



Co-funded by
the European Union



GIRLS

Generation for INNOVATION, RESILIENCE,
LEADERSHIP and SUSTAINABILITY

THE GAME IS ON!

2023

GAME-BASED LEARNING COURSE HANDBOOK

Game-based learning is an innovative educational approach that integrates gaming elements and principles into the learning process to achieve specific learning objectives. Teachers can incorporate games as individual learning activities or utilize them throughout the entire course. By embracing game-based learning, educators create a dynamic and emotionally engaging environment that fosters active student participation in the learning journey. Collaborating with their peers, students gain valuable opportunities to practice essential skills.

TABLE OF CONTENTS



02	TABLE of CONTENTS
03	WHY GAME-BASED LEARNING?
04	THE BREAKDOWN of a GAME-BASED LEARNING COURSE
11	EXAMPLES
22	TEAMS' DIMENSION and RULES
23	TEACHER ROLES and RESPONSABILITIES
24	ASSESSING GAME-BASED LEARNING

WHAT IS GAME-BASED LEARNING?

PARTNERS
LOGO



Game-based learning offers a dynamic and effective approach to education that engages learners, promotes active participation, and fosters the development of essential knowledge, skills, and attitudes in a fun and engaging process.



THE BREAKDOWN OF A GAME-BASED LEARNING COURSE DESIGN

Based on 6D Werbach & Hunter design



Source: <https://www.universityxp.com/blog/2022/12/6/what-are-game-goals-and-objectives>

Definition of main Objectives

Start your Game-Based design by clearly stating what do you want your students to learn with it.

Students like challenges, simplifying your game to the point of easy completion eliminates the challenge aspect and can be perceived as an insult to the player's intelligence. While it's not advisable to create the most difficult game imaginable, ensure that your gamified course or game offers levels, questions, scenarios, and activities that require players to invest substantial effort and thoughtful consideration to succeed. Set the levels structure and the objectives to be achieved at each one of them.



Outline Target Behaviours

Instructional videos help students to initially adopt correct solutions. Nevertheless, they might limit their problem-solving approaches and delay students' help-seeking behaviours and encouraged independent problem-solving. Methodologically, as a teacher you should use game log files to collect and analyse data efficiently, offering insights into students' behaviours during gameplay.

To enhance your student's game performance, include instructional videos and design in-game learning supports adaptable to different difficulty levels. Provide also multiple voluntary supports to avoid imposing constraints on players' problem-solving approaches.

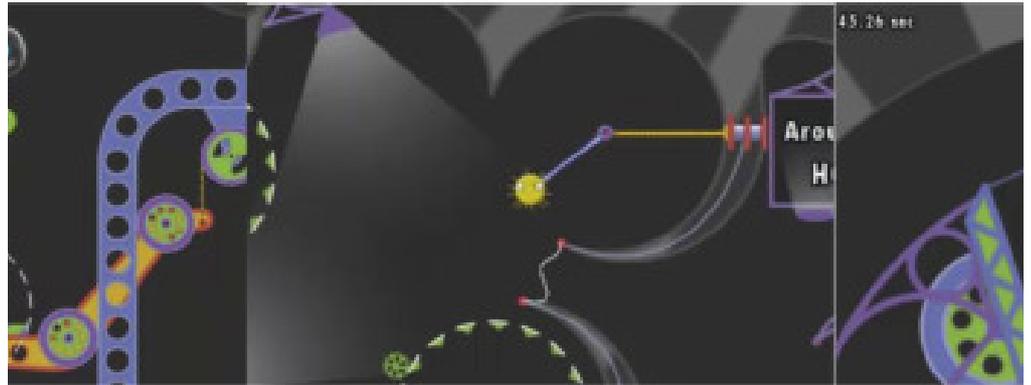
Yang, X., Rahimi, S., Fulwider, C. et al. Exploring students' behavioral patterns when playing educational games with learning supports at different timings. *Education Tech Research Dev* 70, 1441–1471 (2022). <https://doi.org/10.1007/s11423-022-10125-9>



