GAMIFICATION IN CULTURAL HERITAGE: BEST PRACTICE CASE STUDIES FROM BULGARIA

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Abstract

Recently, gamification has gained significant attention. Even fields such as cultural heritage have not gone unnoticed, and various gamification mechanics have been widely implemented for different purposes. Bulgaria is among the countries with high interest in the matter. Although some successful initiatives have been carried out and are still being implemented, there is a lack of knowledge about what does not work well and why, which will help stakeholders avoid making the same mistakes in the future. The article aims to select best practices for gamification in Bulgaria's cultural heritage. This purpose is addressed by applying a framework for determining best practice case studies on gamification in cultural heritage. Based on a set of twelve gamification criteria and nine impact criteria and by keeping to a three-stage methodology, the first two top-rated case studies have been selected as best practices and briefly described.

Keywords: gamification, cultural heritage, best practice approach, Bulgaria

Introduction

Nowadays, gamification is among the most trending topics, and it is widely and successfully implemented in many areas to solve a variety of educational, social, cultural, business, and even health problems. According to the global management consulting company IMARC Group, the global gamification market size reached USD 22.2 billion in 2024, and it is expected to reach USD 102.5 billion by 2033, expanding at a CAGR of 18.53% during the period from 2025 to 2033[1]. The existence of accumulated knowledge and good practices for implementing gamification in different fields, as well as evidence for its positive impact on users' attitudes, intentions, behaviour, and engagement, makes it alluring to various actors as a potential source they can learn from.

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[1] "Gamification Market Report by Component (Solution, Service), Deployment Mode (On-premises, On-Cloud), Enterprise Size (Small and Medium-sized Enterprises, Large Enterprises), Industry Vertical (BFSI, Retail, Education, IT and Telecom, Manufacturing, Media and Entertainment, and Others), and Region 2025-2033", IMARC, accessed November 23, 2024, https://www.imarcgroup.com/gamification-market.

Researchers and practitioners from all fields are aware of the best practice approach[2] and they have long recognised the benefits of applying it. Although the best practice approach is undoubtedly beneficial and could be used in various settings, the main issue is to create a reliable framework and criteria for selecting best practices.

Cultural heritage is a fertile field for applying various gamification tools, and many aspects of heritage work have been gamified. There is evidence for the successful application of gamification as a heritage and destination marketing tool, tourism product design, safeguarding and preservation of tangible and intangible heritage assets, etc.[3]

Marques, Pedro, Dionísio, Almeida, and Silva[4] a systematic literature review concluded that a significant portion of the Scopus and WoS publications on gamification in cultural heritage originated from European universities. Bulgaria, along with Portugal, Italy, Greece, and the United Kingdom, was recognised as a country that contributed to the field. Although the research in the field encompasses various aspects from heritage education to heritage dissemination, there is no study on the best practices for gamification in cultural heritage neither for Bulgaria nor other European countries, which various stakeholders could use as examples to learn from.

The objective of this article is to select best practice case studies for gamification in cultural heritage in Bulgaria, which could be used by researchers, practitioners, the public, and local authorities as a source of knowledge. The article is structured in an introduction, three paragraphs, and a conclusion. The first paragraph focuses on applying gamification to cultural heritage in Bulgaria. The second paragraph is dedicated to the best practice case study selection methodology. The third paragraph includes implementing the method in Bulgarian cultural heritage and briefly describing the two best-ranked gamified initiatives qualified as best practices.

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[2] Jiannan Wu, Yao Liu, and Stuart Bretschneider, "Best practice is not just "best": An empirical study based on judges' perceptions". *Urban Governance* 3, Iss. 2 (2023): 130-137, https://doi.org/10.1016/j.ugj.2023.03.005.

[3] Imran Khan, I., Ana Melro, Ana Carla Amaro, Lidia Oliveira, "Role of Gamification in Cultural Heritage Dissemination: A Systematic Review", in *Proceedings of Sixth International Congress on Information and Communication Technology. Lecture Notes in Networks and Systems 235*, ed. Yang, XS., Sherratt, S., Dey, N., Joshi, A. (Springer, Singapore, 2022), https://doi.org/10.1007/978-981-16-2377-6_37; Boaventura DaCosta & Carolyn Kinsell, "Serious Games in Cultural Heritage: A Review of Practices and Considerations in the Design of Location-Based Games". *Education Sciences* 13, no. 1 (2023): 47, https://doi.org/10.3390/educsci13010047.

[4] Celio G. Marques et al., "A systematic literature review of Gamification in Cultural Heritage: Where are we? Where do we go?". *Journal of Tourism and Heritage Research* 5, no. 4, (2022): 64-83, https://www.jthr.es/index.php/journal/article/view/417.

Gamification in cultural heritage

Cultural heritage experiences many issues due to economic and social transformations, as well as natural and human-driven causes[5]. Recently, gamification and all other immersive technologies have found their significant role and power in creating more inclusive, engaging, and memorable heritage experiences for diverse target audiences, enriching user experience, and fostering a deeper connection and even bond with cultural heritage. Integrating game-like elements and mechanisms into non-game environments as cultural heritage is expected to contribute to preserving cultural heritage[6], involving more citizens in safeguarding cultural heritage, promoting a broader understanding and cultivating appreciation of cultural heritage, and fostering a shared bond and sense of belonging to a community among the generations[7].

Gamification methods and tools are broadly applied in the field of cultural heritage. Even within the cultural heritage area, the objectives of applying gamification approaches range from safeguarding digital intangible heritage[8] to innovative marketing communication for enhancing tourist engagement and creating tourism experiences[9], dissemination[10] and promoting cultural and historical heritage sites and especially museums[11], achieving higher awareness

[5] Jorge Garcia-Fernandez & Leonor Medeiros, "Cultural Heritage and Communication through Simulation Videogames—A Validation of Minecraft", *Heritage 2*, no. 3 (2019): 2262-2274, https://doi.org/10.3390/heritage2030013; Milo Skovfoged et al., "The tales of the Tokoloshe: safeguarding intangible cultural heritage using virtual reality", in *Proceedings of the Second African Conference for Human Computer Interaction: Thriving Communities (AfriCHI '18)*, no. 66 (ACM, 2018): 1–4, https://doi.org/10.1145/3283458.328348.

[6] Elisa Rubegni et al., "A format to design narrative multimedia applications for cultural heritage communication", in *Proceedings of the 2010 ACM Symposium on Applied Computing (SAC '10)*, (ACM 2010): 1238–1239, https://doi.org/10.1145/1774088.1774350.

[7] Jorge Garcia-Fernandez & Leonor Medeiros, "Cultural Heritage and Communication through Simulation Videogames—A Validation of Minecraft", *Heritage 2*, no. 3 (2019): 2262-2274, https://doi.org/10.3390/heritage2030013; Panagiotis Petridis et al., "The Herbert Virtual Museum", *Journal of Electrical and Computer Engineering*, (2013): 1-8, 487970, http://dx.doi.org/10.1155/2013/487970.

