



The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained there in.







The Gamelearn project: aims and results



The Gamelearn project was approved in 2021 and was inspired by the post-Covid education scenario, in which the education system, unprepared to handle an event of such magnitude, had to implement distance learning in record time. Many teachers found themselves in difficulty because their own digital skills were not sufficient to ensure quality and engaging education at the same time.

The Gamelearn project, therefore, aimed to disseminate the methodology of game-based learning precisely to support teachers in planning a more engaging and engaging education for students. The products realised are 2: a MOOC on game-based learning theory, a compendium of digital tools and this curriculum, where you can find inspiration for your future lessons.

From our project website, you will have access to all products produced in all languages of the partnership, i.e. Italian, Spanish, German and Slovenian, as well as English.





$\bigcirc \bigcirc \bigcirc$





The teachers who participated in the project actively experienced the power of game-based learning in their classrooms. During the experiment, which lasted a few months, they introduced games in the classroom, and created some with their own students. At the end, we gave them a questionnaire, the results of which were astounding.

More than 75 per cent of the teachers stated that they learned a lot about game-based learning and all of them had experienced the use of games in the classroom at least once. The main motivations were to make lessons more stimulating and to keep students' attention high.

We also asked them to evaluate the students' response to the methodology, and more than 80% noted greater interest and engagement in the learning process.

$\bigcirc \bigcirc \bigcirc \bigcirc$

Before starting

The content of the Game-based curriculum



Learning Outcome Map

Here we will list some LOs common for different subjects and we will suggest some type of games to play or some tools to use for creating a pleaseant lesson.



Planning a game-based lesson can be quite hard, even more if it's the first time, but don't worry, we created some supporting tools to help you in planning them over the time and to find the best activity for each LO



Evaluation Tool

Evaluating students become a slightly different when you use game-based learning because it let emerge also other skill and competencies that we must take care off.

+ G0

Learning Outcome Map

What you student should be able to do after completing a Learning Unit?

KNOW MORE



 $\bigcirc \bigcirc$

PISA OECD SURVEY



According to the OECD PISA surveys, assessing the reading, mathematics and science skills of students attending European schools, it emerged that there are four subjects in which they have more difficulties:

- Mathematics and Science,
- English,
- Literature.





+ INFO

For this reason, we decided to include in our experimentation teachers who teach these subjects, that seem to be the more difficult fo students.







 $(k+1)!\cdot(n-(k+$ k)! $a^{k}b^{n+1-k} + b^{n+1-k}$ ∞ = 1 - $(2n-1)^{5}$ $\sum_{n=1}$ $(n+1)!_{T}$ 273,1((n+1) - (k+1))!



START >

 $\bigcirc \bigcirc \bigcirc$





These are the topic on which our math teachers used the game-based learning approach. Touching the icon, you will see the Learning Outcomes the students aimed to reach. On the next page you will see some useful tools for digital game-based learning. However some of our teachers used also some analogic games: they asked students to prepare a card deck for playing Taboo on Maths, and they performed a trivial quiz like the Jeopardy tv show. You can read more about that on the Math Curriculum.



$\bigcirc \bigcirc \bigcirc$

Math Tools



These platforms were developed for the teaching of mathematics, geometry and physics. They contain readymade lessons and exercises, divided by subject and grade level. You will find lessons on basic mathematics up to advanced university level

There are several apps and platforms to play with mathematics, create interactive content to better explain difficult topics, using animations and hypertext links. These are just a few of those available.







START >



These are the topic on which our science teachers used the game-based learning approach. Touching the icon, you will see the Learning Outcomes the students aimed to reach. On the next page you will see some useful tools for digital game-based learning. However some of our teachers used also some analogic games: some organized a Thinking Hat activity or to play a crossword or a simulation game. You can read more on the Science Curriculum.



$\bigcirc \bigcirc \bigcirc$

Science Tools



These platforms were developed for the teaching of biology, chemistry and physics. They offer online open materials realized by some of the most important universities in order to make science for interesting for students.

Bio Bio Interactive Here we indicate some virtual labs and platforms for virtual simulation or for creating an app. Most of them are developed by American University and given for free to students and teachers.



