GAMIFIED SOLUTIONS FOR VOCATIONAL E-LEARNING

InnoVET

T4 TEAM 4 excellence

Akira

KONYA
İl Millî Eğitim Müdürlüğü

Game-Based Learning: Innovative e-learning pedagogies for VET educators

2021-1-RO01-KA220-VET-000030350

INNOVET

Gamified solutions for vocational e-learning

Revision: v.1.0

Project result	PR1 - Game-based solutions analysis for digital learning environments
Activity	Research study report
Deliverable lead	Konya Provincial National Education Directorate (KMEM)
Due date	31 October 2022
Authors	ACOMI Nicoleta, ACOMI Ovidiu, AKINCI Eyyup, ANDREI Roxana Elena, AYDIN Ibrahim, BENCU Zoia, CONSTANDACHE Mihaela, DIMA Adriana, DUDAN Anghelina, LANZETTA Miriam, ORDINE Francesco
Abstract	In the new digital and online landscape, there is a significant potential to apply gamification in non-formal education to improve learners' experience and engagement. The concept of gamification in education refers to the presence or addition of game features in activities that are not traditionally considered games. This study aimed to determine the opportunities and options for the gamification of vocational non-formal education, to support innovative game-based learning programs in the digital education ecosystem. To achieve the project aim, the research team envisaged a research methodology which included secondary and primary research. Firstly, the research team carried out secondary research to define the selection criteria and collect 20 good practice games. The good practice games were then validated during focus groups with vocational teachers/trainers. During these focus groups, researchers verified the extent to which games and game elements respond to the pedagogical needs of vocational educators.

	Then, the results of the secondary and focus group research were validated with vocational students. Students were invited to complete a survey to determine the desirable gamification features when it comes to vocational students' classroom engagement. Finally, conclusions and recommendations were formulated, with the outlook of using these further in the INNOVET project for designing game-based learning programs and integrating these into a digital education ecosystem. As a result, this research provides important insights from all the stakeholders involved: researchers, vocational trainers, teachers and students into identifying and evaluating good practices to define the process of gamification in education and its elements. Nevertheless, there is abundant room for further progress in determining the maximum potential of gamification and its elements in the educational process. Further studies, which take these variables into account, will need to be undertaken.
Keywords	Gamification, research, methodology, survey, questionnaire, focus group, target audience, good practices, game elements, vocational education, teacher, trainer, facilitator, educator, instructor, educational games, online education, e-learning, game-based learning

Acknowledgement

Disclaimer

The European Commission support for the production of this publication does not constitute an endorsement of the content 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 therein.

Copyright notice

Summary

In the new digital and online landscape, there is a significant potential to apply gamification in non-formal education to improve learners' experience and engagement. The concept of gamification in education refers to the presence or addition of game features in activities that are not traditionally considered games. It refers to computer games and online achievements that can be applied in various ways. Gamification in education uses the mechanics and dynamics of games to facilitate learning.

In this context, four organizations from Romania, Italy and Turkey created a multidisciplinary consortium to implement the "Game-Based Learning: Innovative e-learning pedagogies for VET educators" (INNOVET) Erasmus+ project. The project aims to develop an innovative high-performing digital education ecosystem with supportive tools for vocational education and training (VET) providers. The current research study is a precursory step in creating the ecosystem.

This study set out to determine the efficacy of gamification in the educational process to launch an innovative game-based learning program. This paper describes and discusses the methods used in this investigation to reach its objectives. The present study involved VET trainers, teachers and students to define the process of gamification in education and its elements.

Chapter 1 presents the study methodology which was created and put into practice by the research consortium in accordance with the goals, qualitative and quantitative performance indicators and impact and sustainability objectives of the INNOVET project. This technique was created to help professionals and educators do primary and secondary research, gather good practices for gamification in the educational process, analyse, evaluate and validate them.

Following up on the methodology, **Chapter 2** describes in greater detail the analyses of good practices that have been collected by all the partners. There are presented 20 good practices collected from a multicultural perspective: Romania, Italy and Turkey. Researchers identified the best digital teaching practices based on a common set of criteria: practicability, topic, resources and skills, aesthetic elements, elements of mechanics, results and review.

As part of the study program, focus groups were held to examine the requirements, features and game components that the target groups would find more appealing and encourage participation in game-based learning programs. In **Chapter 3**, the researchers analysed the results of the focus group discussions undertaken with VET teachers and trainers.

Chapter 4 is concerned with the analyses of the survey applied to VET students that could be interested in gamification. This section provides an important opportunity to advance the understanding of the most effective instructional techniques and instruments suitable for online education, taking into consideration VET students' perspectives on gamification based on their needs and preferences.

Chapter 5, the final one, sets out conclusions and recommendations of the study, with the outlook of using these further in the INNOVET project for designing game-based learning programs and integrating these into a digital education ecosystem. The conclusions provide an interpretation of the main research findings uncovered by the current study. Then, the final chapter draws upon the conclusions and sets out recommendations concerning the implications of the findings in the project as well as future research and practices in this area.

Contents

5

Introduction

The term "gamification" was first used by British developer Nick Pelling in 2002, meaning "accelerating and attracting electronic tools using game-like graphical interfaces". Subsequently, the term acquired different connotations. Gamification refers to the use of game elements and techniques used in the design of games in a "non-game" context.

This concept refers to the presence or addition of game features in activities that are not traditionally considered games. It refers, in particular, to computer games and online achievements that can be applied in various ways. Gamification in education uses the mechanics of the game to enrich and facilitate learning.

Games increase the level of dopamine, which also leads to an increase in attention and motivation naturally, and this aspect is desired by every teacher during the courses. Games have great potential to provoke and work on the development of emotions such as curiosity, optimism, pride or security. The game meets the needs of students.

> *„Gamification consists of the use of based mechanics on games, aesthetics and game thinking to involve people, motivate action, to promote learning and solving problems."*
>
> *Karl M. Kapp*

The audience for digital games is growing quickly. Young people play practically constantly and it is already reaching older age groups. Both men and women enjoy social, casual, and intensive kinds of gaming. The face of gaming is evolving as a result of new technology, including tablets and smartphones, as well as new methods to play games, particularly online. In addition to driving expansion in the amusement video games sector, investment and innovation in the games business are also influencing other industrial areas, such as science, defence, media, and education. Growth in this business is evidence of how valuable digital games are for "serious" uses.

In terms of European policy, this might help accomplish some of the primary objectives of Europe 2020, including improving educational opportunities, reducing poverty, and ending social isolation. It is pertinent to five of the main flagship policies, including Youth on the Move, the Digital Agenda for Europe, the Agenda for New Skills and Jobs, the European Platform against Poverty and Social Exclusion, and the Innovation Union.

Children from underprivileged communities, youth who are not in employment, education, or training (NEETs), people with disabilities, people who are acutely and chronically ill (both mentally and physically), elderly people who are isolated, people who live in areas with high crime rates or extremism issues, and social entrepreneurs are just a few of the target groups that can benefit from the use of digital games. However, this study reveals that game-based techniques provide a unique chance to connect with VET students, teachers and trainers.

In this context, a multidisciplinary partnership comprising four organizations from Romania, Italy and Turkey, named INNOVET consortium, aimed to develop an innovative high-performing digital education ecosystem with supportive tools for VET providers. The goal of the ecosystem is to adapt to online learning and to use digital technologies for learning creatively and collaboratively.

1. Research methodology

This methodology was developed to guide experts and teachers to conduct primary and secondary research, to collect, analyse, evaluate and validate good practices for using gamification in the educational process.

The most relevant games used in the process of teaching, learning and assessment, together with the game elements, served as the foundation of the innovative game-based learning program.