[8] Marinela Alivizatou, "Digital Intangible Heritage: Inventories, Virtual Learning and Participation", *Heritage & Society 12*, no. 2–3 (2024): 116–135, https://doi.org/10.1080/2159032X.2021.1883950.

[9] Feifei Xu et al., "Gamification in Tourism", *Information and Communication Technologies in Tourism*, (Springer, Cham, 2014): 116-135, https://doi.org/10.1007/978-3-319-03973-2_38; Feifei Xu et al., "Tourists as Mobile Gamers: Gamification for Tourism Marketing", *Journal of Travel & Tourism Marketing 33*, no. 8, (2016): 1124–1142, https://doi.org/10.1080/10548408.2015.1093999.

[10] C. Ortiz, R. Ramirez Coronel, and V. Noriega, "The dissemination of cultural heritage through the creation of an interactive web repository", *EDULEARN22 Proceedings*, (2022): 4371-4377, https://doi.org/10.21125/edulearn.2022.1045.

[11] Zhaokang Li, Qian Zhang, Jiayue Xu, Chuntao Li, and Xi Yang, "Gamification of virtual mu-

and motivation of the students in Cultural Heritage study fields[12], and cultural heritage crowdsourcing[13].

Bulgaria is among the countries that contribute much to the matter[14]. A search[15] the SCOPUS database identified 329 documents on gamification in cultural heritage published between 2013 and 2024. Co-authorship analysis[16] performed on the bibliographic SCOPUS database file identified forty-six of a total of sixty-two countries, which meet the threshold of a minimum of two documents per country, and classified them into sixteen clusters (Fig. 1a). Thirty-two of the countries (e.g., the United Kingdom, Italy, Greece, Portugal, Ukraine, Egypt, Turkiye, etc.), grouped in eight clusters (Fig. 1b), are the best performers on the total link strength measure and best collaborators as they have internationally co-authored journal articles. These eight clusters are in the core of the network map with a total link strength value varying from twenty-six for the United Kingdom to one for Ukraine. Bulgaria's cluster is cut off from the rest of the sample as no Bulgarian scholars collaborated with their colleagues from abroad. Although there is no co-authorship between Bulgarian scholars and scholars from other countries, which results in an isolated, peripheral cluster with no connections with the different clusters (Fig. 1a), as well as the SCOPUS database is not exhaustive, Bulgaria is still among the leading contributors[17], especially in the following fields: cultural heritage education, preservation, and tourism.

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seum curation: a case study of Chinese bronze wares", *Heritage Science 12*, No. 348 (2024), https://doi.org/10.1186/s40494-024-01464-2.

[12] Oleg Konstantinov, Eugenia Kovacheva, and Nataliya Palikova, "Gamification in cultural and historical heritage education", INTED2018 Proceedings (2018): 8443-8451, https://doi.org/10.21125/inted.2018.2043.

[13] Oula Seitsonen, "Crowdsourcing cultural heritage: public participation and conflict legacy in Finland", *Journal of Community Archaeology & Heritage 4*, no. 2 (2014): 115–130, https://doi.org/10.1080/20518196.2016.1252129; Dora Constantinidis, "Crowdsourcing Culture: Challenges to Change", in *Cultural Heritage in a Changing World*, ed. Karol J. Borowiecki, Neil Forbes, Antonella Fresa, (Springer, Cham, 2016): 215-234 https://doi.org/10.1007/978-3-319-29544-2_13.

[14] Celio G. Marques et al., "A Systematic Literature Review of Gamification in/for Cultural Heritage: Leveling up, Going Beyond", *Heritage 6*, no. 8 (2023): 5935–595, https://doi.org/10.3390/heritage6080312; Celio G. Marques et al., "A systematic literature review of Gamification in Cultural Heritage: Where are we? Where do we go?". *Journal of Tourism and Heritage Research 5*, no. 4, (2022): 64-83, https://www.jthr.es/index.php/journal/article/view/417.

[15] The search in SCOPUS database was implemented by the statement TITLE-ABS-KEY ("gamif*" AND "heritage"), without any restrictions on date range.

[16] Co-authorship analysis was performed by VOSviewer, and authors' countries were used as a unit of analysis.

[17] Bulgaria's cluster includes ten documents, fifteen citations, and a total strength of co-authorship links of zero.
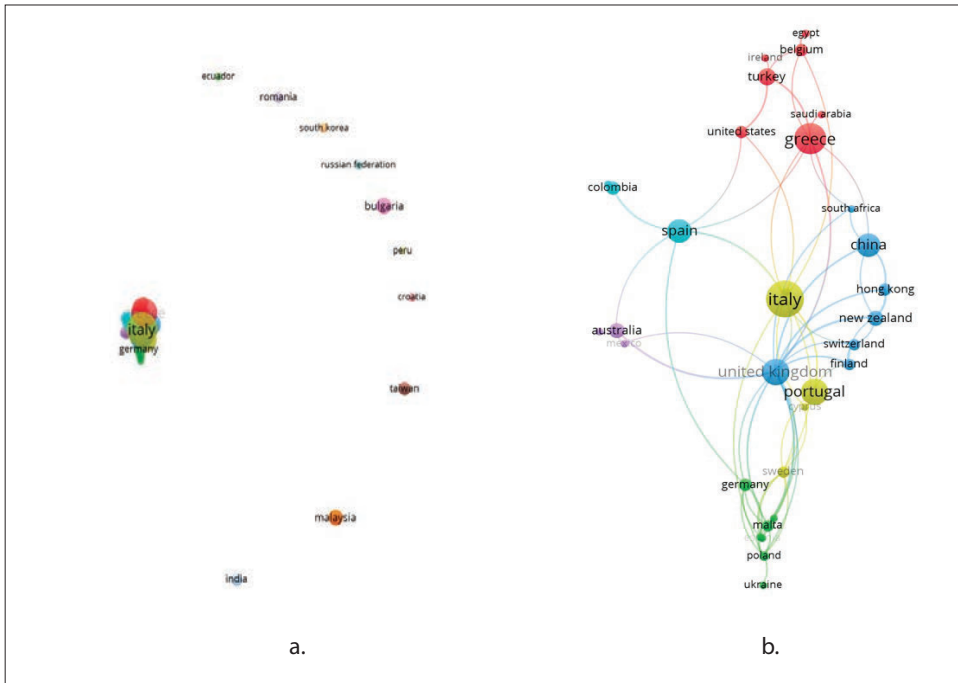
Fig. 1. Bibliometric map based on the network of co-authorship relations among 46 countries (visualisation weight: number of publications).
Source: authors' research

Bulgarian scholars' interest in gamification in cultural heritage dates back to 2015. Multiple scientific publications use gamification as a learning and teaching strategy to improve cultural and historical awareness of Bulgarian students, increase their motivation and curiosity to learn and experience cultural heritage and cultivate better comprehension strategies and creative thinking[18]. Some Bulgarian scholars highlight the power of gamified methods and tools in engaging