Foreing Language and Mother tongue



START >



For languages, we will not point you to open source resources on content, since for each country, there are different databases, but we will focus mainly on games.

Although languages are different, as is their literature, the learning mechanisms are the same and the same tools and games are effective in all of them. When it comes to learning grammar or vocabulary, you can choose between digital and analogue games. For literature, certainly, offline and presence games are the most interesting. Scroll down the slide for inspiration.





000

Bonus Tool



TOOLS AND GAMES

FOR TEACHING



SUMMARY

Tool	Page
Classcraft	5
DragonBox	7
Geoguessr	9
Kahoot	11
Little Alchemy 2	13
Moodle	15
Plickers	17
Wordle	19
Kaltura	21
Miro	23
Quizlet	25
Genially	27
Geogebra	29
Phet	30
LearningApp	32
EdClub	34
Twine	36

Digital Tookit Tools and Games for teaching

In addition to the games and platforms already mentioned, we have developed a toolkit with descriptions of other useful resources. Together with the teachers, we identified easy-to-use and effective tools, both generic and subjectspecific. For each game you will find a presentation sheet and a page with a description of its functionality. You can find it on the project website by clicking the button below.

It is available in English, Italian, Spanish, German and Slovenian. To download the pdf in your language, just change the language of the site on the top right.





Before starting



Take a look at the MOOC

Before you start planning a lesson, we suggest you take a look at our MOOC on Game-based learning. Through a course divided into 10 chapters, including texts, videos and exercises, you can strengthen your knowledge on game-based learning. Among them, Chapter 6 will provide you with insights into the principles to be inspired by when creating an effective lesson. In the next slide, we will quickly go over them, so we recommend that you sign up for our course available for free on Udemy and available in the languages of the partnership.





The 4 questions

There are 4 magic questions that can help you...

When you start planning a lesson, ask yourself questions that will help you better focus your objective and make the lesson effective for your students.



These questions are fundamental also to correctly using our planning tools. Let's start checking them.

000





Long-Term game-based Plan Tool



Lesson Plan Tool



Learning Outcomes association tool



Control Flowchart

Long-term game-based plan tool

SUBJECT

This does not need an explanation: just enter the subject for which you intend to develop the learning plan.

ΤΟΡΙΟ

We have already mentioned the importance of learning outcomes, therefore, it is essential to identify from the beginning what outcomes we intend for students to achieve and to associate activities and games consistent with these.

LEARNING

OUTCOMES

ACTIVITIES

Activities are divided by type:

- presentation and explanation of topics
- consolidation of knowledge and skills
- putting knowledge into practice
- evaluation

Activities can be conducted in traditional or game-based modes.

Long-term game-based plan tool

GAMES

One mistake that frequently happens is overlapping game and tool since we have been accustomed, thanks to the spread and popularity of some platforms, to identify the tool with the game itself.

What we encourage you to do in this step is to think about the type of game that is useful for achieving the LOs (for example memory game, quiz, time challenge, simulation). It is the Learning Outcome itself that suggests the right one, if it is well developed. Based on the action verb chosen for writing, the LO will tell us which type of game to use.



Long-term game-based plan tool

TOOLS

Having chosen the game, you can choose the tool to make it depending on the needs. Some platform cannot have all the gamification functions you need, or other can offer a wider options for playing. Remember to check our Digital Toolkit on the website, but also to explore on Google. Just typing few keyword, it will show of a plenty of tools.

You can also choose to play offline and involve your students in the creation process asking them to create the playing materials and the share them with you.



Long-Term game-based plan tool

SUBJECT	TOPICS	LQs	ACTIVITIES	GAME	TOOL
	Topic 1	Learning Qutcome 1	Activity 1	Game	Tool 1
			Activity 2	Game	Tool 2
		Learning Qutcome 2			
		Learning Outcome 3			
	Topic 2				