For defining adequate and effective game-based teaching solutions, the authors proposed a progressive model comprising of preparatory activities, focus groups, data analysis and finalization.

1.1. Preparatory activities

Preparatory activities consisted of preliminary desk research for identifying good practices in teaching and learning by gamification. Each partner designated a person in charge of the research. The designated persons were experts from the INNOVET Consortium. They coordinated the team of researchers from their organizations to collect a minimum of five good practices for using game elements in teaching and learning, online and face-to-face, to facilitate the desk research of good practices. The process was divided into three phases and the criteria and/or methods to be followed in each phase have been predefined. The research on good practices in using gamification in learning comprised three stages:

- Identification;
- Collection;
- Validation & evaluation.

The results of these preparatory activities were used as input for the focus group.

> *"A good practice is not just a practice that is defined as good in itself, but a practice that has been proven to work well and produce good results and is therefore recommended as a model. It is a successful experience, which has been tested and validated, in a broad sense, which has been replicated and deserves to be shared to be adopted by as many people as possible"* (FAO, 2013)

1.1.1. IDENTIFICATION OF GOOD PRACTICES FOR LEARNING

Good practices in gamification

The objective was to identify and collect good practices for teaching and learning with games that have proven to work and have obtained satisfactory results. Each partner selected a minimum of five good practices for online and face-to-face covering different types of educational games.

Mainly, the researchers focused on:

- A beneficial experience that can be replicated elsewhere;
- A validated and successful experience, how to increase „VET attractiveness", which deserved to be disseminated for better adoption by a larger number of beneficiaries;
- An experience, which has been tested, accepted and adopted by those who implemented it.

The INNOVET partner leaders guided the team of researchers from their organization to collect good practices in gamification of education in their organization or at the national and even international level.

Target audience for the good practices

The INNOVET consortium used the collected practices to obtain valuable information about the gamification elements that served for further development of the Game-based Learning Programs.

VET Teachers integrated the game elements into teaching and other professors can access the results of the research carried out during the project once published on the project webpage and via the Erasmus+ Project Results Platform.

Criteria to identify good practices in gamification

This section established the criteria that all researchers jointly used to identify good practices in gamification. These criteria referred to general characteristics that must be found in certain practices to consider their good practices.

ESSENTIAL CHARACTERISTICS

- Effective and successful: The practice proved to be effective in achieving the specific objectives of the course; it was successfully adopted and had a positive impact on learners.
- Technically feasible: Technical feasibility was the basis of a "good practice". It was easy to learn and implement.
- Replicable and adaptable: A "good practice" should have the potential for replication and should therefore be adaptable to similar objectives in varying educational environments.

DESIRABLE CHARACTERISTICS

- Collaboration: Participatory approaches were essential as they support the development of teamwork expertise.
- Competition: The implementation of a game design competition involved the challenge of including varied learners and the contexts that they learn within.

SPECIFIC CRITERIA

- Flexibility in the administration of the game.
- Aligned game elements to learning objectives. Assumed conclusions according to achieved results.
- Level of achievement. What was measured by the game in accordance with Bloom's taxonomy? E.g., knowledge, comprehension, application, analysis, synthesis and evaluation.

1.1.2. COLLECTION: DOCUMENTING GOOD PRACTICES

At this stage, partners organized the identified information on the Good Practices in Gamification, using a common method. It was important to include which of the characteristics that we had previously determined in the identification phase were fulfilled and to what extent.

9

Essential elements for documenting good practices. Source: (FAO, Good practices template, 2015)

For the scope of documenting the good practices in gamification, authors revised the essential elements for documenting good practices to fit the purpose and prepared a consolidated table: good practices template.

The table shown below was used to gather the information needed about each good practice and served as an evaluation of the characteristics found in the concrete practices. Inside the template, there were sets of guiding questions and explanations to be used as a reference. These allowed partners to know what information shall be included in each category.

Effective gamification must turn tasks into challenges that made the student feel ready to take them, rather than imposition, to be tempted by the challenge, and therefore to surrender to it with the feeling of doing so voluntarily, which inspired them to pursue achievement.

Once the Good practice sheet was filled in, each partner shared the results with the Consortium.

Table: Good practices template

Title:	Topic/Subject:		Collected by partner:
Duration:	☐ Face-to-face in classrooms		☐ Individual
	☐ Online		☐ Teams
Elements of mechanics: ☐ Points ☐ Levels ☐ Mission ☐ Badges ☐ Leaderboards ☐ Unlocks ☐ Events Feed ☐ Quiz ☐ Visual Progress ☐ Other, please describe	Elements of dynamics: Constraints ☐ Appoint dynamics ☐ Countdown ☐ Throttles ☐ Other: Emotions ☐ Competition/ contest is to compare performance with that of others. ☐ Surprise ☐ Success/ realization is the most satisfying reward, the recognition of achievements Narrative		Resources & Skills needed ☐ Technical ☐ Wifi ☐ Software ☐ Guided by teacher ☐ Smartphone ☐ Other, please describe

☐ Exploration/ Experiment

☐ Create empathy

Progression

☐ Progress (emotional) lets players know what their progress is.

☐ Collection/ status is the acquisition of recognition and prestige by overcoming a series of obstacles and scores.

☐ Achievements are something of value for a certain type of action.

Relationships

☐ Collaboration/ Involvement

☐ Community

☐ Other, please describe

ASSESSMENT OF SPECIFIC GAMIFICATION ELEMENTS		IDENTIFIED GOOD PRACTICE
ELEMENTS OF MECHANICS	Players test their skills. Game mechanics are rules, actions and goals that are used to make games fun or challenging. They are the triggers for building, exploring, running, and winning. Help to answer the question: **What should be done?** Three basic mechanisms are distinguished by their popularity and presence in games, known as PBL **The POINTS** system should be established from the beginning and be consistent. **BADGES** are a system of rewards that are obtained by fulfilling different tasks. The effort must be in concordance with the reward. **LEADERBOARD** provides analytics and helps learners focus on terminal objectives. Other elements. Source: (Biworldwide, 2022) **LEVELS** show how users reach a milestone, program status, or areas of accomplishment. **MISSION** provides objectives for users to accomplish as a team or as an individual. **UNLOCKS** can be deployed with quizzes, activities, and missions containing badges where there is a determined linear progression. **EVENTS FEED** enables users to see how everybody else in the gamification is doing; for example, a user may read on the Events Feed that a colleague has completed a mission and progressed to the next level. **QUIZ** allows users to test their knowledge. **VISUAL PROGRESS** shows users where they are in completing missions, challenges and in the overall Gamification user journey.	(*describe here elements of mechanics of the good practice*)
AESTHETIC ELEMENTS	The story on which the game is based and its duration are very important points for its development, which allows the introduction of challenges of different complexity to develop skills and abilities.	(*describe here the aesthetic elements of the good practice*)
ELEMENTS OF DYNAMICS	These are the observable results that mechanics produce. E.g.: The elements of dynamics try to satisfy intrinsic motivation, such as the desire for reward, self-expression, achievement or competition. **CONSTRAINTS (relate to Scarcity)** are the rules a player must follow to participate in the game, every gamification design has its own constraints, which are always conceived aiming the final objective of the gamified system **EMOTIONS** find us daily and may reflect among other things, curiosity, competitiveness, happiness, surprise and pride, as well as disappointment, envy, regret and frustration. **NARRATIVE** (relates to epic meaning) can be defined as "a story or account of events, experiences, or the like, whether true or fictitious". The narrative helps us build the experience from its base and makes it easier for the player to retain and interact with the material being presented. **PROGRESSION** (relates to accomplishment) refers to the player's growth and development within the experience and usually creates a sense of accomplishment in many stages of it. **RELATIONSHIP** (relate to social pressure) is either social or virtual interactions of the player with the gamified environment that generates all	(*describe here elements of dynamics of the good practice*)

	kinds of positive and in some cases negative feelings, which then direct the player towards the gamified system's goal The participant shows a series of attitudes during the game that allows us to know if a change or correction of the elements is necessary.	
RESULTS	What are the learning objectives? How are the gamification elements aligned with learning objectives to achieve positive results? (Lambdasolutions, 2018)	(*describe here the reward system associated with the learning objectives*)

