COMMON REPORT

Game-based Learning and Gamification Techniques in Education
2022-1-EL01-KA210-SCH-000084562

GAME - BASED
Learning &
GAMIFICATION
TECHNIQUES
in Education

DouMag Ltd

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1.Introduction

Modern educational needs require student-centered teaching methods, rich social and educational resources, and an interaction and cultural life. In this direction, the pedagogical use of digital technologies that contribute to the vision of an open, innovative school that introduces changes in the teaching practice, making use of the most modern and innovative features of pedagogical science, as it is, for example, 'play-based learning', making teaching more attractive to pupils and, by and therefore more effective.

With the evolution of technology, digital games have emerged as an important activity and rightly attracted the interest of the educational community. Today's students, due to their high level of engagement and familiarity with technology, enjoy more a learning experience embedded in a computer game, because they are based on the principle of 'play and learn', from which they derive their advantages as an educational tool. They are also based on modern learning theories and innovative learning models such as discovery learning, experiential learning, learning through community participation and learning by doing. This trend is known as game-based learning and aims to design, develop and implement digital games through educational scenarios in order to achieve the objectives set by the teacher. The game-centered learning approach can provide learning experiences that combine a balanced combination of immersion in the topics of the knowledge domain.

Another trend imposed by contemporary educational needs is gamification, the use of game mechanisms or features in non-game related activities. It has been proven by scientific methods that through this process, children's emotional involvement is increased, their behavior is influenced, while at the same time the communication of messages is greatly facilitated and their acceptance is enhanced.

The above data, demonstrate: a) the importance of new educational techniques and methods such as game-based learning and the use of gamification and b) the great need in the educational community for specialized training in modern educational methods.

DDE Ioannina and the partners of the project, DOUMAG LTD and CRHACK LAB FOLIGNO 4D, proceeded in the design of the present project by involving as sending agencies school units that were used to explore the training needs through interviews-discussions.

The aim of the project is to meet the above needs and requirements by:
- designing, structuring and developing a European-wide training process in the field of game-based learning and gamification
- the development of a modern innovative digital guide in the above areas by qualified scientists and institutions.

In the general scope of this project and in an effort to create the project's Guidebook to support the educators in their actual educational problems they are dealing with, in their efforts to motivate their students and help them achieve their goals through education. The objective of this analysis is to establish the current state and research routes that

will allow explaining, contextualizing and better understanding the benefits of the development and mastery of these topics in the target group. The analysis was produced through a template, which each organization filled with relevant information from its country and is attached as an Annex, in the end of this analysis report document.

2. Introduction to Game-based Learning & Gamification Techniques usage in Secondary Education in partner countries

All partner countries have stated that those techniques have been used more and more the recent years in the secondary education institutions of their countries. Nonetheless there is a lot of

In **Greece**, gamified learning and the use of game-based learning (GBL) have gained significant attention in the field of education in recent years. These approaches leverage elements of games to enhance student engagement, motivation, and learning outcomes. Game-based learning involves the integration of educational content and objectives into a game or game-like environment. It typically employs interactive digital platforms or educational games specifically designed to support learning. Gamification refers to the application of game elements and mechanics to non-game contexts, such as educational activities. Gamification aims to make learning more enjoyable and increase students' intrinsic motivation by providing clear goals, feedback, and a sense of achievement. The game is used more in primary education than in secondary education. Nevertheless, teachers should intensify the game in their lesson because the children show special interest and the lesson becomes enjoyable and more effective.

Game-Based Learning (GBL) and Gamification have increasingly become significant methodologies in the educational landscape worldwide, including **Cyprus**.

Several secondary schools in Cyprus have also adopted gamification strategies to enhance their teaching methods. Teachers are trained to create gamified lesson plans that transform traditional learning activities into competitive and fun experiences. Inside the country, GBL approach is steadily gaining ground in secondary education specifically. The Ministry of Education, Culture, Sport, and Youth has been proactive in integrating digital tools and innovative teaching methodologies to modernize the educational system. GBL is part of this broader strategy to foster a more engaging and effective learning environment. Some of the steps the Ministry has already taken in that direction are:

- The Ministry developed a comprehensive digital education strategy as part of the National Action Plan for Digital Skills. This plan focuses on enhancing digital literacy, providing necessary infrastructure, and promoting the use of digital tools in education.

- Significant investments have been made in ICT infrastructure across schools. This includes equipping classrooms with interactive whiteboards, providing tablets and laptops for students and teachers, and ensuring high-speed internet connectivity in all educational institutions.
- The Ministry has organized extensive training programs for teachers to equip them with the skills needed to effectively use digital tools in their teaching. These programs cover various aspects of digital pedagogy, including the use of educational software, gamification techniques, and online collaboration tools.
- The Ministry has launched pilot programs to test the effectiveness of game-based learning and gamification in classrooms. These programs are closely monitored, and successful strategies are scaled up across the education system. Examples include the use of Minecraft: Education Edition for teaching history and the implementation of Kahoot! for interactive quizzes.