Romeo and Juliet – William Shakespeare



SUBJECT	ΤΟΡΙΟ	LEARNING OUTCOMES	ACTIVITY	GAME	TOOL
ENGLISH	XVI CENTURY				
	ENGLISH THEATRE				
	SHAKESPEARE LIFE				
	SHAKESPEARE OPERAS				
	SHAKESPEARE OPERAS				
	ROMEO AND JULIET	Memorize the characters of the drama	Watch the movie "Romeo and Juliet"	Memory Game: matching the pairs	Quizlet
		Memorize the plot of the drama			
		Summarise and highlight the crucial scenes of the drama	Collective Reading of the drama	Role-play game	Moodboard for roles and instructions
		Analyse the drama and find the relevant connections with the historical period	Teachers lecture on the most importat scenes of the drama		

Learning Outcome association tool

Breaking the stereotypes

We have already pointed out that the trend of game use is concentrated only in the assessment stages of student learning, while there is little use of games in other stages of student learning. For this reason, we have developed a tool that can be useful as a brainstorming exercise in planning and also be used with students.

Learning is based on a process of acquiring, internalizing, consolidating and using the proposed knowledge, and therefore, how effective would it be if each of these stages were accompanied by an enjoyable game experience?



000

Lesson Plan Tool

It's foundamental to set clear instructions for each game, because, in this way, you will avoid distractions and disorders in class.

Before creating the content, check if there are already ready-to-use contents, as in many platforms thare are. In this way you'll save time and take inspiration from other teachers Associate the lesson at the learning phase

Describe the game: define the contents and instructions Identify the specific Learning Outcomes expected from the lesson

Check the Learning Phase we mentioned in the previous tool. Is the lesson aimed at explaining, consolidating, fostering or evaluating the knowledge and the skills?



Development // Learning session 2

Lesson Compendium

In next page you'll fine some lesson plans created by the teachers who participated at the project. Check them, use them, get ispired .





 $(k+1)!\cdot(n-(k+$ k)! $a^{k}b^{n+1-k} + b^{n+1-k}$ ∞ = 1 - $(2n-1)^{5}$ $\sum_{n=1}$ $(n+1)!_{T}$ 273,1((n+1) - (k+1))!



START >



Math

Probability and Combination Calculus

Consolidation phase



Game

Quiz Game created by the students.

The teacher divided the students in two group, each one in charge of creating a list of questions about the application of the theory learned.



Implementation and feedback

The competition was divided in two phases: the first group asked the questions to the second group and then they swapped. The teacher set a time for each round, so the team had to try to answer as much questions as possible. For each correct answer they earned a point.

The students showed much interest and also demostred a better knowledge of the topic.



Math

Euclidean Geometry

Consolidation phase



Game

Taboo game.

The teacher proposed a game like the Taboo, so the player has to let the other understand the searched word without using a list of other words.

Implementation and feedback

The teacher asked the students to create a deck of cards of Taboo based on the topic presented. After the first creation, the teacher checked the quality of the draft cards, which then were created online with Quizziz. The students then played in couples.

The activity helped the students in interiorizing the topic and consolidate their knowledge. They showed a huge committment to the creation of the cards



Math

Equations

Putting knowledge in practice



Game

Escape Room.

The teachers prepared an Escape Room online with a series of equations to be solved in order to break out the room.

Implementation and feedback

The teacher created the escape room using Genial.ly as virtual tool for playing. The escape room was shared with the students which had 2 day to play the game. Only the ones who were able to solve the problems and the equations proposed were able to break out the room.

The students were motivated and showed better results in solving the algebra issues proposed. They asked for playing a similar game again in future.

$\bigcirc \bigcirc \bigcirc \bigcirc$

Other ideas

Math lessons



QUIZZIZ

some teacher opted for a virtual quiz on quizziz, creating some questions and playing it in class



JEOPARDY

Jeopardy is a famous quiz show on TV. The teacher prepared the questions and, as in the game, they were organized from the easier to the harder associated to different score. Won who gained more points.

Foreing Language and Mother tongue



START >



English

Passive Verbs

Consolidation phase



Game

Pictionary The game pictionary is a team game where one player draws and the other member of the team as to guess the word or the sentence



Implementation and feedback

The students were organized in group and they had to draw what they understood of the text listened in English. The more accurate the drawing is the better is the score.

The teacher prepared short sentences and they had to draw them.

The game was appreciated by the students because it was challeging ad fun.



English

Distinguish verb tenses

Putting knowledge in practice



Game

Unjumble and Missing the words.