RATE THE PRACTICE		
On a scale from 1 to 5, where 1 is not sufficient and 5 is very good, how would you rate this practice?		
ESSENTIAL CHARACTERISTICS	**DESIRABLE CHARACTERISTICS**	**SPECIFIC CRITERIA**
Effective and successful ☆ ☆ ☆ ☆ ☆	Collaboration ☆ ☆ ☆ ☆ ☆	Flexibility in game administration ☆ ☆ ☆ ☆ ☆
Technically feasible ☆ ☆ ☆ ☆ ☆	Competition ☆ ☆ ☆ ☆ ☆	Aligned game elements to learning objectives ☆ ☆ ☆ ☆ ☆
Replicable and adaptable ☆ ☆ ☆ ☆ ☆		Level of achievement ☆ ☆ ☆ ☆ ☆
VALIDATION	Link:	

1.1.3. EVALUATION AND VALIDATION

The evaluation and validation of the practices collected during the research were carried out through focus groups (with VET teachers and trainers) and online surveys (among VET learners) carried out by partners.

1.2. Focus group methodology

Each partner organization implemented a Focus group with 10 VET teachers and trainers to gather the target groups' needs regarding the features and game elements they would find more effective and engage in Game-based Learning Programs.

Game-based learning: Consisted of incorporating games or video games into teaching, as a complement to ordinary teaching.

The focus groups were organized face to face or by using online conference platforms: MS Teams, Moodle or ZOOM.

The flow of the activities followed the steps:

- Partners identified relevant participants;
- Sent invitation (set up the online meeting/ conference room and transmitted the agenda);
- On the day of the meeting:
  - a brief introduction to the topic to be discussed, mentioning its objectives;
  - partners presented selected best practices;
  - work in groups to evaluate the good practices following initial criteria;
  - discussed specific questions on the collected good practices to select transferable elements and formulate recommendations.
- The report was shared with all project partners.

1.2.1. DESCRIPTION OF THE ACTIVITY

Each partner organization implemented one Focus group with 10 VET teachers/trainers to gather the target groups' needs and preferences on features and game elements they would find more effective and engaging Game-based Learning Programs.

Game-based learning: Consisted of incorporating game elements or video games into teaching, as a complement to ordinary teaching.

- **Introduction** - the moderator introduced the topic of the discussion and himself/herself, then, introduced the INNOVET project and the scope of the focus group
- **Breaking the ice** – with a question "Why did you decide to join our focus group today?"
    - or, with an exercise:
    Prepared three big sheets of paper (A3) and wrote the titles: Expectations, Fear, and Contributions. Gave three coloured post-it pieces of paper to each participant and asked them to write one word for each: Expectations, Fear, Contributions. Post it on the A3 poster and kept them for the reflection session, at the end of the focus group.
- **Key Questions** - to assess the good practices following initial criteria and to encourage a deeper analysis of games used for learning in VET.
- **Closure** - Asked if anyone would like to add something and if they enjoyed the discussion.

1.2.2. OBJECTIVES

1. Understanding the opinion of the participants about gamification for the VET disciplines.
2. Determining the most appropriate elements that can be integrated at different stages of learning the experience.

Assumption

- The vast majority consider games to be an innovative way of learning.
- Some of the participants think that the games are useful in evaluation.
- Most VET teachers are used to teaching face-to-face and would like to add some game elements.

The Focus Group aimed to:

- To gather the VET teachers' and trainers' opinions about the game elements that would be more effective for achieving the learning outcomes.
- Review the collection of good practices to select the relevant game elements that can be used at various stages of e-learning.

The focus-group coordinator guided participants in the selection of the most appropriate transferable elements that can be integrated into the following phase for the design and development of game-based solutions analysis for digital learning environments.

1.2.3. METHODOLOGY TO BE APPLIED FOR THE IMPLEMENTATION OF THE ACTIVITY:

The method adopted to implement the Focus Group is the questioning route, a sequence of questions in complete, conversational sentences. Each partner implemented its focus group following the questions agreed upon in advance by partner organisations to reach the goals of the focus group.

- The facilitator briefly presented selected good practices.
- Guided the participants to assess the good practices following the initial criteria.
- Discussed specific questions on the collected good practices to select transferable elements and formulate recommendations.

Structure and Route

Section	Aim	Topic	Questions
Introducing participants 5'	To create a positive environment for the work to be done		Ice-breaker Getting to know each other
Presentation + General questions to introduce the topic 10'	To align everybody's general knowledge of gamification- the game-based learning and teaching	Good practices: - presentation - new examples	Q1 Do you have access to the knowledge of digital tools and platforms for gamifying lessons? What are some examples?
Key Questions 30'	To encourage a deeper analysis of game elements that can be used for learning *If appropriate, describe a content/discipline to which a game would apply (a sequence of 10-15 min).*	Assess specific gamification elements	**Imagine that you are having classes on a specific subject.** Q1 What would motivate learners to join an online educational game? Q2 How can we encourage online socialisation during the online course? Q3 What game elements would be appropriate throughout the lesson? Q4-At which stage of learning would game elements be more effective? Q5 What game elements would help you to measure learners' abilities to: - remember - understand - apply - analyse - evaluate - create
Closing 10'	Final questions that give the participants the chance to express their conclusions on the general topic of discussion	-presentation of the results	Q1 What aspects are most relevant to a game? Q2 What motivates you to add game elements to your lessons?

The focus-group coordinator guided participants in the presentation and selection of the most appropriate transferable elements that can be integrated into the following phases for the design and development of game-based solutions analysis for digital learning environments.

Specific questions on the collected good practices were decided by the researchers' team once the collection of practices is finalized. As a result of the focus groups, the quality criteria were agreed upon for each type of game.

1.3.   Survey questionnaire

This survey questionnaire was conducted for those who benefit from gamification experience, VET students. Each partner organization gathered the target groups' needs, preferences on features and game elements they would find more effective and engaging Game-based Learning Programs. The responses to this survey assisted in determining the desirable gamification standards when it comes to VET students' classroom engagement.

1.3.1.   BACKGROUND

The use of gamification in numerous fields may be traced back to psychologist Jean Piaget, who promoted the use of games as a vehicle for children's meaningful learning and social interaction. Since Piaget first promoted gamification, much has changed as virtual reality and video games have altered the landscape of learning for children, adolescents, and adults. Gamification is still very much influenced by the psychology of human motivation, though.

The students of today have a new profile and are digital natives. They have fresh attitudes about the learning process, different learning styles, and higher expectations for teaching and learning since they grew up with digital tools. Teachers must employ a variety of instructional strategies to encourage pupils to participate actively in their own learning and to be highly motivated to do so.

Education is a sector with a strong potential for using "gamification," a concept that tries to improve user experience and engagement with a system. For this specific survey, the users are represented by VET students under 18 years old, between the ages of 18 and 25, or more than 25. The research team analysed the extent to which young people would engage in a classroom with gamification elements.