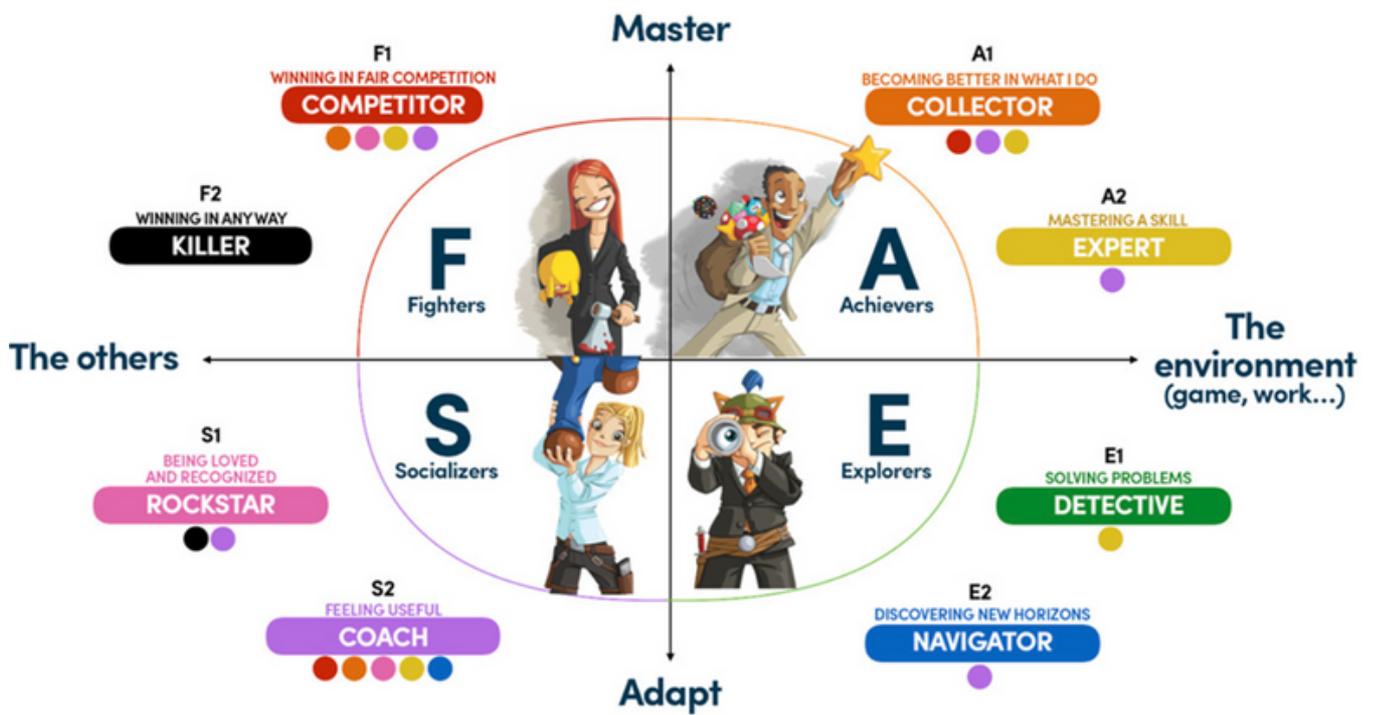
Ensure a reasonable common students' background

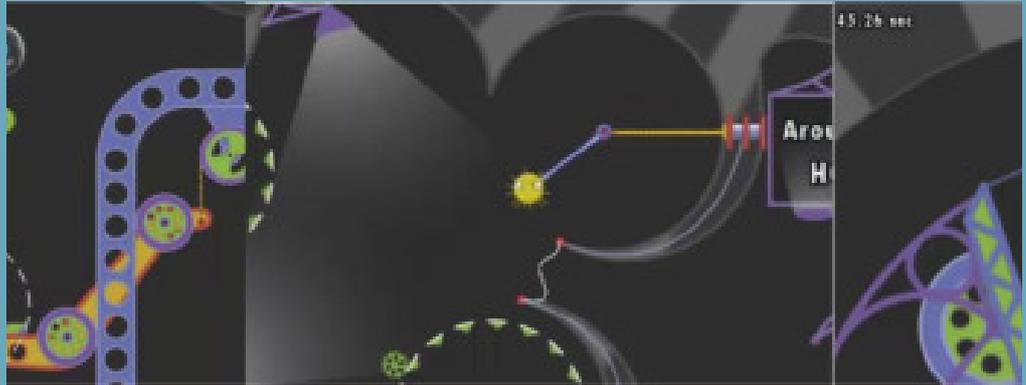
Examining our students' existing knowledge and abilities, as well as identifying areas for improvement, exemplifies a strength-based perspective. It's crucial to prioritize their current knowledge rather than dwelling on their deficits. Embracing a growth mindset, both for ourselves and our students, yields remarkable outcomes. This period offers an opportunity to reinforce student self-efficacy and strengthen our collaborative efficacy as we unite in teamwork. Related to your curricular unit, identify the necessary bases on top of which your students will build and enhance their knowledge. If needed, devote some extra office hours where you will level the background.