Finally, Gamification and game-based learning (GBL) are gaining traction especially in secondary education, in **Italy**, but not as extensively as in some other countries. These methodologies are being gradually integrated into teaching practices to enhance student engagement and learning outcomes.

While there isn't comprehensive data on the extent of GBL and gamification usage specifically in secondary education across Italy, some schools and educators have been experimenting with these methodologies. However, the adoption may vary depending on factors such as school policies, teacher training, and access to technology.

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3. Analysis report results per partner country

Below you can find the results gathered by partner institutions and refer to events and resources used in each country's schools and especially in Secondary Education. The information categories are:
- Educational games physical or digital used in country's secondary schools
- GBL and Gamification practices in country's schools
- Books regarding the project's subject in national language
- Educational videos
- Trainings organized in the country for schools and teachers.

Educational games physical or digital used in country's secondary schools	Educational games physical or digital used in Greek secondary schools: • Minecraft: This popular sandbox game has been adapted for educational purposes. Minecraft Education Edition provides a platform for students to explore and create virtual worlds while incorporating educational content and activities. It can be used across subjects such as mathematics, science, history, and even coding. • Kahoot! is a digital platform that allows teachers to create and share interactive quizzes, surveys, and discussions. It turns learning into a game-like experience, where students can participate using their devices and compete with their peers. Kahoot! promotes student engagement, active learning, and knowledge retention. • Taboo is a popular word-guessing party game where players have to describe a word to their teammates without using specific "taboo" words related to it. The objective of the game is for the player to get their teammates to guess the word on their card within a time limit, while avoiding the use of certain restricted words. • A treasure hunt is a game in which players search for hidden objects or dark secrets usually by following a series of clues or riddles. The object of the game is to find the treasure or solve the puzzles that lead to the treasure. Treasure hunting is popular with children and adults and can take place in a variety of locations, such as parks, gardens, homes, but also specially created environments such as outdoor spaces or escape rooms. A treasure hunt promote collaboration, problem solving and exploration, and can provide fun and exciting experiences for all participants • Role-playing games (RPGs) are a genre of games where players assume the roles of fictional characters and immerse themselves in a fictional world. RPGs typically involve creating a character, developing their abilities and attributes, and embarking on adventures or quests within a structured narrative.
GBL and Gamification practices in country's schools	Some GBL and Gamification practices in Greek schools are: • Gamification and training • The gamification of learning and its utilisation in secondary education • https://www.theacropolismuseum.gr/el/content/hameno agalma-tis-athinas-parthenoy-0

Books regarding the project's subject in national language	Books regarding the project's subject in Greek language: • Design of educational materials & technologies for digital Education. https://repository.kallipos.gr/handle/11419/9129 • Digital games and learning. https://repository.kallipos.gr/handle/11419/9738 • Digital technologies and foreign language teaching. https://repository.kallipos.gr/handle/11419/9302 • Play in the mathematics education of young children. https://repository.kallipos.gr/handle/11419/1295
Educational videos	Educational videos on GBL and Gamification in education: • https://www.youtube.com/watch?v=W72DnmSZbr4&ab_channel=TeachingsinEducation • https://www.youtube.com/watch?v=7uaaOobo3Ws&ab_channel=teacherdiaries • https://www.youtube.com/watch?v=BqyvUvxOx0M&ab_channel=KarlKapp
Trainings organized in the country for schools and teachers	Trainings organized in Greece for schools and teachers: • EEPEK: The main purpose of EEPEK is the promotion of innovative actions in the educational community and the development of appropriate support structures for them so that they can be applied in the wider Greek education system. • https://dipe.tri.sch.gr/%CE%B7-%CE%B5%CF%86%CE%B1%CF%81%CE%BC%CE%BF%CE%B3%CE%B7-%CF%84%CE%B7%CF%83-%CF%80%CE%B1%CE%B9%CF%87%CE%BD%CE%B9%CE%B4%CE%BF%CE%BA%CE%B5%CE%BD%CF%84%CF%81%CE%B9%CE%BA%CE%B7%CF%83-%CE%BC%CE%B1%CE%B8/ • https://conferencedu.weebly.com/?fbclid=IwZXh0bgNhZW0CMTAAAR2ixMS0nxpyUMDXneMPupB36aakxVQGVSCA_-clnDBcPYdTdeEk3-K-3zQ_aem_ASFCZ95CyB9v5WjvcS9wiAmreOE93ffXyxvnCGi5yWpFYO-Zz2pF-MpKjuQhmaq2MuINpOTBPNwhgQl991YpSCzo