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[18] Neviana Krasteva & Desislava Alexova, "Gamification in the field of education, culture and tourism – cases from Bulgaria", *Czasopismo Naukowe „Turystyka – zarządzanie, administracja, prawo" 1*, (2023): 19-28; Desislava Paneva-Marinova et al., "Tell the Story of Ancient Thracians Through Serious Game", in *Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection, EuroMed 2018. Lecture Notes in Computer Science 11196*, (Springer, Cham 2018), https://doi.org/10.1007/978-3-030-01762-0_44; Desislava Paneva-Marinova & Radoslav Pavlov, "Mini-symposium on future trends in serious games for cultural heritage", in *8th International Conference Digital Presentation and Preservation of Cultural and Scientific Heritage, DiPP 8*, (DiPP, 2018): 241-244, https://doi.org/10.55630/dipp.2018.8.25; E. Kovatcheva & N. Palikova, "Learning And Gamification In Digitalised Heritage Environment", in 10th annual International Conference of Education, Research and Innovation (ICERI2017), (2017): 5280, https://doi.org/10.21125/iceri.2017.1383; K. Stefanov et al., "Reusing components from cultural heritage games – the RAGE project approach", in *6th International Conference on Digital Presentation and Preservation of Cultural and Scientific Heritage, DiPP 2016, 6*, ed. Radoslav Pavlov & Peter Stanchev, (2016): 49-62, https://doi.org/10.55630/dipp.2016.6.5.

and motivating kids to learn cultural and historical heritage, increasing their awareness, and developing their affiliation with the values of the pan-European cultural heritage[19]. Another group of Bulgarian researchers explores the potential of gamification for involving users in preserving and protecting cultural heritage and raising awareness of climate resilience and built heritage sustainability[20].

Among the aspects of cultural heritage that Bulgarian scholars are focusing their research efforts on is the application of gamification as an approach for increasing and customising visitors' experiences in Digital Cultural Content Management Systems[21], which refer to digital libraries with digital cultural resources, digital collections of Bulgarian culture and history, and repositories related to Bulgarian culture and history.

The potential and power of gamification as a marketing tool of heritage tourism do not remain unnoticed and unexplored by Bulgarian researchers. Gamified applications are used for the interactive discovery of Bulgarian cultural and historical sites[22] and for promoting Bulgaria's capital, Sofia, as a tourist destination and cultural and historical heritage. A key informant survey[23], conducted among travel agencies and the hospitality sector in Sofia revealed that gamification applications are recognised as an essential part of destination management, a valuable tool for creating added value and awareness of the destination tourist resources, for providing a unique, immersive, and engaging experience to tourists, attracting and retaining more visitors and increasing revenues, a management solution for urban public areas in terms of spatial concentration of tourists. The survey concluded that gamified applications are implemented as a powerful and effective technique for destination marketing in the tourism sector in Sofia, which provides competitive advantages, and tourism organisations with a strong innovation culture are more adept at leveraging gamification for marketing and management goals.

[19] Vladimir Georgiev & Aleksandra Nikolova, "Virtual reality simulations for presenting cultural-historic content in e-learning for kids", in *11th International Conference on Digital Presentation and Preservation of Cultural and Scientific Heritage, 11,* (DiPP 2021): 267–272, https://doi.org/10.55630/dipp.2021.11.24.

[20] Boyan Bontchev et al., "Let Us Save Venice"—An Educational Online Maze Game for Climate Resilience", *Sustainability 14*, no. 1 (2022): 7, https://doi.org/10.3390/su14010007.

[21] Maria Dimova, "Towards models and tools to increase and customize visitors' experiences in a digital cultural content management system", in *7th International Conference on Digital Presentation and Preservation of Cultural and Scientific Heritage 7,* (DiPP 2017): 239–242, https://doi.org/10.55630/dipp.2017.7.22.

[22] Desislava Ivanova & Vladimir Kadurin, "Mobile application for interactive discovery of Bulgarian cultural and historical places", in *46th International Conference on Applications of Mathematics in Engineering and Economics 2333*, no. 1 (AMEE 2020), https://doi.org/10.1063/5.0042259.

[23] Sonia Mileva, Innovation culture as a premise for engaging and memorable tourist experiences through gamification, *Turyzm/Tourism 33*, No. 2 (2023): 83-94, https://doi.org/10.18778/0867-5856.33.2.07.

Bulgaria's tourism and hospitality sector implements various micro and location-based gamification applications to attract more visitors, improve their experience at the destination, enhance visitors' or tourists' awareness, engagement, and commitment, and increase satisfaction. They also provide interactive experiences to engage tourists and improve their understanding of the historical and cultural significance of the exhibits.

Gamification methods and techniques applied in Bulgaria are primarily external or attitudinal/behavioural[24] as they are implemented as a marketing tool or induce a change in attitudes/behaviours regarding cultural heritage. They are primarily based on:

(1) heritage scavenger hunts, which encourage tourists to explore a specific destination by collecting artifacts, completing tasks, or uncovering clues related to its tangible and intangible heritage,

(2) interactive trivia quizzes, which involve asking questions to assess visitors' or tourists' knowledge about the cultural heritage of the places they visit and thus create a higher appreciation and deeper understanding of their cultural and historical significance,

(3) heritage virtual tours, which allow tourists or visitors to explore cultural and historical sites and assets virtually by developing an interactive narrative-based virtual environment with 360° photos and images of various cultural and historical heritage places, objects, and artifacts, or

(4) augmented reality experiences, which allow tourists or visitors to entertain, learn about, and explore a destination by creating interactive experiences that integrate different forms of digital information (3D models, 2D and 3D animations, sound, videos, and many other multimedia forms) within real-world settings.

To boost visitors' or tourists' awareness and engagement and enhance the promotion and conservation of cultural and historical sites and assets, gamified applications applied in Bulgaria incorporate a variety of game-like components and mechanics, which:

(1) drive visitors or tourists to complete actions and tasks and explore further a specific cultural and historical heritage site or artifact,

(2) create a sense of ownership and deeper connection by providing visitors or tourists with tailored experiences through tailoring interaction to different visitors or tourists in the same context or delivering personalized cultural and heritage content that fits their preferences and tastes,

(3) allow visitors or tourists to progress and reach the next milestone through achievements by unlocking exclusive content, collecting points, rewards, discounts, and badges,

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[24] In their book, Kevin Wernach and Dan Hunter differentiate three types of gamification: internal, external, and behavior-change gamification. Kevin Wernach and Dan Hunter, *For the win: How game thinking can revolutionize your business* (Wharton School Press, 2012).

(4) foster a sense of community and interaction by collaborating, competing with others, comparing one's progress to opponents' progress on leaderboards, challenging other tourists or visitors, or sharing accomplishments with them.

Despite the active participation and contribution of Bulgarian scholars to gamification in cultural heritage, there is still a lack of comparative research on gamified applications implemented in the Bulgarian cultural heritage sector. Most studies[25] focus on presenting and discussing specific case studies applied in Bulgaria or a given destination without real comparison across various initiatives. No studies rely on a framework and set of criteria for selecting practices for gamifying Bulgarian cultural heritage that are superior to others and could be used as a benchmark to strive for.