The Unjumble game consist in putting words in correct order and recreate a full sense sentence. It possible to create this game on many platform. **S**

Implementation and feedback

The teachers et the game on Wordwall and created a list of sentences to be put in order and a set of sentences to be completed with the correct verb tense. Actually this game is often proposed to streght the knowledge of English grammar, but it was spiced up by competion and the digital environment.





English

Revision of vocabulary

Consolidation of the knowledge





Flashcard.

The flashcar are a usual memory game in which the player have to give the associated concept to the one showed..



Implementation and feedback

The teachers created a deck of flashcard. On one side there was the definition and on the other the word. It could be played in two different ways: the teacher gave the word and the student gave the definition or vice versa.

The activity was effective to help students in memorizing the vocabulary and they are stimulated by the dynamism of the game itself.

French

French Theatre

Consolidation of the knowledge and Putting Practice



Game

Role Play Game

The Role-Play game model used was Dungeons and Dragons. The game consist in a fiction and simulation game in which student played a character (French Author or opera charachters).



Implementation and feedback

The realization of this activity required a long planning and it was realized in the arch of 4 month.

The approach mixed flipped-classroom and gbl. Th students had to prepare themselves about the given topic, then discuss them with the teachers and the classmates. They prepared also supporting materials such as videos, podcast... At the end of the whole planning, the students played the Dungeons and Dragons based on what they studied.

• •



Literature

Putting Practice



Game

Dramatisation.

Dramatisation consists of reading a play and performing it. It is necessary:

- analyse the play
- create costumes and settings
- assign roles
- familiarising the students with the characters



Implementation and feedback

For the realisation of this activity, the teacher selects passages from the play to dramatise and allocates time for the realisation

Each dramatisation can be made more challenging if students are asked to fulfil certain requests: these can be of different types, such as rewriting the passage in a modern key, reversing roles, changing the ending. This will add interesting play elements and test various other skills.

•



Literature

Putting Practice



Game

Challenge Creative Thinking

The creative thinking challenge consists of giving students a series of small challenges while studying a work or collection of poems. Each student will be asked to reinterpret the assigned piece creatively, through rewriting it, making a drawing, a video.

r

Implementation and feedback

The teacher prepared a multimedia content on Genial.ly in which students could explore the content subject of their challenge. Each piece was accompanied by insights and suggestions and students were asked to reinterpret it in two ways: by creating a drawing or photo and by writing a personal interpretation. Each student then presented their content to their classmates.

The students enjoyed the activity because it allowed them to express themselves freely, breaking the prejudice that poetry is boring.



Literature

Putting Practice



Game

Flashcard

We have already analysed flashcards for foreign language learning. In the case of the mother tongue, it can be used both to reinforce the study of rhetoric and literature, helping students to memorise authors, works and plots.

r

Implementation and feedback

During the study of a work, the teacher asked the students to create flashcards on which on one side they would draw a character and on the other side write their name and role within the work. Each student was assigned a piece to represent the characters in order to avoid overlapping. The cards were created at home and then approved by the teacher.

The cards were used in a team game in which each group was presented with the cards created by members of the other group..



Grammar

Putting Practice



Game

Virtual Triathlon

virtual triathlon is a relay or individual race based on speed and readiness. The topics and exercises to be used can be varied depending on the goals to be achieved. You can opt for completion, memory, logic and comprehension exercises, combined in series. You can use apps such as Wordwall or LearningApp.



Implementation and feedback

The teacher created this marathon of exercises using WordWall by choosing the following types: true or false, connect the pairs and multiple-choice quizzes. The marathon was individual, each student would complete the exercises by competing individually against other classmates. The topic was grammar with exercises on verb tenses and syntactic analysis.

$\bigcirc \bigcirc \bigcirc \bigcirc$

Other ideas

Foreing Language and Mother tongue



KAHOOT

some teacher opted for a virtual quiz on kahoot, especially about the literature to memorize better the knowledge



Podcast

Ask for creating a podcast is real interesting way for students to foster their speaking and listening skill in foreign language. Ask your student to create a podcast, simply using their smartphone.







START >



Biology Safety in Lab

Putting Practice



Game

Simulation

Simulation activities can be of different types, ranging from the use of laboratories and virtual workspaces to practical classroom exercises. Simulation activities take a little longer to plan and implement because they require detailed drafting of steps and instructions for implementation, but they are also the ones that bring the most results in terms of learning effectiveness.