1.3.2.   SURVEY METHODOLOGY

To develop the Game-based Learning Program, the research team followed the ASSURE model, which comprises six steps:

- [A] Analyse training needs for VET learners to develop gamification in the educational process by literature review;
- [S] State objective of the Game-based Learning program, to be a toolkit for synchronous and asynchronous classroom activities;
- [S] Select methods. Questionnaires were used to understand VET learners' preferences in online learning and interviews with VET teachers and trainers were to ensure their perspectives are integrated;
- [U] Utilize media and materials for Game-based Learning Program development: relevant scientific literature as a solid background for the program;
- [R] Require users' participation for piloting and validation: potential users responded to the questionnaire and suggested improvements to the final version of the program;
- [E] Evaluate and revise the final version of the program before publishing.

The study team chose organizations and people who work with young people and may be interested in employing gamification as appropriate stakeholders. Each partner group put out a stakeholder map, making sure to include all pertinent areas: under 18 years old, between the ages of 18 and 25, or more than 25.

A 5-questions survey was chosen. Since professional feedback was anticipated, the study team only forwarded the questionnaire to those who were pertinent. The invitation was sent out via WhatsApp and email. The survey's final iteration was transmitted via Google Forms. The announced availability of the online survey was from 7 June to 10 August 2022.

The below survey was proposed for VET learners. It can be used to guide the discussions with VET teachers/trainers.

Proposed survey for VET learners:

Q1. Age category

- Under 18
- 18-25
- Over 25

Q2. Imagine that you join an online course. How would you like to be welcomed at the beginning of the course?

- A course welcome video from the instructor
- Welcome letter from the instructor
- By a message from the instructor which offers online office hours
- By an online discussion forum where all students and instructors to introduce themselves
- Other

Q3. How do you see online socialization during the online course?

- Forum discussions between classmates
- Community of learning with classroom discussions on different topics
- Debates facilitated by instructors, where learners formulate and critique arguments
- Other:

Q4. What type of game elements would motivate you to remain engaged in a course (choose three, the most important for you)?

- POINTS system should be established from the beginning and be consistent.
- BADGES are a system of rewards that are obtained by fulfilling different tasks.
- LEADERBOARD provides analytics and helps learners focus on terminal objectives.
- LEVELS show how users reach a milestone, program status, or areas of accomplishment
- MISSION provides objectives for users to accomplish as a team or as an individual.
- UNLOCKS can be deployed with quizzes, activities, and missions containing badges where there is a determined linear progression
- EVENTS FEED enables users to see how everybody else in the gamification is doing; for example, a user may read on the Events Feed that a colleague has completed a mission and progressed to the next level.
- QUIZ allows users to test their knowledge.
- VISUAL PROGRESS shows users where they are in completing missions, challenges and in the overall Gamification user journey

Q5. Imagine that you participate in face-to-face classes with a duration of 50 minutes. Where would you like to have the game elements?

- At the beginning of the lessons to evaluate prior knowledge
- During the course as video lessons, missions and rewards on completion
- At the end of the lesson to evaluate the achievements

Q6. During the evaluation stage, how would you like to demonstrate your abilities and knowledge on the newly completed topic?

- By completing missions and levels during the course
- By taking a quizzes
- By playing a game

1.4.   Data analysis

Partners analysed the results of the Good practice Collection and the Focus Groups, by using the analysis tools provided in the methodology, and elaborated national reports with findings and consideration.

1.5.   Finalization

The findings, recommendations and conclusions were published in a comprehensive report. It was expected to provide a detailed picture of the needs of VET teachers/trainers and learners. During the next stage of the project, the most engaging gamification elements were used to design the innovative Game-based e-Learning Programs.

2. Good practice games for vocational e-learning

The good practices were identified and analysed taking into consideration the following criteria:

Symbol	Significance
	PRACTICABILITY
	TOPIC
	RESOURCES & SKILLS
	AESTHETIC ELEMENTS
	ELEMENTS OF MECHANICS
	ELEMENTS OF DYNAMICS
	RESULTS
	REVIEW
PLAY	FOLOW LINK

Source: Authors

2.1. Good practice 1 – FunGo!

Good practice collected by AKIRA, Italy

Online classrooms	Math	Wifi
Individual work		software
60-90 minutes		

The graphical assets produced are original: the avatars were created in 3D and exported in 2D in the game, based on the 2.5D paradigm. FunGo is inspired by some video games of the past, such as Super Mario Bros. FunGo in fact shares the basic mechanics of Platform games, which is a horizontal scrolling system in which the player is required to maneuver a character that would be their avatar.

Source: SeriousMathGames

19

FunGo encloses in-game quizzes containing concept-based questions regarding mathematical functions. These questions are present in the "Casket" paths. The questions are designed to make students reflect on mathematical concepts rather than mechanically applying formulas or rules. Often, the questions are based on real-life situations, requiring the application of mathematical reasoning and concepts to real issues.

The player earns virtual coins by solving mathematical questions. For each correct answer, they can get a bonus in coins that they can use to get support to answer the mathematical questions and proceed in the game. There are three different levels.

The player's progress is highlighted on the upper side of the player's screen. They can visualize the number of coins collected, the number of Casket Questions successfully completed and a timer with the overall time employed in the game.

At the end of each level, each player's statistics are collected into a ranking board that compares the results obtained by the individual with those of the other students participating in the game. The final leaderboard is based on the number of coins players achieved throughout the game-based learning experience.

In the Crossroad Path, the player has to choose among multiple visual paths representing function graphs: they will have to select the correct path based on the question displayed. A correct answer in this phase of the game will see the avatar move autonomously through animation along the correct path to the next game area. If the student chooses the wrong one, they will be led to the last checkpoint and restart from there.

In case of a wrong answer to the questions, players will have a penalty of 30 seconds in terms of game time: the avatar has infinite lives; every time they die, they start again from the last checkpoint, that is, the previous point in which he was given a correct answer. Furthermore, traps are scattered along the path, such as barbed wire and quicksand, which hinder and slow the player in completing the level in the shortest possible time or cause the loss of coins.

At the end of each level, the player's score flows into a ranking, which compares the results with those of the other players. The final rankings take into account the number of coins collected until the end of the game. Throughout the game, the player can visualize their achievements.

FunGo has succeeded in the objective of transferring knowledge, favoring the memorization of information, the internalization of behaviors and sequences of actions, accustoming the player/student to make correct choices that are reinforced by a reward, but also to deal with wrong choices, aware of the possibility to restart and try again.

It can be seen from the data below that *FunGo* is maximum rated as effective and successful. It promotes competition and it is easily replicable and adaptable. Furthermore, it is likely technically feasible. Collaboration is not one of its features.
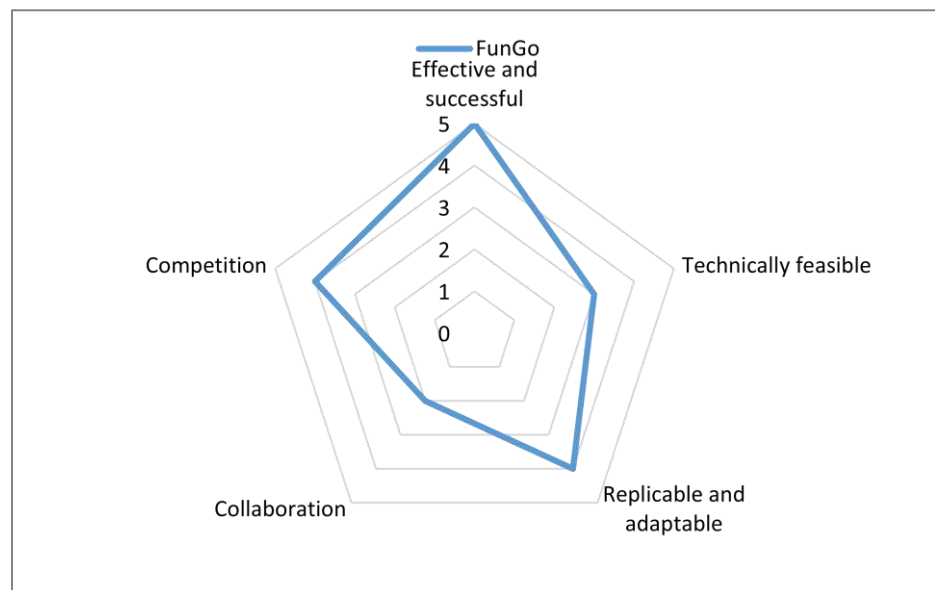
Source: Authors

All things considered, *FunGo* focused on role play and individual online learning. There are some game elements, no relationship and not too much flexibility in game administration. Moreover, the game has a very good level of achievement. In the end, it is not suitable to be integrated into face-to-face classes.