Describe your Students as Players - get to know them



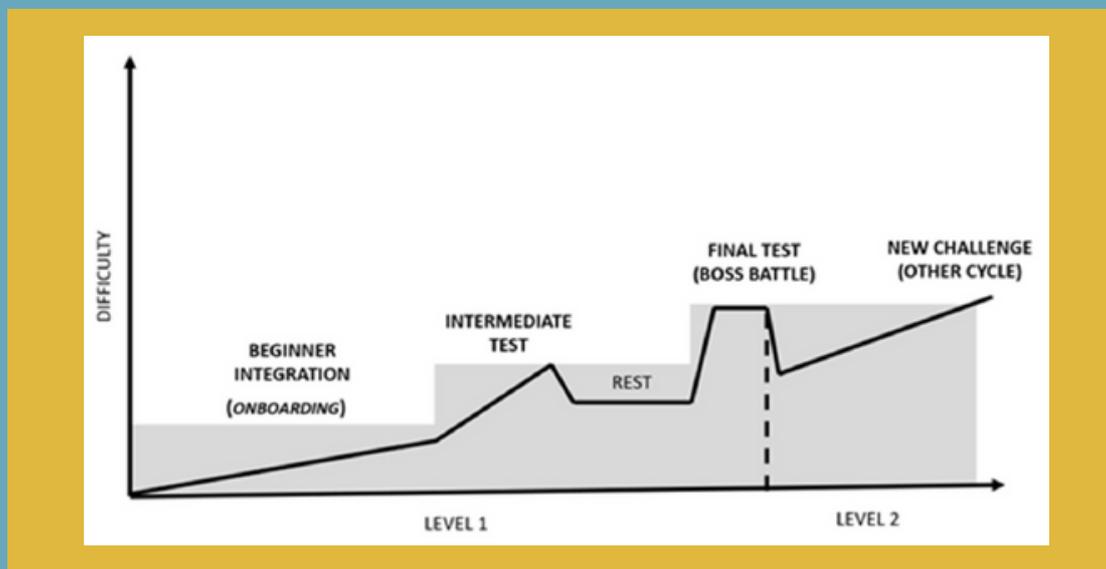


Define Activity Loops

Activity loops in game-based learning processes are a sequence of actions and feedback that recur and engage students in iterative cycles of exploration, problem-solving, and skill development within the game environment. These activity loops are essential to the structure and design of educational games and facilitate continuous learning and progress through meaningful interactions and experiences. Some activity loops in game-based learning processes include:

- Engagement and Exploration;
- Challenge and Problem-Solving;
- Feedback and Reflection*;
- Skill Development and Mastery;
- Progression and Achievement;
- Extension and Application.

All these activities must seek and enhance intrinsic students' motivation. The learning process starts with students willing to enlarge their knowledge.



*Eng, D. (2019, June 18). Feedback Loops. Retrieved December, 30th, 2023, from <https://www.universityxp.com/blog/2019/6/18/feedback-loops-in-games-based-learning>



Don't Forget the FUN

When designing your Game-Based learning process be sure to incorporate regular moments of fun. Although these processes are serious games, they also need to incorporate game elements and mechanics that enhance engagement, motivation, and learning outcomes. The fun factor of games captures students interest and sustains their engagement throughout the learning process. These fun elements will also function as anxiety diminishers and enable the learning process to be performed smoother.





Define Tools

In game-based learning, the thoughtful selection of tools is vital to create engaging and effective educational experiences. The wise choice of tools encompasses a careful consideration of various factors, including the learning objectives, target audience, technological capabilities, and pedagogical approach. Educators must assess the suitability of different game development platforms, software applications, and digital resources based on their alignment with specific learning goals and instructional strategies. Additionally, the tool choice should prioritize accessibility, usability, and scalability to accommodate students' diversity and learning environments. By leveraging the right tools, educators can design immersive and interactive games that foster critical thinking, problem-solving, and collaboration while maximizing learning outcomes and student engagement in game-based learning contexts.

EXAMPLES

Gamification to reinforce knowledge

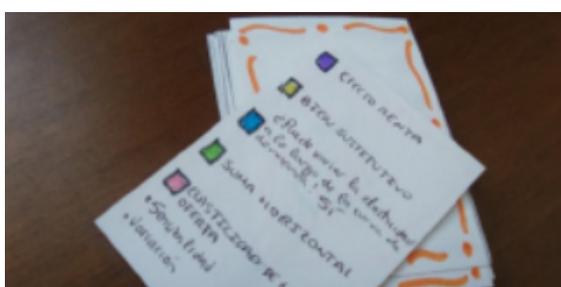
All of these formats aim to improve the ability to remember terms, ideas, and concepts related to the subject matter, and to review them in a fun and motivating way for students. Some of them are played individually, others in groups, to improve learning cooperatively. In some cases, it is also proposed that the students participate in the elaboration of questions. Although they are designed for specific subjects, they can be easily adapted to any subject.