Best practice approach to gamification in cultural heritage

The significance of protecting and preserving cultural heritage and the existence of evidence for the successful implementation of various gamification methods and tools in cultural heritage[26] makes it possible to identify, assess, and select case studies and initiatives as 'best practices', capture what was done, why it was done that way, and what went wrong, and implement all lessons learned from experience to cultivate an appreciation of cultural heritage and engage current and future generations with its preservation and revalorisation. It is valuable to gain knowledge from others' experiences and to have evidence for what is effective in practice and what is not.

The importance of best practices approach is recognised in a variety of areas. It is widely applied in fields such as education[27], human resource management,

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25 Sonya Mileva et al., "Gamified Applications For Sofia, Promoting Capitals' Cultural Heritage", Cultural and Historical Heritage: Preservation, Presentation, Digitalization (KIN Journal) 6, no. 2 (9) (2020): 49-63, http://www.math.bas.bg/vt/kin/files/papers/6_2/05-KIN-6-2-2020.pdf.

26 Boaventura DaCosta & Carolyn Kinsell, "Serious Games in Cultural Heritage: A Review of Practices and Considerations in the Design of Location-Based Games". *Education sciences 13*, no. 1 (2023): 47, https://doi.org/10.3390/educsci13010047; Goncalo Baptista & Tiago Oliveira, "Gamification and serious games: A literature meta-analysis and integrative model", *Computers in Human Behavior 92*, (2019): 306-315, https://doi.org/10.1016/j.chb.2018.11.030; Jorge Garcia-Fernandez & Leonor Medeiros, "Cultural Heritage and Communication through Simulation Videogames—A Validation of Minecraft", *Heritage 2*, no. 3 (2019): 2262-2274, https://doi.org/10.3390/heritage203013.

27 Mary T. Peters & Timothy E. Heron, "When the best is not good enough: An examination of best practice", *The Journal of Special Education 26*, no. 4 (1993): 371–385, https://doi.org/10.1177/002246699302600403.

business[28], risk management[29], heritage management[30], public management[31], energy management[32], family planning[33], medicine, public health[34], etc. Plenty of conceptualisations, frameworks, and criteria for evaluating case studies and qualifying them as best practices vary from field to field.

The best practices are conceptualised as approaches and techniques proven through research and experience to lead to the desired result reliably[35]; a set of guidelines or standards that are well-known as producing good outcomes if accepted[36]; practices that are considered to be superior at delivering specific outcomes and are implemented as benchmarks to strive for[37]. The best practices are conceptualised as knowledge about what works well in given contexts, settings, and environments, leads to the desired results, and could be used as a base for developing and implementing solutions that allow adaptation to suit similar problems in other settings and contexts[38].

[28] S. Dani et al., "A methodology for best practice knowledge management", in *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture 220*, no. 10 (2006): 1717-1728, https://doi.org/10.1243/09544054JEM651.

[29] Tarek Rana et al., "New development: Integrating risk management in management control systems—lessons for public sector managers", *Public Money & Management 39*, no. 2 (2019): 148–151, https://doi.org/10.1080/09540962.2019.1580921.

[30] Mahmoud Sodangi et al., "Best Practice Criteria for Sustainable Maintenance Management of Heritage Buildings in Malaysia", *Procedia Engineering 77*, (2014): 11-19, https://doi.org/10.1016/j.proeng.2014.07.017.

[31] Jiannan Wu et al., "Best practice is not just "best": An empirical study based on judges' perceptions", *Urban Governance 3*, no. 2 (2023): 130-137, https://doi.org/10.1016/j.ugj.2023.03.005.

[32] Nicholas Spates, "Best practice approach: How to plan, execute, & thrive in the "changing" world of energy management, energy efficiency, & climate change", World Energy Engineering Congress 2009, WEEC 2009, Vol. 1 (2008): 392-418.

[33] WHO Regional Office for Africa, *A Guide to Identifying and Documenting Best Practices in Family Planning Programmes*, (2017), https://iris.who.int/bitstream/handle/10665/254748/9?sequence=1.

[34] Eileen Ng & Pierpaolo De Colombani, "Framework for Selecting Best Practices in Public Health: A Systematic Literature Review". Journal of Public Health Research 4, no. 3 (2015): 157-170, https://doi.org/10.4081/jphr.2015.57.

[35] WHO Regional Office for Africa, *Guide for documenting and sharing "best practices" in health programmes*, (2008), https://www.afro.who.int/sites/default/files/2017-06/Guide_for_documenting_and_Sharing_Best_Practice_-_english_0.pdf.

[36] WHO Regional Office for Africa, *A Guide to Identifying and Documenting Best Practices in Family Planning Programmes*, (2017), https://iris.who.int/bitstream/handle/10665/254748/9?sequence=1.

[37] Matt Andrews, "The logical limits of best practice administrative solutions in developing countries", *Public administration and development 32*, no. 2 (2012): 137-153, https://doi.org/10.1002/pad.622.

[38] Marusya Smokova et al., *A guide to identifying best practices for gamification in cultural heritage* (PH Tsenov: Svishtov, 2024): 53, https://dlib.uni-svishtov.bg/handle/10610/5035.

Regardless of the field in which the best practice approach is implemented, best practice case studies hold some peculiarities that are important for their conceptualisation:

a) Case studies qualified as best practices can act as a benchmark as they are based on evidence. Essential components of best practices are documentation, systematisation, and implementation of what works well and what does not. The primary purpose is to improve future practices by avoiding mistakes that were made in the past;

b) Best practices are not considered to be perfect or optimal. No practice is best for everyone or every situation, condition, or circumstance. A best practice case study is superior to specific case studies regarding particular criteria, settings, and circumstances, but it does not remain best for a very long time;

c) The identification and documentation of best practice case studies should not be done in vain. Best practices and lessons learned from them must be shared with wider audiences and adopted to benefit more people locally, regionally, and nationally.

Despite the variety in the conceptualisation of best practices, applying the best practices approach to selecting case studies on gamification in cultural heritage requires designing a context-specific framework for gamification in cultural heritage. This article is based on the definition of best practice for gamification in cultural heritage proposed by Smokova et al.[39] Inspired by other application fields, best practice refers to a learning tool, knowledge about what gamification elements and mechanics applied to cultural heritage work well, deliver desired results, engage communities, and generate multiplier effects.

The selection of best practices for gamification in cultural heritage should be based on a context-specific selection framework. This article uses a three-stage methodology to identify best practices for gamification in cultural heritage. The first stage is primarily research-oriented, and it encompasses many research activities, such as conducting desk research and processing secondary data, as well as gathering primary data directly from a person who is experiencing the problem, has installed a specific gamified application, and visited a given cultural and heritage place. Its goal is to establish a relevant base of case studies on gamification in cultural heritage.