PLAY

2.2.   Good practice 2 – Can you beat the system?

Good practice collected by AKIRA, Italy

Face-to-face Teams 60-90 minutes	Simulation game about the global food system. Geography, Citizenship Education, Socio-Environmental Education, Global Citizenship	Guided by teacher

The game is built upon a consistent storyline and well-defined interaction dynamics among students/players in the story's context. Each team represents a different player in the global food system that seeks to profit from selling maize each "month" (cycle of 6-10 minutes). The game includes the following role cards: small-scale farmers, the market, a global food company, agents and the government.

Source: Oxfam

The game includes a currency system, based on the "Bank of Oxfam" banknotes. The goal of each team in the game is to make as much profit as possible by producing /selling/purchasing maize and regularly paying a food bill to the "Government". If a group fails to pay the government's monthly food bill, it loses. Therefore, the winning group is the one that will have made the most profit at the end of the game.

The game is structured into different cycles, lasting approximately 6-10 minutes each. Each team, in every cycle, will try to make a profit from the sale of maize. There are three versions of maize (A, B, C) and they have different monetary values.

A ranking of the various teams, drawn upon a flipchart or whiteboard and managed by the "Government" group, will show the cash profits of each team throughout the game. Each team will be able to constantly view its performance based on the profit acquired, based on the number of banknotes and maize available and the ranking drawn up on a flipchart or whiteboard.

Each group, according to the role played in the game, is equipped with different amounts of resources (i.e., money, licenses, pencils, papers) that will significantly affect the way they will play and their possibility to win. If a group, for example, has not made product C, they will have to buy it from the "Market" group. Only the Market can sell product C to other groups, while the others must have a license to sell product C to the Market.

Furthermore, the games comprise "Event" Cards, randomly drawn up by teachers, introducing new rules that players must comply with. Such cards represent actual events that occur in the global food system and affect all its stakeholders, particularly the farmers. There might be positive or negative events.

The competition between the various groups is constant: although each group plays a different role, they all will compete to achieve the same goal: to make enough profit to stay in the game and ultimately win the competition. Each group of students/players will be able to assess the success of their actions at the end of each cycle, based on the achievement or not of the different purposes and tasks listed in the game rules, the amount of profit achieved, and the number of maize produced/sold.

The game elements used in this learning experience, particularly the scenarios, role cards and consistent narration, reinforced by its mechanics and clear rules, successfully enable students to learn about and reflect upon the global food system, empathize with small-scale farmers and think as global citizens.

It can be seen from the data below that *Can you beat the system?* is maximum rated as effective and successful, technically feasible, collaborative, replicable and adaptable. Also, it promotes competition.
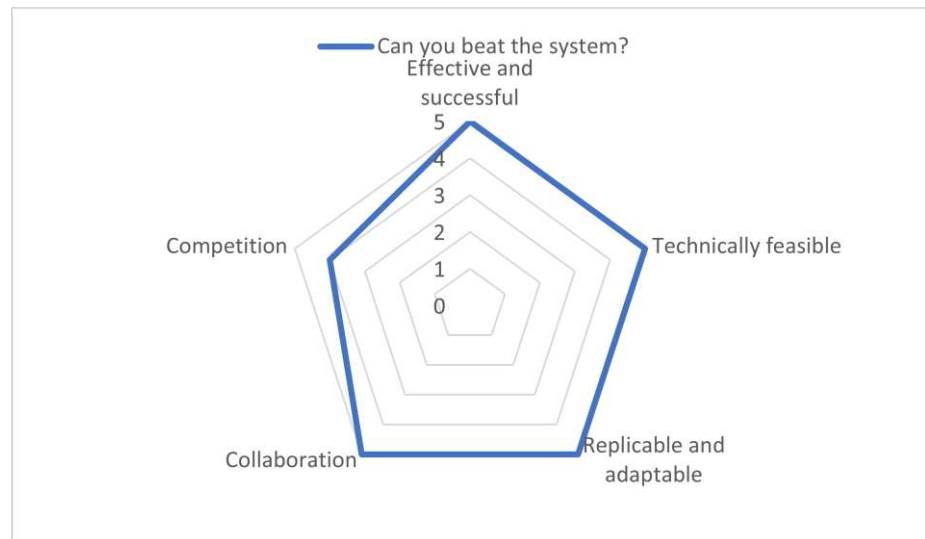
Source: Authors

All things considered, *Can you bet the system?* is very good for exploration, collaboration, and guided classes for citizenship education and developing social responsibilities skills. Furthermore, it is appropriate for working in a team during classes. It must be taken into consideration that it is difficult to adapt the game to subject-specific classes.

PLAY

2.3.   Good practice 3 – Change Game: Play with Earth

Good practice collected by AKIRA, Italy

Online Teams Variable duration	Applied game on climate change	Wifi Smartphone

Change Game is an applied game created exclusively for smartphones designed to make people understand the multiplicity and complexity of the factors that impact the earth's climate concerning elements linked to the climate, such as human settlements, economic activities and natural events. The graphic interface is straightforward and intuitive, with the presence of several icons that indicate all the parameters in continuous evolution in the

Source: Google Play

Players have one core mission: pursuing virtuous actions to reduce CO2 levels within a specific time limit to avoid natural disasters. If the green goal is not reached or if the planet's temperature increases by +4 degrees, the game ends, decreeing the defeat of the player and the respective city.

Players earn virtual coins throughout the game. The currency system has a critical role in the development of the gaming experience in Change Game. Particularly, the game requires the progressive accumulation of coins that players will use for progressively constructing the buildings necessary for the sustenance of their city.

The game features various levels, which come in the form of turns. During each turn, the player will have to carry out certain actions to avoid events such as overpopulation in their city or an excessive increase in the greenhouse effect. It is not possible to construct some of the buildings without specific technologies to be unlocked.

The player's progress, continuously updated based on the actions performed, is constantly visible in an overlay on the screen. At the end of each round, there is a real-time ranking of the best cities in the game.

If players fail to manage overpopulation, they are required to build new houses. At the same time, if the planet's temperature increases beyond the allowed limit, players are required to decrease energy consumption.

The higher the level of emissions the players generate, the greater the challenges they will face. If the number of the population or the level of GHG are not kept under control, players will have to deal with heat waves, droughts, floods, rising sea levels or the spread of new diseases.

There is a certain level of competition between the various planets: each planet will have to take the necessary actions to bring well-being to its population by guaranteeing them food and reducing CO2 levels.

Players can collaborate or compete by pursuing different but interconnected goals. The only way to foster the best city and the best planet is to collaborate: players can choose either to participate in a public game by creating their city into an existing planet created by another player, or they can participate in private games by entering the planet code that only the planet's creator knows.

Change Game aims at improving students' awareness, knowledge and understanding of climate change and, particularly, the interconnectedness of societal and environmental issues. Furthermore, the game aims to stimulate a change of mentality through the levers of emotion, collaboration and the ability to challenge assumptions and beliefs.

It can be seen from the data below that *Game: Play with Earth* is maximum rated as collaborative. Also, it is suitable for competition, being technically feasible, effective and successful. It is likely replicable and adaptable. Its main limitation is replication and adaptability.