Gamification with board games

These formats are based on the structure of well-known board games to adapt them to the content of a subject. Board games used in the classroom aim to entertain students while they acquire knowledge in a context, they are familiar with. This type of game encourages active student participation and promotes cognitive and social development. The teacher keeps the basic structure of the original game and adapts the necessary elements, mainly the playing cards, to the content, objectives, and competencies of the subject.

Party

The activity is designed to be carried out after sessions have been developed to explain the necessary conceptual content. The game is done before the assessment activities to review and consolidate the content and to identify strengths and weaknesses in preparation for the exam. This activity allows for greater motivation in review activities, an active role of the student, and more meaningful learning through the different stimulation of the senses.



Trivial

This game can be easily adapted to the classroom by configuring different topics related to the subject and developing a battery of questions for each of them. This game has been adapted for a marketing subject with the variation of developing two types of questions. Conceptual questions and exemplary questions. The questions are developed by the students themselves, while the corresponding conceptual content is taught and studied. In addition, the board is adapted and elaborated to be printed in a larger size so that the game can be played easily in class.

Students internalise the content because it encourages comprehension, construction, content retrieval, revision, and teamwork.

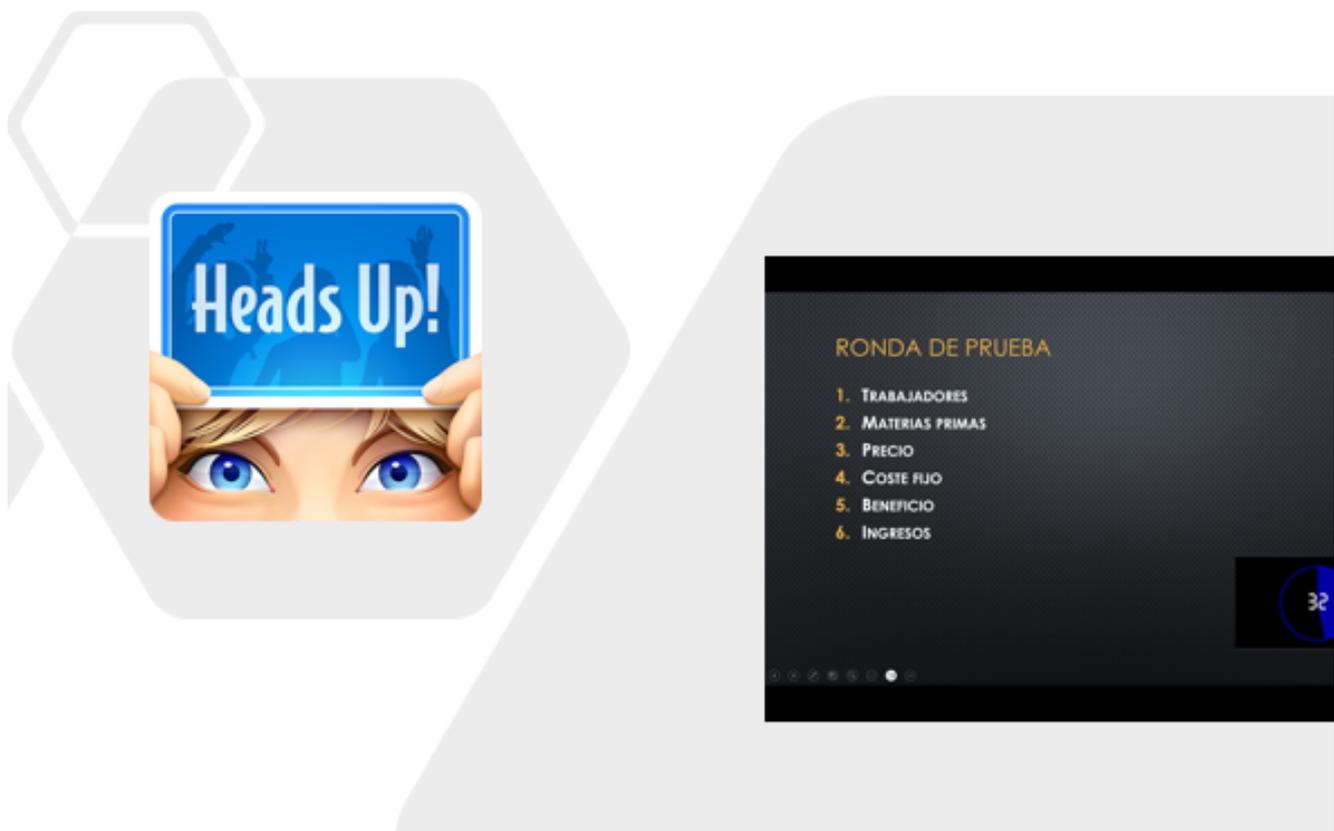
It should be noted that some online applications and websites allow the printing of Trivial Pursuit card templates and boards.