The second stage is evaluation-oriented, and it covers activities such as adopting context-specific criteria for selecting best practices for gamification in cultural heritage, recruiting and training evaluators, allocating case studies among the evaluators, evaluating case studies by the predefined set of criteria, measuring the consistency and agreement between the evaluators in their evaluations, calculating overall scores and ranking the case studies. This article

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[39] Marusya Smokova et al., *A guide to identifying best practices for gamification in cultural heritage* (PH Tsenov: Svishtov, 2024): 53, https://dlib.uni-svishtov.bg/handle/10610/5035.

is based on the criteria proposed by Smokova et al.[40] The authors have developed a toolkit for selecting best practices for gamification in cultural heritage. They have differentiated two groups of selection criteria. The first group is labelled as gamification criteria, and it is inspired by the gamification heuristics proposed by Tondello et al.[41] Gamification criteria include twelve sub-criteria, including six intrinsic motivation heuristics (purpose and meaning, challenge and competence, completeness and mastery, autonomy and creativity, relatedness, immersion), three extrinsic motivation heuristics (ownership and rewards, scarcity, loss avoidance), and three context-depended heuristics (feedback, unpredictability, change and disruption).

The second group is labelled as impact criteria, and it encompasses nine sub-criteria, including two performance criteria (effectiveness, sustainability), two accessibility and inclusion criteria (accessibility, inclusion), two innovation and creativity criteria (originality, creativity), and three social and cultural impact criteria (social development, enhancement of social culture, multiplier effects).

According to the proposed evaluation framework, all case studies should be evaluated by two evaluators to avoid subjectivity and ensure unbiased evaluations. Evaluators should evaluate case studies using a 6-point rating scale for all criteria, where five is for very high, 4 – is for high, 3 – is for neither high nor low, 2 – for low, 1 – for very low, 0 – for no applicability, no existence of the criterion. All case studies should also describe the territory's cultural heritage and density, the gamification elements and mechanics used, and community engagement.

The third stage is scoring-oriented. It encompasses scoring and ranking activities related to calculating evaluators' scores and the final score for each case study, sorting the case studies in decreasing order based on the final scores, and selecting the best performers.

The proposed context-specific selection framework was applied in Bulgaria to identify community-based practices for cultural heritage gamification that perform best on the evaluation criteria.

Best practice case studies for cultural heritage gamification from Bulgaria

To identify best practice case studies for cultural heritage gamification in Bulgaria, the research was done from March to May 2024. Various sources and data types were used to establish a relevant base for case studies on gamification in Bulgarian cultural heritage. Both primary and secondary data were used, varying from academic articles and papers, newspaper interviews and articles, publications on websites, and evaluators' opinions based on their experience with

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[40] Marusya Smokova et al., *A guide to identifying best practices for gamification in cultural heritage* (PH Tsenov: Svishtov, 2024): 53, https://dlib.uni-svishtov.bg/handle/10610/5035.

[41] Gustavo F. Tondello et al., "A Gameful Design Heuristics: A Gamification Inspection Tool", in *Proceedings of HCI International 2019, Human-Computer Interaction. Perspectives on Design 11566*, (Springer, Cham, 2019): 224–244. https://doi.org/10.1007/978-3-030-22646-6_16.

specific gamified applications. Secondary data were gathered through an advanced search represented by the statement ("gamification" OR "gamified application" OR "gamified process" OR "gamified tool") AND ("heritage" OR "cultural heritage") AND ("Bulgaria"). The search was run in Bulgarian and English to cover materials in both languages. The search result list was scrutinised for overlapping, relevance, and completeness. The final list of case studies, which represents the relevant base of practices for the gamification of cultural heritage in Bulgaria, includes 16 active gamified initiatives. The composition of the appropriate base was done in April 2024.

At the evaluation-oriented stage, all identified case studies were allocated randomly among fourteen evaluators to ensure that two would evaluate each case study. The evaluators were trained and assessed in April and May 2024.

After the evaluation of the case studies, the intraclass correlation coefficient[42] was calculated for all pairs of evaluations of gamified practices. Three of the case studies were assigned in the assessment by a third evaluator due to the abysmal reliability ratings and low level of agreement – below the threshold value of 0.5. As the additional evaluations were completed and the requirement for an acceptable level of agreement was met, ratings were further aggregated to calculate the final scores of the case studies. First, the relative rate for each group of criteria was calculated. Second, the relative rates for each group of criteria were averaged to generate the evaluator's final score. Last, evaluators' final scores were averaged to determine the final score of each case study for cultural heritage gamification.

The final scores for all evaluated case studies from Bulgaria vary from 27.86 to 75.71 (Fig. 2).
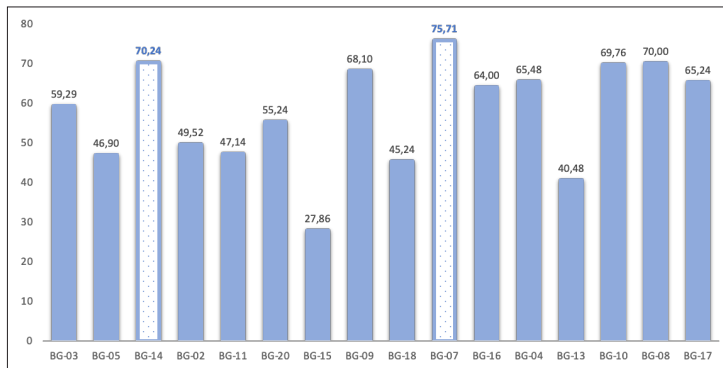

Fig. 2. Final scores for all evaluated case studies from Bulgaria
Source: authors' research

Most of the evaluated case studies from Bulgaria (87.5%) concern the gamification of tangible cultural heritage. Only two of the case studies represent

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[42] Intraclass correlation coefficient, based on two-way mixed effects, consistency, multiple evaluators/measurements, was preferred to measure the interrater reliability of evaluations and the amount of consistency between the ratings of two or more evaluators.

gamified intangible and natural heritage. Eleven case studies address cultural heritage with international (50.0%) or national (18.75%) significance. Local heritage is addressed in 31.25% of the case studies. Thirteen case studies from Bulgaria are community-based. A community was neither involved in the project design nor the project development and aftermath for only three case studies. Four case studies (25.0%) represent gamified cultural heritage in the low-density territory of Bulgaria.

Bulgarian case studies rely on various gamification mechanics and elements in both digital and analogue forms—paper maps, geolocations, storytelling, virtual reality, etc. Unlocking content, puzzles and riddles, interactive trivia quizzes, points, badges, medals, and leaderboards are used to engage and immerse visitors or tourists.

The case study with the highest score (Fig. 2), which was ranked first, is "Belogradchik highlights: A high wizard's legacy", with a value of 75.71. The case study ranked in second place is "Roman Plovdiv – Urban Game", with a final score of 70.24[43].