Source: Authors

On one hand, Change Game: Play with Earth is very good for exploration, collaboration, and for creating strategies to avoid natural disasters. On the other hand, it is difficult to adapt to subject specific classes.

PLAY

2.4. Good practice 4 – Father and Son

Good practice collected by AKIRA, Italy

Online Individual 60 minutes	Arts, History and cultural storytelling	Wifi Smartphone

The game's protagonist is Michael, a boy on the trail of an archaeologist father he never met. Michael goes to Naples, to the National Archaeological Museum, after receiving a letter from his father to learn more about his parent's life and the teachings he left him. Stories and eras follow one another, exploring the streets of a city full of characters with whom to dialogue and interact, with experiences he has to dig and investigate.
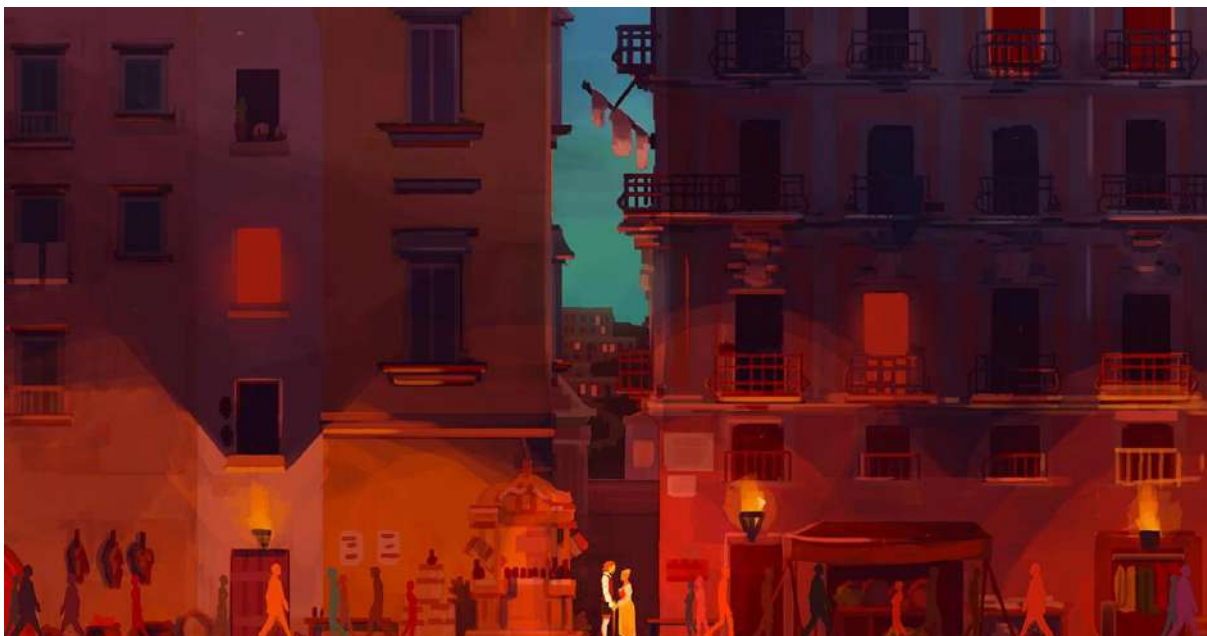
Source: Father and Son

The game's main objective is to complete multiple missions by exploring various museum collections in the National Archaeological Museum of Naples. Through their in-game avatar, the player is required to enter the Museum and choose the section to visit. In each section of the Museum, there will be different works, each of which corresponds to a specific mission to be completed by exploring different historical periods.

Some sections with the respective works that are part of it are unlockable only if they visit the museum through their mobile phone with the geolocation service. There is a "check-in" functionality that enables a connection between the digital content of the video game and the museum's physical space. The system will automatically recognize the presence of players and unlock new content such as new character outfits and a new game location. Consequently, the game cannot be completed except by integrating the offline experience with a direct visit to the museum.

Each day the player will be in their home at the beginning of the day and will be tasked to reach the MANN. Once they reach the museum, they will be able to choose the section to visit and complete the related mission. After completing the daily mission, they will find themselves catapulted back to their home, ready to get back to the museum to discover new sections and start new missions.

Players are constantly surprised by discovering new museum collections and corresponding historical periods in which they are catapulted. In addition to visiting the various collections present inside the museum, the protagonist crosses different historical periods during the experience: from Ancient Rome to Egypt, from the Bourbon age up to today's Naples

The player will constantly be faced with choices to make, shaping the story with their decision. They are required to answer the various questions asked by the other characters they meet throughout the game, choosing the option that best suits their personality. Also, the game explores feelings such as love, dreams, and fear, through a son's journey to discover an archaeologist father he never knew.

Father and Son is a new form of storytelling: a new way of describing the museum. The game's objective is to involve users in the discovery of the history and collections of the Museum. Thanks to a very engaging narrative dimension and refined and elegant graphics, the playful experience perfectly aligns with the learning objectives.

It can be seen from the data below that *Father and Son* is maximum rated only as effective and successful. The game is inclined to be technically feasible, replicable and adaptable. It doesn't promote collaboration and competition.
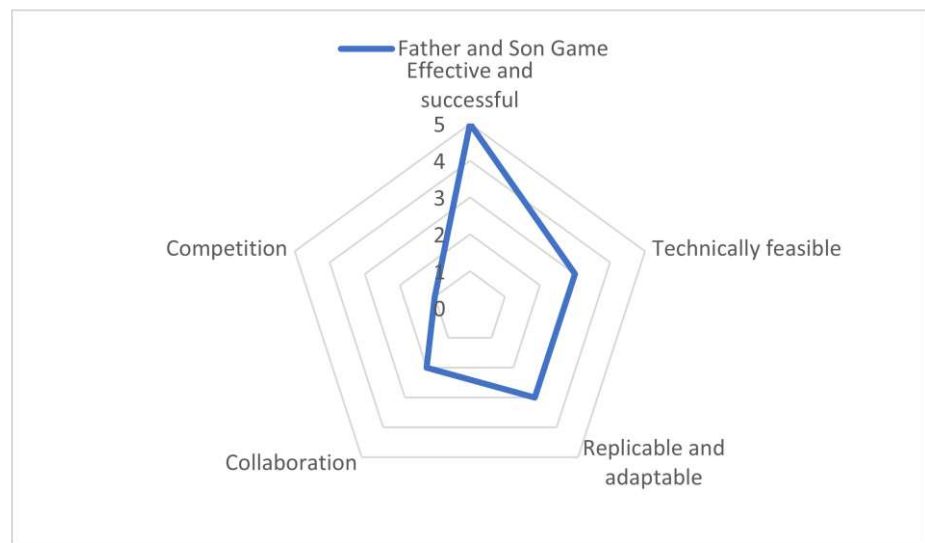
Source: Authors

Father and Son is an explorative game. It is appropriate for individual learning and does not include collaboration. It is very good for learning and achieving learning objectives. Also, it is not suitable to be integrated in a face-to-face class.

PLAY

2.5. Good practice 5 – Calpo di Stato

Good practice collected by AKIRA, Italy

Face-to-face Teams 2 – 4 hours	historical investigation narrative card game	Technical Guided by teacher Observation, logic and deduction

Colpo di Stato is a cooperative narrative card game for 2-6 people, inspired by the mechanics of escape games, which addresses historical, artistic, journalistic and current issues through the languages of narrative storytelling. The deck comprises 72 double-sided cards, including puzzles, characters and historical insights. There are 22 puzzles, 11 characters and more than 20 bibliographic sources, all linked together.