Implementation and feedback

The teacher asked the students to replicate a biology laboratory, paying particular attention to all safety regulations in force for their operation. The students were divided into groups: one group worked on the design of environment and the arrangement of the instrumentation, the second worked on the identification and arrangement of all materials, glassware and reagents used, the third on pictograms and safety devices.

The experience was appreciated as the students truly perceived the importance of safety in the working environment.



Biology Biomolecule and genetics

Putting Practice



Game

Simulation

Students often fail to train their skills in science subjects due to a lack of space or adequate equipment. For this, online simulation is a valuable ally. There are many online chemistry and biology laboratories and with these, students can really test what they have learnt in safety.

Implementation and feedback

The teacher proposed that the students experience identifying a bacterial strain through genomic sequencing using the virtual laboratory. The laboratory is located on the HHMI platform. Following the instructions already provided on the site, the students prepared the sample, carried out PCR, sequencing and sequencing analysis. At the end, they answered a questionnaire proposed by the platform to validate their understanding of the steps taken.



Physics Vectors and Motion

Putting Practice





Game

Simulation

Physics is a subjects in which simulations can have a significant impact on students' understanding, as they are generally only dealt with on the level of abstraction. There are platforms such as Geogebra that allow students to play with physical phenomena, experiencing the correlation between forces and cause and effect.



Implementation and feedback

The teacher proposed the use of Geogebra platform simulations to work on vectors and motion. In the Geogebra labs, students will be able to work directly with the elements and note how by changing the parameters, the effects change.

By browsing the platform, it is possible to find simulations for mathematics and physics for every grade level, making it a valuable tool for demonstrating the practical application of the theories explained.



Physics Vectors and Motion

Putting Practice





Game

Simulation

Physics is a subjects in which simulations can have a significant impact on students' understanding, as they are generally only dealt with on the level of abstraction. There are platforms such as Geogebra and Phet that allow to play with physical phenomena, experiencing the correlation between forces and cause and effect.



Implementation and feedback

The teacher proposed the use of Geogebra and Phet platform simulations to work on vectors and motion. In the these labs, students will be able to work directly with the elements and note how by changing the parameters, the effects change. By browsing the platform, it is possible to find simulations for mathematics and physics for every grade level, making it a valuable tool for demonstrating the practical application of the theories explained.



ICT Microcontroller

Consolidation of knowledge





Game

Surveys and quiz

There are many platforms for creating quizzes and surveys. These can be used both for knowledge assessment and as debriefing tools at the end of each lesson to assess how clear the concepts conveyed to students are. Among the platforms, there are the classic quiz platforms, but also others such as Menti.com or Plickers.



Implementation and feedback

The game consists of written questions related to the functions of the Arduino microcontroller.

For example, how do you define whether an Arduino pin is an input or output. Students must pick up to for possible answers which are functions of Arduino IDE language. The running order of questions corresponds to the logical program flow. For instance, answers are like digitalWrite(), pinMode, digitalRead() etc

Playing the game helps them to remember what they heard at the beginning of the lesson and with increasing speed of the new questions the game becomes more challenging.



ICT

Flowchart

Putting knowledge into practice





Game

Simulation

Just as with other science subjects, in ICT, students must transfer theoretical knowledge to a practical plane in order to make it a skill. Among the most complex things, there is definitely the use of programming language and knowledge of the basic algorithms for making a software or program. Among these practice tools is RAPTOR.



Implementation and feedback

RAPTOR is a flowchart-based programming environment, designed specifically to help students visualize their algorithms and avoid syntactic baggage. RAPTOR programs are created visually and executed visually by tracing the execution through the flowchart. Required syntax is kept to a minimum. Students prefer using flowcharts to express their algorithms, and are more successful creating algorithms using RAPTOR than using a traditional language or writing flowcharts without RAPTOR.

Making the game is the game. Students should be able to plan the simple game and write the program by the visualization of the algorithm.

$\bigcirc \bigcirc \bigcirc \bigcirc$

Other ideas

Foreing Language and Mother tongue



SKETCH UP

it's a platform for 3d modelling which can be applied in different learning areas.