Educational games physical or digital used in country's secondary schools	Educational games physical or digital used in Cypriot secondary schools:
	Physical Educational Game Examples • Scrabble is widely used in language arts classes to enhance students' vocabulary and spelling skills. This word-formation game encourages competitive play while helping students learn new words and improve their spelling. It fosters a fun and engaging learning environment where students can challenge each other to create the best possible words using their letter tiles. • Catan, often used in economics and geography lessons, teaches resource management, strategic thinking, and negotiation skills. Players trade and manage resources like wood, brick, and wheat to build settlements and cities. This game provides students with insights into economic principles and the importance of strategic planning and negotiation in resource management. • Math Bingo is a popular game in mathematics classes that improves students' quick problem-solving skills. The game involves solving math problems to mark off numbers on a bingo card. It makes learning math facts engaging and interactive, turning a potentially tedious activity into a fun and competitive game. • Periodic Table Battleship is used in chemistry classes to help students familiarize themselves with the periodic table and the properties of elements. Players place ships on a grid representing the periodic table and use element symbols and properties to target their opponent's ships. This game reinforces knowledge of chemical elements and their positions on the periodic table. **Digital Educational Game Examples** • Minecraft: Education Edition is employed across various subjects, including history, science, and mathematics. It allows students to build and explore virtual worlds, fostering creativity and collaboration. Teachers use it to simulate historical events, explain scientific concepts, and teach geometric structures, making learning more interactive and immersive. • Kahoot! is an interactive quiz platform used in various subjects, including general knowledge, science, and language learning. It turns learning into a game by

	allowing teachers to create quizzes that students answer in real-time. This platform is used for quick assessments and engaging reviews of lesson content, promoting active participation and immediate feedback. • Duolingo is a gamified language learning app used to help students practice and improve their language skills. It offers exercises and challenges that adapt to each learner's level, making language acquisition fun and interactive. This app is particularly effective in maintaining student interest and motivation in language studies. • DragonBox offers a series of educational games designed to teach mathematics from basic arithmetic to algebra. These games make learning complex mathematical concepts intuitive and enjoyable. By integrating gameplay with math lessons, DragonBox helps students understand and apply mathematical principles in a fun and engaging way.
GBL and Gamification practices in country's schools	Some GBL and Gamification practices in Cypriot schools are: • **https://erasmus-plus.ec.europa.eu/projects/search/details/2021-2-CY01-KA210-SCH-000050073** • **https://erasmus-plus.ec.europa.eu/projects/search/details/2020-1-CY01-KA201-066058** • **http://bupaproject.eu/**
Books regarding the project's subject in national language	Books regarding the project's subject in Cypriot language: • Play and Learning in the Digital Age by Maria Papadopoulou • Education through Digital Games by Andreas Christoforou • Introduction to Gamification by Eleni Nikolaou • Digital Games in the Educational Process by Giorgos Antoniou
Educational videos	Educational videos on GBL and Gamification in education: • https://www.youtube.com/watch?v=-X1m7tf9cRQ • https://www.youtube.com/watch?v=DDXk7B_7N48 • https://www.youtube.com/watch?v=uGTQRfelUhk

	Trainings organized in Cyprus for schools and teachers:
Trainings organized in the country for schools and teachers	- Gamification in Education Workshop, by the Cyprus Pedagogical Institute: The Cyprus Pedagogical Institute organized workshops that provided hands-on training for teachers to integrate gamification techniques in their teaching. - Digital Game-Based Learning Seminar, by the Ministry of Education Cyprus: The Ministry of Education, organized an event in order to discuss among educators the latest trends in GBL, showcasing successful case studies and providing training on popular educational games. - Minecraft Education Training, by the Cyprus Computer Society: Organized by the Cyprus Computer Society, this training session informed teachers on how to use Minecraft: Education Edition to create interactive and immersive learning experiences.

Italy

	Educational games physical or digital used in Italian secondary schools:
Educational games physical or digital used in country's secondary schools	- Kahoot!: Kahoot allows teachers to create quizzes, surveys, and discussions, turning learning into a game-like experience. It's widely used in Italian classrooms. - Quizizz: With Quizizz teachers can create interactive quizzes and games for students. It provides immediate feedback and allows for competitive gameplay. - Scopone Scientifico: This is a card game that originated in Italy and is often used as an educational tool in secondary schools. It involves elements of strategy and mathematics, reinforcing logical thinking and problem-solving skills. - Escape Room Kits: Some schools in Italy have started using escape room kits as educational tools, complete with puzzles, riddles, and challenges related to specific subject areas. - SimCity EDU: This is an educational version of the popular city-building simulation game. It allows students to learn about urban planning, environmental sustainability and civic responsibility. - Minecraft: Minecraft has been adapted for educational purposes in Italy and worldwide, as students can collaborate and explore concepts in subjects like geography and science.