Heads Up!

This game not only improves or focuses on memory, but also on the ability to understand and synthesise technical terms to communicate them appropriately to classmates. The class is divided into teams of about five people. Different words or concepts are shown on the screen in rounds of 60 seconds each. In each team, 4 players give clues, and one player has to guess the word with strict rules about the terms to be used to describe it (e.g. not to be used: Words with the same root or synonyms in another language).

Adaptable to any subject, it can be used in a term or a unit. While reviewing concepts, students are kept active to avoid boredom, and cooperative work is encouraged. The format also allows for feedback from the teacher when weaknesses or gaps in understanding of concepts or topics are identified.



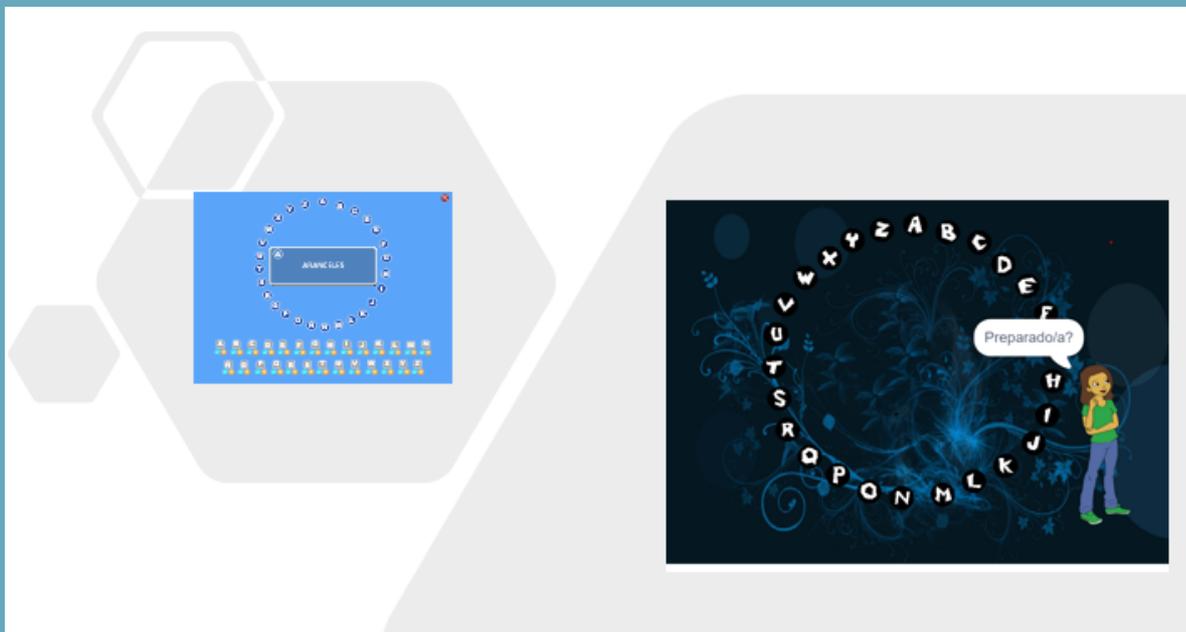
Games based on TV games

This consists of using well-known television formats to create games in the classroom that reinforce what has been learnt. These formats are mainly aimed at learning theoretical content.

Motivation through play facilitates learning and reinforces knowledge by promoting understanding and recall.

Pasapalabra "The alphabet game"

Exercises memory and vocabulary expansion while encouraging student participation. The students, individually or in groups, are confronted with a series of letters, each of which hides a word that they have to guess correctly, taking into account the definition given by the teacher. The wheel is projected on the screen and the pupils stand with their backs to the screen. The game continues for the candidate (pupil) as long as he/she gets the words right.



Source: Made with Scratch

Ahora caigo! “Still Standing”

The format of the game is similar to that of the television program, in which students, divided into pairs, compete against each other to win. The competition takes the form of questions on a topic. The questions can be, as in the original game show, questions with three possible alternatives to choose the correct one or to complete the incomplete word. The answer time for the pair whose turn it is to answer is timed by a stopwatch. All pairs have two life jokers.