Case study "Belogradchik highlights: A high wizard's legacy

Belogradchik Highlights: A High Wizard's Legacy[44] In a real-life city exploration game, participants can explore ten historical landmarks in Belogradchik (Fig. 3) – Belogradchik Fortress, St. George the Victorious Church, Belogradchik Astronomical Observatory, and others. The purpose is to visit the most famous places in Belogradchik and get to know Bulgarian military heroes. Through practice, participants can explore the Bulgarian naive and intuitive art scene and admire the unique Balkan architecture of the region.

Game interface design patterns: This case study concerns cultural heritage, located in a territory with low population density but with international importance. The logical challenges for visitors are of the "problem-solving" type to advance in the game and complete the route and the story. Each participant must be physically present at these locations. Those who collect the most points (XP) receive gold, silver, and bronze medals displayed in a ranking. You must use a smartphone or tablet with the Questo app installed to play the game.

Game design patterns and mechanics: A mission usually takes between 60 and 120 minutes, depending on the participants' speed. The routes pass through the most critical sites while at the same time offering the opportunity to explore places and stories that may be overlooked in traditional tourism.

The gamified application's target group is foreign tourists. It is available in English, and we plan to add more languages. The Questo app is also a great date idea for couples wanting to spend time together.

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[43] An analysis of both best practices could be found in Silviu Millou, Marusya Smokova, and Sergiu Musteata, eds., *A Gamification Model for Community-Based Heritage Work: Selected Best Practices* (Editura Cetatea de Scaun, 2024).

[44] "Belogradchik Highlights: A High Wizard's Legacy", Questo (2023). Accessed December 1, 2024, https://questoapp.com/city-games/belogradchik-a-high-wizard-s-legacy.

Game design principles: Questo App[45], on which the case study is based, was developed by a Romanian start-up in 2017 on the principle of so-called missions or quizzes related to engaging and authentic tourist sites. Users of the application become "discoverers" by following riddles, hints, clues, and questions. This application has enjoyed great success, receiving an award from the World Trade Organization for Start-up Innovation and winning the Audience Award at Phocuswright Europe in 2019.[46]

Game design methods: The platform is designed for mobile devices. According to Startups&TheCity, the Questo app can be purchased for iOS and Android through platforms such as TripAdvisor, GetYourGuide and Booking.com for prices ranging from 8 to 30 euros. Questo also won the Booking.com Booster Lab 2018 in Tel Aviv. For the Belogradchik Highlights game, the announced price falls in the lowest price range.

The creators of Questo work with local guides, historians, and tour operators, with 70% of the revenue going to those who develop the content of the tours in the regional destination, and the platform for service delivery and marketing retains the remaining 30%. What all the gamified applications considered as good practices have in common is that they use the tourist attractions and resources of the destination as a basis, emphasising the role of cultural and historical heritage[47].

Fig. 3. Belogradchik Rocks. Source: "Belogradchishki skali", Wikipedia Foundation, last modified June 12, 2024, 05:40 (UTC), https://bit.ly/49cq6lj

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[45] "Questo: Play & Explore Fun Tours by Local Storytellers", Questo (2017). Accessed December 1, 2024, https://questoapp.com/; Oana Vasiliu, "Interview. Alex Govoreanu (Questo): Start the Questo and explore the city", BR Business Review (2017). Accessed December 1, 2024, https://business-review.eu/news/interview-alex-govoreanu-questo-start-the-questo-and-explore-the-city-152862.

[46] Sebastian Florian, "Questo's city exploration mobile game, winner of people's choice award at Phocuswright Europe 2019", *Startups & The City*, May 17, 2019, https://startupsnthecity.com/questos-city-exploration-mobile-game-winner-of-peoples-choice-award-at-phocuswright-europe-2019/.

[47] Sonya Mileva et al., "Gamified Applications For Sofia, Promoting Capitals' Cultural Heritage", Cultural and Historical Heritage: Preservation, Presentation, Digitalization (KIN Journal) 6, no. 2 (9) (2020): 49-63, http://www.math.bas.bg/vt/kin/files/papers/6_2/05-KIN-6-2-2020.pdf.

The evaluation of Belogradchik Highlights goes through two steps – evaluation by gamification and impact criteria. When evaluating the gamification criteria, three aspects were considered: intrinsic motivation heuristics, context-dependent heuristics, and extrinsic motivation heuristics, each of which includes several sub-criteria. The highest scores for the inherent motivation of this case study are associated with purpose and significance, completion and mastery, connectedness and immersion. This means that through the game, users can achieve a meaningful and vital goal while simultaneously completing several tasks that allow them to increase their competence, ultimately receiving a virtual reward – a ranking with players who have played the game at any time. In addition, users can socialise with other potential players through joint games or by commenting in the game's review section. The fantastic story players must unravel in the game connects real locations with fictitious first-person stories, allowing users to be transported into an imaginary world. The criteria such as challenge and competence and autonomy and creativity remain almost unchanged from the game, meaning that the game's challenges do not help users increase their competence, nor do they provide opportunities for multiple solutions and self-expression.

Three criteria were used to evaluate extrinsic motivation heuristics. The best contributor was loss avoidance, followed by possession and rewards. However, this practice lacks boundedness. Since the game uses a real-time ranking, it motivates players to actively participate in climbing the rankings by competing for virtual medals–gold, silver, and bronze. The game does not offer special rewards or achievements outside the stated ranking.

Context-dependent heuristics in the study assessed three criteria, the most developed in the game being feedback, since in real time, players can track their progress, reveal the following tasks and challenges, as well as the unpredictability associated with the unknown of the next task and the difficulty of making assumptions. However, outside the game remains variability and rule-breaking, which does not allow players to change the game for improvement or abuse.