Animaker

It's a platform for understanding the basics of coding and creating content and games through a guided approach to coding language. Teachers use it not only for ICT but also to help students for creating simulation content.







VS



Traditional Assessment

Traditional assessment methods allow us to evaluate through predefined ways the knowledge acquired by the student, quantifying its value through a scoring system.

The advantage is the fairness and speed of assessment.

The disadvantage is that it does not assess skills and does not take into account contingent variables.

Game-based assessment

Using the game-based approach for assessment as well allows looking at students from a whole different point of view. As we have already shown, gaming improves students' learning performance, and using it as an assessment tool will allow you to not only assess knowledge, but track skills and discover their hidden abilities.

The advantage is that it allows you to assess the student comprehensively and in the long run.

The disadvantage is that it requires more detailed and complex planning.



$\bigcirc \bigcirc \bigcirc \bigcirc$

Disciplinary contents

During the game, students must demonstrate that they have acquired the knowledge of the topic presented, internalized it, and can apply it appropriately and correctly.

Assessment takes knowledge and competence into account. The items to be assessed are:

Knowledge

Correctness/Precision	1	2	3	4	5
Completeness	1	2	3	4	5
Deepening of knowledge	1	2	3	4	5

Skill

Practical Application	1	2	3	4	5
Adequacy of application	1	2	3	4	5
Mastery of application	1	2	3	4	5

During the game, it is also important to assess the ways in which students express themselves, to ascertain their effective understanding of disciplinary content and appropriate ability to describe and discuss it. Correct language shines through a clear understanding of the topics. For this reason, it is important to assess their communication skills.

Communication skill

Appropriate Lexicon	1	2	3	4	5
Linguistic Register	1	2	3	4	5
Clarity of exposition	1	2	3	4	5
Interdisciplinary connections	1	2	3	4	5

$\bigcirc \bigcirc \bigcirc \bigcirc$

Technical Skills

The evaluation of technical skills is closely related to the type of activity being performed, so determine for each activity which technical activities are to be evaluated. For example, in the request to make a presentation, the graphic quality of the content, the originality of the product, the interactivity of the product may be evaluated. If we evaluate the use of a simulation platform, mastery in the use of functions, the ability to interact with the virtual environment will be evaluated. Here we suggest just the general technical skills for a virtual environment.

Mastery in the use of the platform	1	2	3	4	5
Accuracy of actions taken	1	2	3	4	5
Timeliness in sharing results	1	2	3	4	5
Appropriate use of tools	1	2	3	4	5

$\bigcirc \bigcirc \bigcirc \bigcirc$



During the game dynamics, students' soft skills also emerge, which, are generally not tracked by traditional assessment methods. This, too, can greatly affect a student's academic performance, especially those who tend to be considered weak. It is important to assess and encourage the improvement of soft skills because they are critical to the proper application of formal skills. These are only the most common soft skills, but you can change according your need the ones to be assessed.

Problem Solving	1	2	3	4	5
Critical Thinking	1	2	3	4	5
Creativity	1	2	3	4	5
Time management	1	2	3	4	5

Personal Skills

As well as soft skills, it is also important to monitor, rather than assess, personal and interpersonal skills because in the game-based approach they are crucial since most activities require students to interact with each other and with the teacher. Tracking these skills brings out the work profile of the students which will enable you to apply increasingly effective strategies for their engagement.

Conflict Management	1	2	3	4	5
Assertive Communication	1	2	3	4	5
Cooperation	1	2	3	4	5
Leadership	1	2	3	4	5
Stress management	1	2	3	4	5
Team working	1	2	3	4	5

$\bigcirc \bigcirc \bigcirc \bigcirc$

Feedback

Summative assessment is what allows us to evaluate the student in content knowledge, however, especially in the face of less than excellent performance, it is crucial for the teacher to engage in formative assessment as well.

Formative assessment is possible by taking into account all the factors mentioned in the previous slides, evaluating not only the results, but the whole process. It is essential to share this type of evaluation with the student by applying the principle of growth mindset: not emphasizing failure, but highlighting potential and suggesting strategies for improvement.

What Worked well
What can be improved