Boom!

Adapting another TV quiz format, two teams of students will face each other and try to 'defuse four bombs' by giving the correct answer to the questions posed to them. To do this, they have to discard the answers they think are wrong from the alternatives given in each question.

The questions are projected onto the screen with the same aesthetics and sound as the original game, which can be easily adapted through a presentation in PWP format.

Other gamification formats

Gymkanas

Games are based on various challenges that have to be solved as a team to progress through all the proposed stages. The challenges can be varied, ranging from theoretical conceptual questions, case solving, puzzles, or role-playing. They can be organised in the classroom or in more open spaces. In the latter case, greater organisation and coordination between teachers is required to control all stages of the game.

This game is suitable for tackling tedious subjects that can demotivate pupils. It puts an end to the excessive tendency to memorise by encouraging the acquisition of knowledge through a dynamic and fun learning mechanism. Students learn by doing as they work in teams.

This type of format not only facilitates student learning but also encourages teamwork and cooperation among students, thus achieving the participation of all students.



Visual association game

Visual association games are useful to increase motivation to learn when students have difficulty associating the theoretical concepts of the subject with their environment. They also break the monotony of reinforcement assessments that take place before an assessment test. In short, meaningful learning of the basic concepts of a subject or unit is achieved.

The activity is designed as a self-assessment activity before the planned assessment. The teacher prepares a card with 16 pictures related to the terms of the thematic unit and the students, grouped in pairs, have 5 minutes to look at them and remember them.

Then, in 30-60 seconds, they are given concepts and definitions to relate to the images they saw at the beginning of the activity. In order to avoid the possibility of pairings being discarded, the initial card contains more images than concepts, thus increasing the effort of the pairs to find the appropriate relationship.



Gamification of cooperative games through challenges

Escape Rooms (ER) are team action games where players face challenges to complete a mission in a limited time. They include educational BreakOuts, where students solve challenges to obtain secret codes that allow them to progress in the game.

Each of the activities or challenges presented can be of the following types: a) cognitive challenges, which involve the players' thinking skills and logic; b) physical challenges, which require the manipulation of elements or physical activities to overcome a challenge; and c) combined challenges, where the final solution is derived from the results of the previous puzzles.

These games usually start with an engaging introduction to motivate and stimulate students, with the game master explaining the rules via text, audio, video message, or a combination of these. Students are usually grouped into teams, as they must work together to solve the various puzzles they face. Escape rooms and BreakOuts are used to expose students to scenarios in which they experience a situation where they need to trust their own and their peers' abilities, work together as a team, and manage both time constraints and the consequences of not working fast enough.

The aim is to reinforce and complement conceptual issues, but also to develop other skills such as critical thinking, analysis, reflection, cooperation and collaboration, problem-solving, teamwork, leadership, and autonomy, not forgetting, of course, the extension and understanding of knowledge related to the subject. The student, within the group, becomes an active protagonist in this learning process, reflecting, proposing, and acting based on his or her reflection.

The design and creation of a BreakOut in the educational environment only requires imagination on the part of the teacher to define the challenges or activities to be carried out by the group. It is necessary to have a wide variety of challenges so that the game does not become boring, and the students' expectations are maintained at all times.

As an example, the activity was carried out in an International Business class with a total of 6 boxes locked with a padlock and a numerical password. The password for each of them was obtained by correctly solving a series of tests, including questionnaires with access via QR code, hieroglyphics, Sudokus, or cryptograms, all linked to the objectives of the subject.