It can be concluded that when evaluating the gamification criteria, the game shows clear advantages related to its mechanisms for engaging users in a fictional story with real places that carry the spirit of challenge, urgency, and uncertainty. These mechanisms offer the opportunity for virtual reward and social integration during the game and after its end. However, outside the game's scope remain the creativity and self-expression of users, as well as the possibility of unique and prestigious rewards. There is no free choice between different options, and there are opportunities for user improvements in the game.
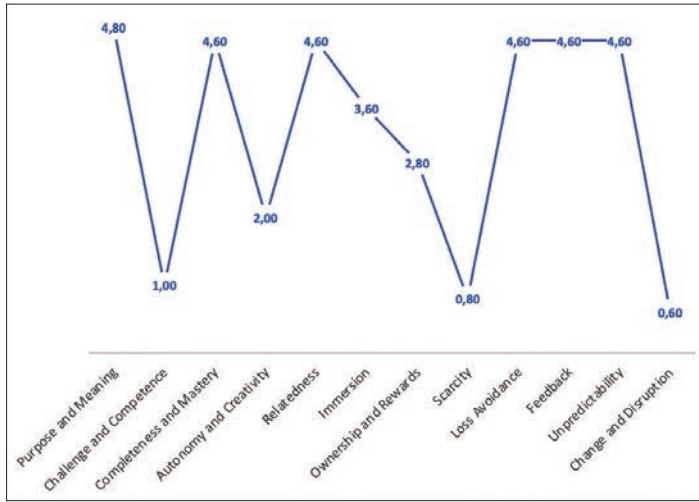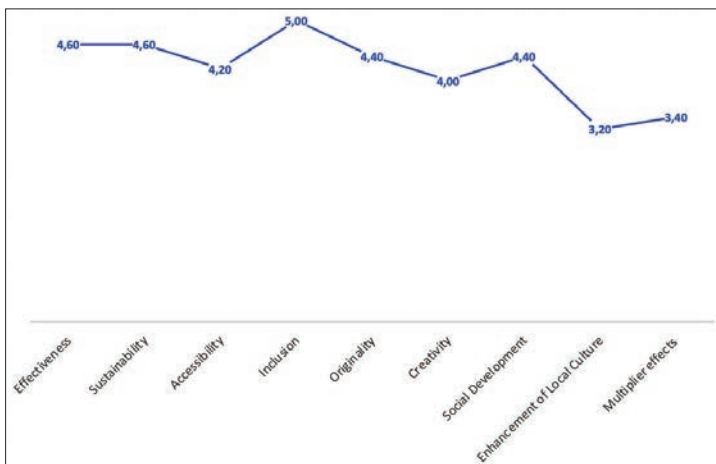
Fig. 4. Average ratings of gamification criteria for best practice Belogradchik Highlights
Source: authors' research

In the second step of the evaluation of impact criteria (Fig. 5), four aspects were identified, each including several sub-areas: implementation, accessibility and inclusion, innovation and creativity, and social and cultural impact. The figure shows that this case study achieves excellent ratings in all criteria at this step. Efficiency and sustainability were found in Implementation. Belogradchik Highlights raises public awareness of the place's cultural heritage while the game has existed since 2023 and is part of a platform that has proven its long-term viability.

Fig 5. Average ratings of impact criteria for best practice Belogradchik Highlights
Source: authors' research

One of the main advantages of the game is that it can be played 24/7 by one person, in pairs or larger groups, and even in a competitive format. The game has the potential to engage users even more actively through the possibility of free choice between different routes and stories, providing opportunities for creativity and self-expression - for example, creating a personalised avatar or unique badges, as well as special prestigious awards (for example, for a master level when playing the route more than 3 times, for the "largest party" when many players participate at the same time, etc.). There is a possibility of creating improved or modified editions of the game based on recommendations from users and others.

A serious problem for Bulgarian gamified practices in cultural heritage is ensuring the sustainability of solutions, which is why many of them have a short life cycle. Incorporating the game into an already established and working platform ensures its sustainability while minimising the necessary investments for developing and maintaining a separate application.

At the same time, the game is not promoted at the municipal or regional level and is absent from the tourist entertainment map in the local tourist information centre[48], relying mainly on distribution through the Questo app advertising campaign.

Another limitation of Belogradchik Highlights is that since its creation, the game has been oriented mainly toward international users, and a Bulgarian translation has not yet been added, which hinders local distribution. Another limitation is that the local public authorities have not fully adopted gamification in Bulgaria as a strategy for promoting tourist destinations, and its potential for attracting tourists and visitors and for expansion has not been utilised.

Case study "Roman Plovdiv – Urban Game"

The gamified application Roman Plovdiv—Urban Game was created to innovatively present the rich historical heritage of Plovdiv, a city with an ancient history and cultural diversity. Known by different names over the centuries, such as Eumolpia, Philippopolis, and Trimontium, Plovdiv is home to unique archaeological sites, which make it an ideal place to develop such a project.

This urban game allows participants to explore significant historical landmarks preserved from antiquity, including temples, arenas, theatres, and forums. Through a gamification approach, visitors are offered a touristic, cognitive, and team-building experience, helping them engage with the city's cultural wealth.

Roman Plovdiv – Urban Game seeks to solve the problem of the concentration of tourists at specific periods, which is a limitation of traditional tourism. By providing flexible access 24/7, the game allows users to choose when to play it, which creates convenience and avoids the accumulation of large groups of people.

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[48] "Tourist information center Belogradchik fortress", Municipality Belogradchik, last modified November 7, 2024, https://belogradchik.egov.bg/wps/portal/municipality-belogradchik/home/tourist.info/tourist.info

Fig. 6. Roman Theatre of Philippopolis. Source: "Antichen teatar (Plovdiv)", Wikipedia Foundation, last modified December 7, 2023, 13:53 (UTC), https://bit.ly/3Zim4Lc

Although created specifically for Plovdiv, the game has the potential to impact beyond the city, as it often inspires participants to explore other historical sites in the country. An essential aspect of the game is the encouragement of interaction between players, which is achieved through the possibility of team play and the combination of actual physical locations and virtual elements.

Game interface design patterns: The game offers interactive city routes that include solving puzzles, overcoming challenges, and working in a team, making each participation a unique experience. Unlike classic treasure hunt games, this project uses a clearly defined theme or, in the spirit of Ancient Plovdiv, a mission. The Ancient Plovdiv mission is part of the five scenarios developed until 2024, offering a fascinating and engaging experience. The primary purpose is to create lasting emotions and impressions that facilitate memorising historical facts and events.

Game design patterns and mechanics: During the tour, Roman Plovdiv – Urban Game acts as a virtual guide, with puzzles that engage and lead to unlocking the following stages of the game. The mission is coordinated between the participants via their devices so that when one team member successfully solves a puzzle, the others automatically access the next challenge. This approach encourages teamwork, strengthens group cohesion, and creates a sense of contribution to a common goal.

Game design principles: The game applies a gamified approach using a point system that ranks participants according to their performance. This adds an element of competition and motivation for better results. The target audience is highly diverse and includes researchers, families, groups of friends, work teams, and others, without age restrictions. Support for two languages – Bulgarian and English – facilitates the participation of locals and foreign tourists.

Game models: The initiative's essence is expressed in a tourist route covering 16 ancient Plovdiv sites within a 2.5 km radius. The actual tour is combined with a web-based game that allows teams of 1 to 5 people to participate. The creators' official website and popular international travel platforms such as TripAdvisor and GuideandGo provide information about joining the game.

Game design methods: Access to the game is paid and can be done through various online platforms. The purchased access code is valid for three years, which gives participants freedom in planning their time for participation. The mission can be interrupted at times, and players have high autonomy. Technical support from the developers is available if necessary.