	- Codemotion Kids: This program offers coding workshops and education through hands-on activities and game-based learning. - Math Games: Various digital platforms have math games designed to make learning math more enjoyable and interactive through levels, rewards and challenges. - Role-playing Games (RPGs): Some teachers in Italy use RPGs to teach history, literature, and social studies. By assuming different roles and engaging in storytelling, students can immerse themselves in the subject matter in a unique way.
GBL and Gamification practices in country's schools	Some GBL and Gamification practices in Italian schools are: - https://drive.google.com/file/d/162pFaW76hI5XVtK YASruOlfMXygxI5VF/view?usp=sharing - https://plftp.clf4d.dev/index.html - https://play.google.com/store/apps/details?id=com.Im pactGames.HeritageQuestAR
Books regarding the project's subject in national language	Books regarding the project's subject in Italian language: - Il valore educativo del gioco. Gamification e game-based learning nei contesti educativi, Silvia Fioretti - GAME-BASED LEARNING: Gioco e progettazione ludica in educazione, Romina Nesti - Game-based learning. Il ruolo del gioco nella progettazione di percorsi formativi, Riccardo Sartori & Massimo Gatti - Apprendere con i giochi. Esperienze di progettazione ludica, Massimiliano Andreoletti & Andrea Tinterri
Educational videos	Educational videos on GBL and Gamification in education: - https://www.youtube.com/watch?v=FcX2ZMzfLbY - https://www.youtube.com/watch?v=KLz3Ufpzgjg - https://www.youtube.com/watch?v=A5PtX_GQRS4
Trainings organized in the country for schools and teachers	Trainings organized in Italy for schools and teachers: - Edumotiva: This organization has conducted various workshops and training sessions on gamification and game-based learning for educators in Italy. They focus on integrating digital technologies and game elements into the classroom to enhance learning experiences. - Agenzia Nazionale per lo Sviluppo dell'Autonomia Scolastica (ANSAS): ANSAS has collaborated with educational institutions and associations to offer training programs on gamification and GBL for

	teachers. These initiatives aim to help educators leverage game-based approaches to engage students and promote active learning.
	• Indire: Indire has organized seminars and conferences on gamification in education, providing teachers with insights into effective gamification strategies and practical tips for integrating games into their teaching practices.

4. Conclusions of the Common Report

- Across Greece, Cyprus, and Italy, the implementation of game-based learning (GBL) and gamification techniques shows a promising trend, reflecting a broader global movement towards innovative educational methods. **In all three countries, there is a noticeable increase in the integration of digital games and gamified activities within the educational framework**. Popular tools like Minecraft Education Edition and Kahoot! are commonly used, highlighting a shared recognition of their effectiveness in enhancing student engagement and motivation. These techniques are applied across various subjects, fostering a more interactive and immersive learning environment. The shared commitment to adopting modern pedagogical methods illustrates a common goal of making learning more engaging and effective for students.

- While the adoption of GBL and gamification techniques is evident in Greece, Cyprus, and Italy, **differences in infrastructure and teacher training significantly impact the extent and effectiveness of these methods**. Cyprus has made substantial investments in ICT infrastructure and has developed comprehensive training programs for teachers, ensuring they are well-equipped to use digital tools in their teaching practices. In contrast, Greece and Italy face more challenges in these areas, with variations in access to technology and the availability of specialized training. These differences highlight the importance of robust infrastructure and continuous professional development to fully realize the benefits of GBL and gamification in education. Addressing these disparities is crucial for achieving a consistent and effective implementation across all regions.

- Across all three countries, **common challenges include the need for more specialized training for educators and consistent access to technology**. While each country has made significant strides in integrating GBL and gamification, the need for a structured and continuous professional development program is evident. Additionally, ensuring equitable access to digital tools and resources remains a priority. Future efforts should focus on scaling successful pilot programs, enhancing infrastructure, and fostering collaborations among educational institutions to share best practices and resources, ultimately aiming for a more widespread and effective implementation of these innovative educational techniques.

Annex: Desk Research Template

Game-based Learning and Gamification Techniques in Education
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ANALYSIS REPORT TEMPLATE

Partner:
Country:

Introduction to GBL & Gamification usage in Secondary Education in your country	
Educational games physical or digital used in country's secondary schools	
3 GBL practices in country's schools (description, photos, link)	
4 books regarding the project's subject in national language	
3 relevant educational videos	
3 relevant trainings organized in the country for schools and teachers	.

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