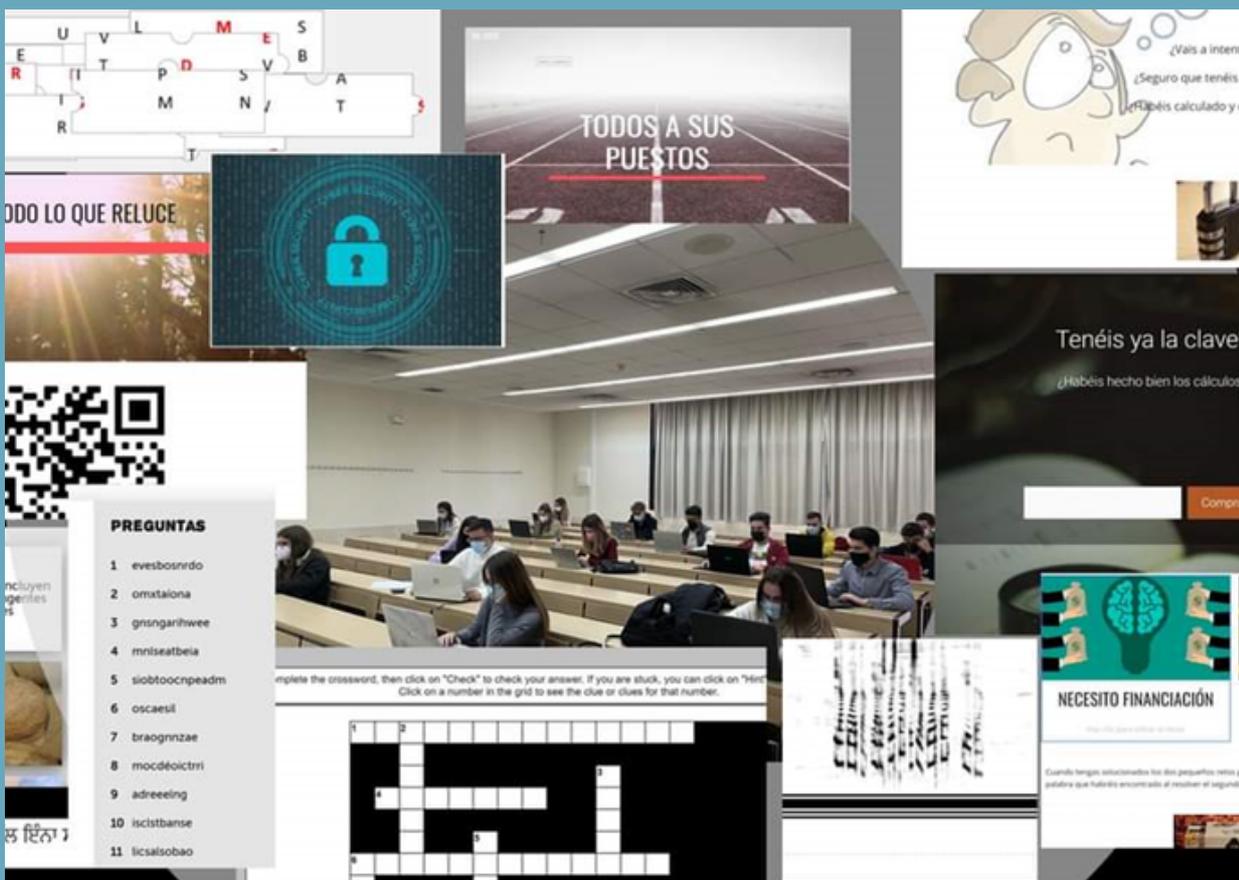
Digital BreakOut

This experience was carried out during the school year 20-21 when health measures due to the COVID-19 pandemic meant that classrooms had to be separated from each other. The activity was designed using the GoogleSites tool.. The different challenges were designed on independent pages, linked by digital padlocks that allowed progress from one challenge to another. The padlocks were created using the tool <https://eduescaperoom.com/generador-candado-digital/> and were inserted into the main pages of the challenges and opened on an external page that redirected to the next challenge if the code entered was correct. Many challenges were also created using the <https://puzzel.org/es/> tool, which allows a wide variety of games and challenges to be adapted to the format. Each participant accessed the BreakOut website on their computer, so that progress through the different screens and stages was done individually, but the thinking and obtaining of the access codes was done cooperatively. The cooperative mode was ensured by the BlackBoard Collaborate tool, which was used to exchange information and create meetings to agree and discuss a solution.

The format is easily adaptable to any subject. In fact, the same structure has been adapted in different subjects over the past two years.



These formats reinforce and complement conceptual issues and facilitate the understanding of knowledge. Moreover, they strengthen critical thinking, analysis, reflective attitude, cooperation and collaboration and teamwork. In addition, they promote problem-solving skills, leadership and autonomy, and the active role of the student through reflection and consensual decision-making. The activity not only fosters the ability to apply knowledge in a reasoned and cooperative way, but also in a collaborative way, since they could consult with other groups in a central space when there were doubts about the solution.



Learning Landscapes

Learning Landscapes allow the creation of learning environments in which learners take an active role through a 'roadmap' of learning stages within a subject, where content is integrated into challenges. The key feature of learning landscapes is that each learner can personalise his or her own learning by choosing a particular pathway, while collaborating with other learners on some of the challenges.

The development of the learning landscape requires the teacher to design and coordinate the activities through a zone matrix that combines the learning levels of Bloom's Taxonomy and Gardner's Multiple Intelligences.