The case study is evaluated as successful, achieving high autonomy, creativity and relatedness ratings according to the gamification criterion system used (Fig. 7).
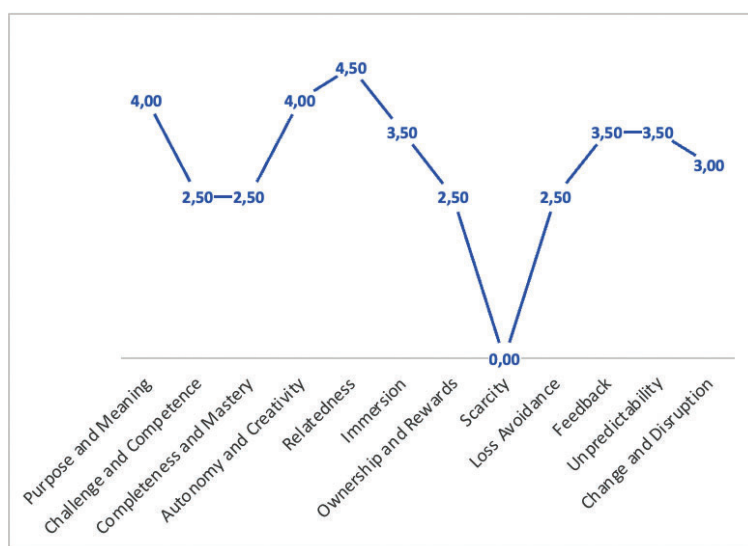
Fig. 7. Average ratings of gamification criteria for Roman Plovdiv – Urban Game.

Source: authors' research

At the same time, the ratings are also high regarding impact criteria, such as effectiveness, accessibility, originality, and creativity (Fig. 8). The highest-ranked criteria are accessibility and inclusion, innovation and creativity, and performance. The gamified practice Roman Plovdiv—urban game achieves the desirable results and meets the goals. It allows all target groups to benefit from the initiative and be immersed and engaged with the settings and the characters.

Roman Plovdiv—Urban Game is committed to socially responsible and meaningful causes. For example, 20.0% of the June-July 2024 revenues from the game purchase were donated to the non-governmental organisation "Pass Forward," which supports municipal care homes for elderly people. Commitment to a cause contributes significantly to the greater public attention to the initiative.
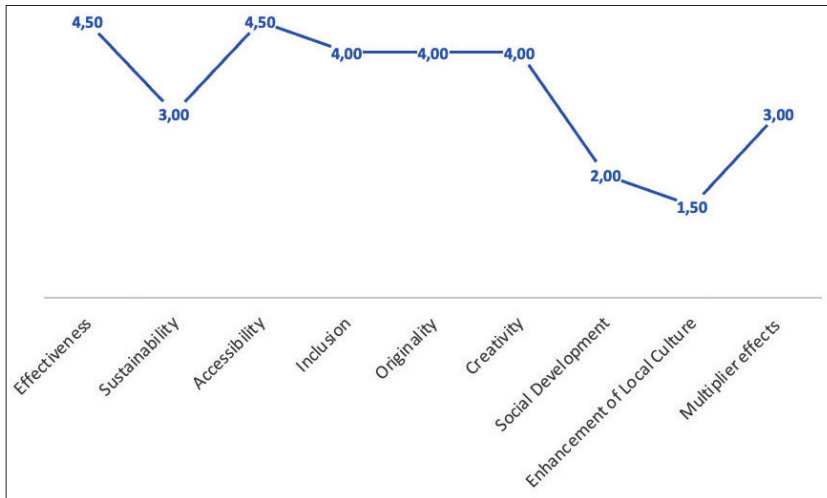
Fig. 8. Average ratings of the impact criteria for Roman Plovdiv – Urban Game.
Source: authors' research

Gamification is emerging as a promising tool for engaging participants. Roman Plovdiv – Urban Game fully implements this approach, combining virtual and authentic experiences. This model allows participants to physically explore ancient historical sites, creating a more profound impression than digital tours. Among the main advantages of the game are the possibility of team participation, the availability of an English language option, a rating system, a rich, informative base, and other elements that can have a long-lasting positive effect. The main disadvantage, which can also be considered an advantage, is the need for physical presence. Adding additional communication channels, artificial intelligence, and augmented and virtual reality technologies can expand the game's capabilities while maintaining the connection with the real environment.

Conclusions and recommendations

This article presents the adoption of gamification in Bulgaria's cultural heritage. It is based on applying the best practice approach as a source of practice-based evidence on how well gamification methods and tools were used in Bulgaria to overcome the challenges and obstacles in the cultural heritage field. A three-stage evaluation methodology was proposed and applied to find relevant case studies on gamification in Bulgarian cultural heritage, evaluate them by context-specific criteria, and identify the best-performing ones. Following the adopted standard for documentation of best practice case studies, only two identified initiatives for Bulgaria have been briefly described.

This article is helpful for scholars, practitioners, and policymakers as it provides a context-specific framework for evaluating case studies on gamification in cultural heritage. The framework encompasses three stages: research, evaluation, and scoring of the case studies. The main activity is applying context-

specific criteria for identifying best practices for gamification in cultural heritage. By implementing the proposed context-specific framework to true-to-life case studies from Bulgaria, the article reveals what works and what does not. The knowledge gained could be shared and used by public and local authorities, museums, communities, and many other stakeholders who have already recognised the significance of cultural and historical heritage for local, regional, and national development. More organisations and people could implement various gamification technologies to increase tourists and visitors, boost awareness of the cultural heritage in Bulgaria, and promote the safeguarding and preservation of tangible and intangible cultural heritage among current and future generations in engaging and immersive settings.

The methodology presented does not lack limitations. As a result of the activities implemented during the research-oriented stage, only sixteen active initiatives on gamification in the cultural heritage of Bulgaria were found. The sample of gamified case studies is incomplete, as the relevant base was established through an online search and encompasses only initiatives reported on the Internet. Also, the impact of the gamified initiatives was evaluated based on available secondary data. However, the limitations presented concern the exhaustiveness of the relevant base and make the accuracy of the evaluation questionable. Despite the study's limitations, the proposed context-specific framework could be used as a general toolkit for identifying and selecting initiatives on gamification in the cultural heritage that perform best regarding the specific gamification and impact criteria.

Rezumat

Recent, gamification a câştigat o atenţie semnificativă atât din partea experţilor în domeniul OIT, cât şi a publiclului larg. Patrimoniul cultural este vizat direct de noile tehnologii, iar diverse mecanisme de gamificare au fost implementate pe scară largă în diferite segmente ale moştenirii culturale. Bulgaria este printre ţările cu mare interes în această chestiune. Deşi unele iniţiative de succes au fost realizate şi sunt încă implementate, există o lipsă de cunoştinţe despre ceea ce nu funcţionează bine şi de ce, ceea ce va ajuta părţile interesate să evite să facă aceleaşi greşeli în viitor. Articolul îşi propune să selecteze cele mai bune practici pentru aplicarea tehnicilor de gamification în domeniul patrimoniul cultural al Bulgariei. Acest scop este abordat prin aplicarea unui cadru de selectare a studiilor de caz de bune practici privind gamificarea moştenirii culturale. Pe baza unui set de douăsprezece criterii de gamification şi nouă criterii de impact, respectând o metodologie în trei etape, primele două studii de caz de top au fost selectate ca cele mai bune practici şi analizate în acest studiu.

Cuvinte cheie: gamification, patrimoniu cultural, abordare a celor mai bune practici, Bulgaria

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