years. These changes are having an impact on traditional education as they become integrated into universities classes. Evidence indicates that hybrid learning is truly a unique learning environment. Educationally useful research on learning needs to focus on the relationships between different modes of learning (for example, face-to-face and game) and especially on the nature of their integration. Integrating a variety of teaching modalities and approaches can increase student self-confidence. Therefore, this study recommends teachers to use games in teaching since they have positive effects on students' achievement and motivation.

NOTES

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2. FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION (FEBA).
3. SOFIA UNIVERSITY "SV. KLIMENT OHRIDSKI".

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REFERENCES

AHMED, H. &WAIS, S., 2012. The low level of academic achievement among high school students from teachers and students' perspective. *Journal: Surra Man Raa*, vol. 28, no. 8, pp. 1 – 38. ISSN: 1813-1735.

BURNS, M., 2011. Education Development Center, Technology Teaching And Learning, Research, Experience, & Global Lessons Learned, *Developing Rehabilitation Assistance to Schools and Teacher Improvement (D-RASATI) Project.*

CRONJE, J., 2021. A decision framework for Blended Learning in the Covid-19 Pandemic. *Academia Letters*, [online] [viewed 5 May 2024]. Available from: https://doi.org/10.20935/AL275.

DAVIDKOV, TZ.; TSVETANSKA, S., 2023. Teacher Value Profile in a National Context, *Pedagogy*, vol. 95, no. 7, pp. 863 – 879, ISSN (print):0861-3982, ISSN (online):1314-8540.

GACHKOVA, M.; SOMOVA, E., & GAFTANDZHIEVA, S., 2020. Gamification of courses in the e-learning environment. In: *IOP conference series: Materials science and engineering*, vol. 878, no. 1, pp.12 – 35.

GEE, J.P. & SHAFFER D.W., 2010. Looking where the light is bad: Video games and the future of assessment. *Epistemic Games Group Working Paper, no. 2010-02*. [online]. [viewed 12 May 2024].

GENTRY, S. V.; GAUTHIER, A.; EHRSTROM, B. L.; WORTLEY, D.; LILIENTHAL, A.; CAR, L. T.; DAUWELS-OKUTSU, S.; NIKOLAOU, C. K.; ZARY, N. & CAMPBELL, J., 2019. Serious gaming and gamification education in health professions: Systematic review. [online]. *Journal of Medical Internet Research*. vol. 21, no. 3 [viewed 10 May 2024]. Available from: https://doi.org/10.2196/12994.

HADFIELD, J., 2002. *Elementary communication games* (3rd ed.). Hong Kong: Thomas and Nelson Sons Ltd.

KOBARI, S., et al., 2022. The Effect of Using Games in Teaching on Students' Achievement and Motivation. Radical Solutions in Palestinian Higher Education. *Lecture Notes in Educational Technology*, pp. 29 – 39. Available from: https://doi.org/10.1007/978-981-19-0101-0 [online]

[viewed 12 May 2024]. ISBN 978-981-19-0100-3 ISBN 978-981-19-0101-0 (eBook).

KRASTEVA, N.; POTEBNYA, A., 2023. *Development of a gamified electronic learning resource for children: marketing in folk tales and fiction.* International Institute of Social and Economic Sciences. ISBN 978-80-7668-006-7, ISSN 2336-6044.

KUO, Y.-C.; WALKER, A.; BELLAND, B. & SCHRODER, K., 2013. A Predictive Study of Student Satisfaction in Online Education Programs. *International Review of Research in Open and Distributed Learning*, vol. 14, no. 1, pp. 16 – 39.

LIN, Y. L.; HUANG, S. W. & CHANG, C. C., 2019. The impacts of a marine science boardgameon motivation, interest, and achievement in marine science learning. *Journal of Baltic Science Education*, [online]. vol. 18, no. 6, pp. 907 – 923. [viewed 9 May 2024]. Available from: https://doi.org/10.33225/jbse/19.18.907.

MAHBOUBIAN, M., 2010. Educational aspects of business simulation software's, *Procedia Social and Behavioral Sciences,* no. 2, pp. 5403 – 5407.

MOORE, M. G., 1989. Three types of interactions. *The American Journal of Distance Education*, vol. 3, no. 2, pp. 1 – 6.

STEENKAMP, L.; BAARD, R. & FRICK, B., 2009. Factors influencing success in first-year accounting at a South African university: A comparison between lecturers' assumptions and students' perceptions. *South African Journal of Accounting Research*, vol. 23, no. 1, pp. 113 – 140.

VELINOVA-SOKOLOVA, N., 2022. *Education 4.0 and innovative techniques in teaching*. Sofia: St. Kliment Ohridski University Press. ISBN 978-954-07-5414-7.

WAWER, M., et al., 2022. Business Simulation Games in Forming of Students' Entrepreneurship. *IJEMS*, vol. 3, no. 1, pp. 49 – 71.

YAMANI, H. A., 2021. A conceptual framework for integrating gamification in e-learning systems based on instructional deign model. *International Journal of Emerging Technologies in Learning,* vol. 16, no. 4.

ZAINUDDIN, Z., 2017. Implementing Moore's model of interaction in a flipped-class instruction. *The Online Journal of Distance Education and e-Learning* [online], vol. 6, no. 3, [viewed 15 May 2024].

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