Source: We are Müesli

31

Colpo di Stato is a game inspired by the mechanics of escape rooms. Players take on the role of a group of reporters who will have to solve various enigmas, based on observation, logic and deduction, by solving sequences of puzzles and quizzes that become increasingly difficult moving forward in the game. Each time an enigma is solved, the game progresses to the next level, consisting of increasingly difficult puzzle sequences and quizzes.

Players cannot continue in the journalistic investigation if they do not solve all 22 enigmas in the game one by one. Consequently, each enigma can only be unlocked if the previous one, with the related sequence of puzzles and quizzes inside, is solved.

The game is based on the resolution of increasingly difficult quizzes/puzzles. Such puzzles are based on historical reconstruction of the events that followed one another in Italy in the sixties and seventies, the so-called period of the "Golpe Borghese". Players are involved in a puzzle wrapped in a mystery. They must solve the sequence of puzzles that will gradually lead them to reconstruct the historical truth of that period through which they will complete their journalistic investigation.

Solving increasingly complex puzzles is the main difficulty for players. Players must observe all the elements present on the cards to apply the information learned in the game through logic and deduction. The players' level of concentration and observation will be the primary key to solving the puzzle. The failure of a single player within the group can obstacle all the others, putting the success of the entire journalistic mission at risk.

Players, taking on the role of reporters, make a real historical-cultural journey back in time to Italy in the 60s and 70s, reconstructing the situation of a country poised on the abyss of a historical fact that is as forgotten as it is disturbing. They will be the protagonists of a real global journalistic investigation through characters and historical insights present on the cards.

Players must always collaborate to solve the puzzles without neglecting any detail. Each player will participate as a single reporter but will feel part of a larger group that will have the task of bringing to light the truth hidden behind the card game's puzzles.

The game aims to make players aware of events in the history of Italy in the 60s and 70s, as well as enhance reasoning and analytical skills, exercising logic and observation to find out about the hidden truth. The game elements are appropriate to allow players to deepen their historical knowledge, as well as develop meaningful logic and deduction skills.

It can be seen from the data below that *Calpo di Stato* promotes collaboration. The game proved to be effective, successful, technically feasible, replicable and adaptable. In addition, competition is not one of its best features.
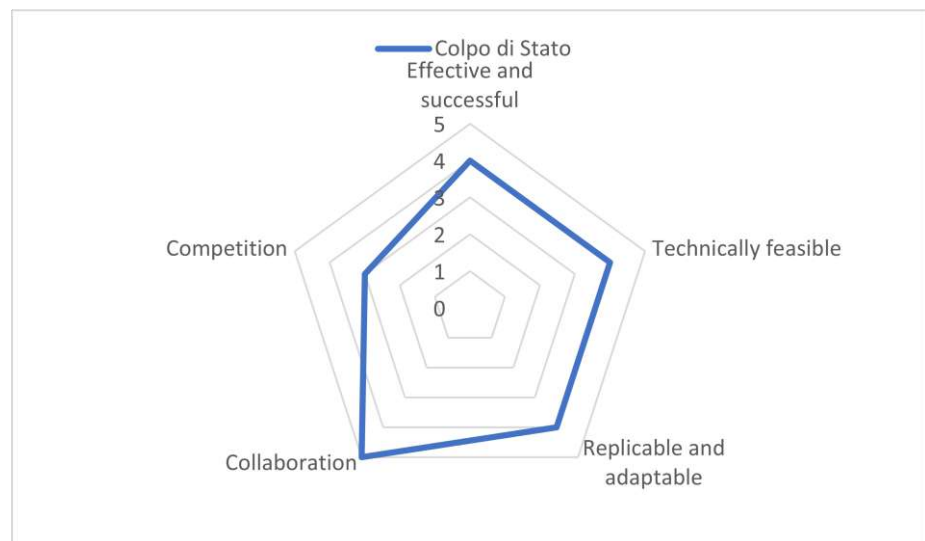
Source: Authors

On the whole, *Colpo di Stat* is a very good game for exploration, collaboration, and for guided classes. Participants solve puzzles, quizzes and investigate. It is appropriate for working in a team during classes, but it takes a few hours. Also, it is difficult to replicate and adapt to subject-specific classes.

PLAY

2.6.   Good practice 6 – Random cards

Good practice collected by Commercial College "Carol I", Romania

Face-to-face Online Individual & Teams 10 – 20 min	Economics, Geography, Social Studies, Chemistry, Math	Wifi Software Smartphone

The pack of cards has a task on each card and represents a vocation. When they are mixed, they create suspense for the student or the team. The time allotted for playing cards depends on the complexity.
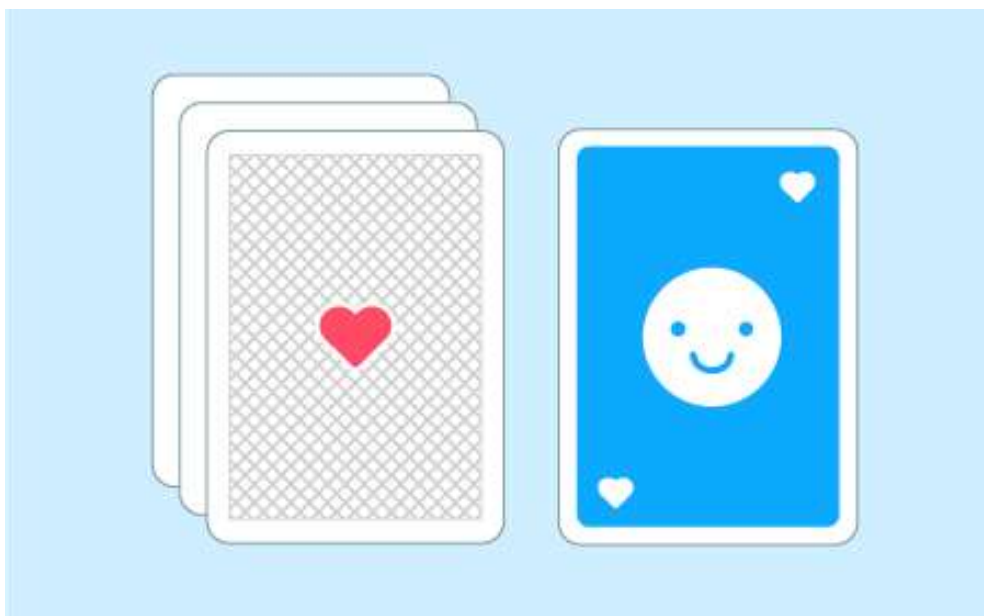
Source: WordWall

The questions are on each card and the players answer as soon as possible.

Students are ranked by rank. They receive points for each correct answer. The ranking is displayed at the end of the game for all players.

On each book, returned to the choice, a question appears. These can be simpler or more complex.

Random cards are an open template. It does not generate scores for a ranking.

Students can see what score they have in a given time frame.

When playing in class, students can be very happy when they know all the answers in front of their classmates.

If it is played in teams, the competition appears, who manages to give the most correct answers.

After each stage of the game, with each card turned, students can see what their level of knowledge is.

The most important goal is for the students to be able to acquire the skills in an interactive and funny way in the classroom, but also at home.