This activity has been developed to introduce the SDGs through an economics subject in secondary education. The learning landscape has been developed with Genially and is made up of different activities that encourage students to reflect and critically analyse certain situations related to the major challenges facing the planet and sustainable development.



TEAMS' DIMENSION AND RULES INSIDE THE GROUP

According to curricular unit goals, students' number, and teachers involved in the process, the team's dimension should be evaluated.

If there are conditions and the game is not to be played individually, groups of 3 students are ideal. It must be noticed that each student has a role (team coordinator, creative thinker, bibliography organizer, communicator, ...) and these roles must periodically change.



TEACHER ROLES AND RESPONSABILITIES

- Check whether individual or group exploration requires further advice;
- Encourage autonomous progress;
- Explain, remember that repetition is always needed at least in the beginning, what students should look for and research to achieve their involvement and autonomous learning;
- Question progress or lack thereof, encouraging persistence;
- Congratulate advances whether small or large.



ASSESSING GAME-BASED LEARNING

Grading methods refer to criteria and formulas used to assess students' competency levels based on their performance in the game. These methods are essential for assigning grades or marks to students. Developing a scoring scheme or rubrics for assessments enhances the grading process, ensuring reliability and objectivity (Dawson, 2017; Jonsson & Svingby, 2007).

Evaluating the appropriateness of a game for a particular assessment involves assessing its alignment with the objectives and intended learning outcomes (ILOs). Educators need to engage with the game and evaluate its suitability for the intended purpose. The decision-making guidelines presented by Udeozor, C., et al.*, provide direction on determining whether a game is suitable for the intended assessment.



Game Rubric

Assessing Student Learning in Virtual Simulations and Serious Games

CATEGORY	Exemplary	Proficient	Partially Proficient	Unsatisfactory	POINTS
Knowledge of the key aspects of the simulation or game.	3 points	2 points	1 point	0 points	___/3
	Identified more than five significant aspects in each of the categories of the game (significant events, key characters, division of labor, resources needed, problems to be solved).	Identified between three and five significant aspects in each of the categories of the game.	Identified fewer than three significant aspects in each of the categories of the game.	Could not identify any significant aspects of the game.	
Ability to understand and communicate the rules of the game	3 points	2 points	1 point	0 points	___/3
	Fully articulated all rules and knows where to verify rules.	Understood the majority of the rules and knows where to find the rules in question.	Understood a few rules and does not know where to find the rules in question.	Did not understand the rules of the game nor where to find the rules of the game.	
Ability to construct a variety of question types to help solve game problems	3 points	2 points	1 point	0 points	___/3
	Correctly constructed at least five knowledgeable questions in several different types. For example, closed or multiple choice, true or false, and analytical or evaluative questions.	Correctly constructed between three and five knowledgeable questions in several different types.	Correctly constructed fewer than three knowledgeable questions that are the same type.	Unable to construct knowledgeable questions.	
Ability to locate and select relevant information from a variety of sources to solve game problems	3 points	2 points	1 point	0 points	___/3
	Located and selected a wide range of relevant information from a variety of sources that will help solve game problems.	Located and selected relevant information from a few sources that will help solve game problems.	Located a limited amount of information. Some were not relevant to the game.	Unable to locate relevant information.	
Use of creative thinking strategies in the game-making or problem solving challenge	3 points	2 points	1 point	0 points	___/3
	Used a large number of original ideas and strategies to solve the game challenge.	Used several original ideas and strategies to solve the game challenge.	Rarely used original ideas to solve the game challenges.	Did not use any original ideas to solve the game challenges.	
Ability to act on constructive feedback	3 points	2 points	1 point	0 points	___/3
	Readily adapted changes when new and relevant ideas and new information was presented	Made changes with some encouragement.	Hesitated to make changes when new and relevant ideas and information were presented	Did not consider new and relevant ideas and information.	
Group/partner teamwork	3 points	2 points	1 point	0 points	___/3
	All team members contributed equally to the activity's objective.	Assisted group/partner in the activity's objective.	Finished individual task but did not assist group/partner during the activity.	Contributed little to the group effort during the activity.	
TOTAL POINTS					___/21

Source: <https://www2.uwstout.edu/content/profdev/rubrics/gamerubric.html>

PARTNERS LOGO

LET'S WORK TOGETHER



GIRLS

Generation for **INNOVATION, RESILIENCE,**
LEADERSHIP and **SUSTAINABILITY**
THE GAME IS ON!



Project Coordinator



© 2023 GAME-BASED LEARNING COURSE HANDBOOK by GIRLS Project partners is licensed under CC BY 4.0

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.