It can be seen from the data below that *Random* Cards' best features are competition, replication and adaptability. The game proved to be effective, successful and technically feasible. Moreover, collaboration is not really promoted.
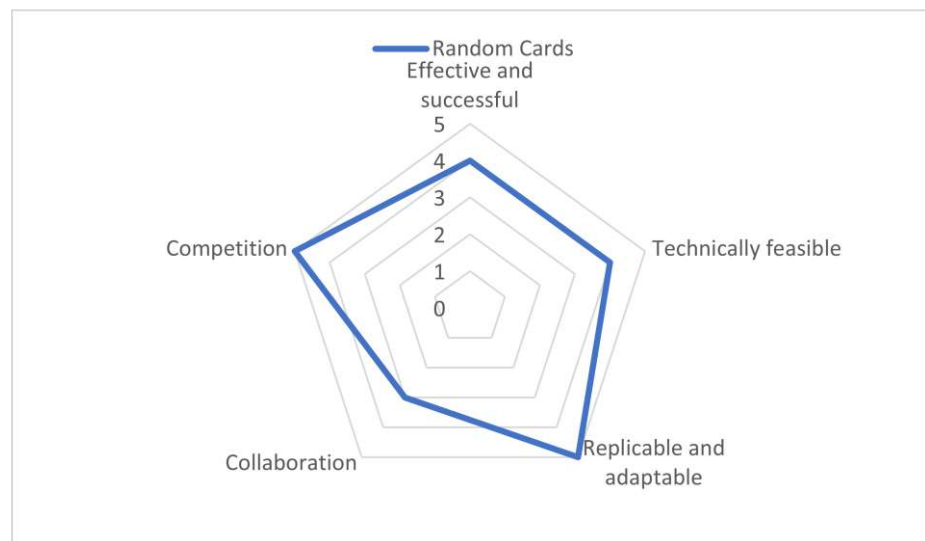
Source: Authors

In a nutshell, *Random Cards* is a very good game for competition. It can be easily adapted to any subject. Furthermore, it is appropriate for working individually or in a team during classes and it is not time-consuming.

PLAY

36

2.7. Good practice 7 – PUZZLES

Good practice collected by Commercial College "Carol I", Romania

Face-to-face Online Individual 15 – 30 min	Economics, Geography, Social Studies, Chemistry, Math	Wifi Smartphone

If most students solve the puzzle game in a short time, the teacher will make different plans with different numbers of pieces or different types of pieces.

Source: ArmoredPenguin

This game is not structured in levels, but you can see the timer and the score in percentage.

There are different levels to create the puzzle, such as by difficulty level or by the number of pieces. The game can have 4 pieces - the easy one and 300 pieces – the hard one.

The Puzzle has no questions. The teacher can ask questions from the contents of the puzzle board to encourage them.

The progress of the players will be observed by the time required to complete the puzzle and what percentage they have solved.

As in any game, to create suspense and to help the student think faster, the teacher can use a stopwatch.

When learning a lesson, the assessment can be made by questions created by teachers and students who answer them through a conundrum. The achievements will be seen through the grades.

The progress is noticed when the students manage to complete a multi-piece puzzle in the shortest possible time. The students are very happy when they succeed and they are rewarded with "Congratulations!".

The game is good to acquire and consolidate the concepts from different subjects.

It can be seen from the data below that *Random* Cards' best features are competition, replication and adaptability. The game proved to be less effective, successful and technically feasible. Moreover, collaboration is not one of its best features.
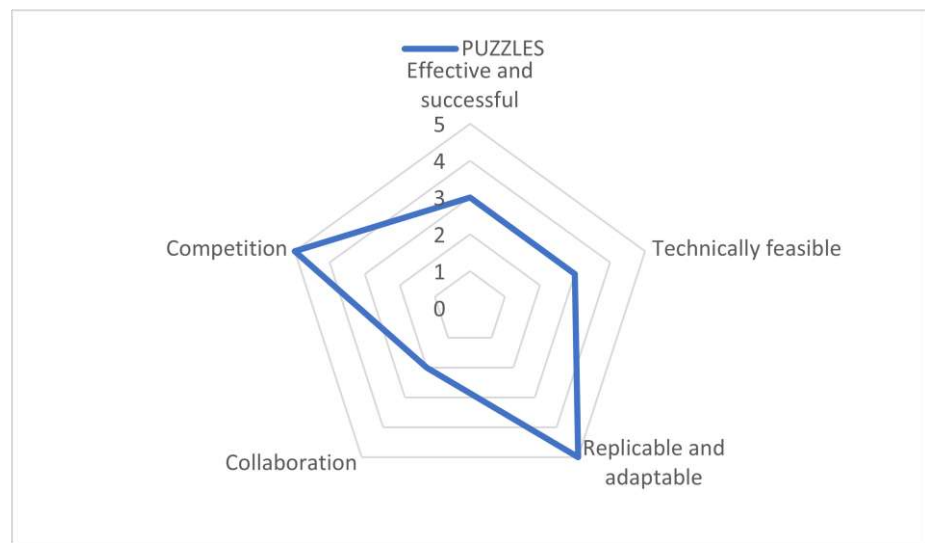
Source: Authors

To sum up, *PUZZLES* is a suitable game for competition that can be easily adapted. It has huge flexibility in the administration of different subjects and individual work. Furthermore, it can be both used in online and face-to-face classrooms.

PLAY

2.8.   Good practice 8 – Turn the wheel

Good practice collected by Commercial College "Carol I", Romania

Face-to-face Online Individual & Teams 5 – 20 min	Economics, Geography, Social Studies, Chemistry, Math	Wifi Guided by teacher Smartphone

The wheel can be used to create both interactive and printable activities. Interactive ones are played on any web-enabled device, such as a computer, tablet, phone, or interactive whiteboard. They can be played individually by students or coordinated by teachers, and students take turns in front of the class. Printable ones can be printed directly or downloaded as a PDF file. They can accompany interactive or independent activities
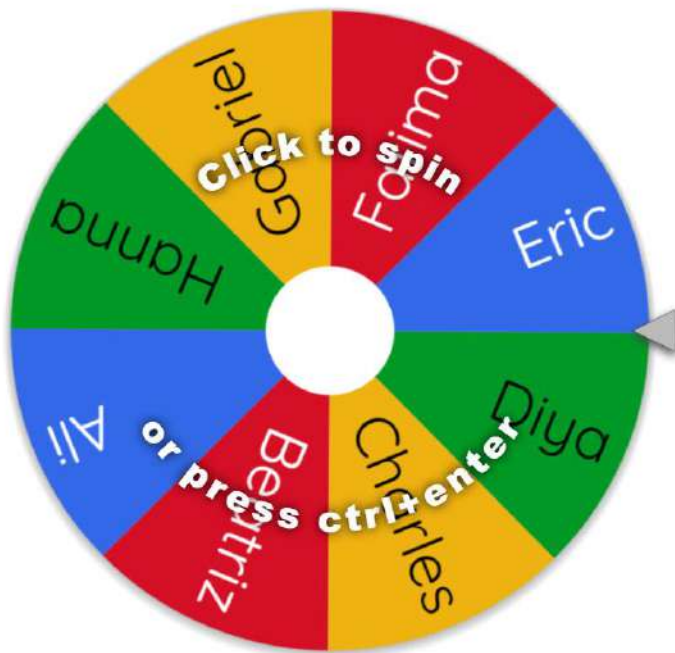
Source: WheelOfNames

Students can play individually or in teams. The teacher spins the wheel and the team must describe the task. Whoever answers correctly stays in the game, whoever does not, leaves the game.

Progress is indicated by applause and confetti for each player who has completed the task.

As in any game, to create suspense and to help the student think faster, the teacher can use a stopwatch.

The game is interactive, which allows the student to be a part of the learning process. The students can feel the emotions of curiosity and surprise while watching the characters' presentations, happiness when they earn more knowledge and pass to the next lesson, as well as a disappointment when they don't succeed.

The wheel is colorful and the soundtrack makes you think of the story. The colors are vivid and urge you to play.

By implementing this game in schools, teachers can adapt it to any subject they need. The progress will come in time with students' results. The success of teachers will also be seen in this regard.

The game is good to acquire and consolidate the concepts from different subjects.

It can be seen from the data below that *Turn the wheel* is only remarkable for its collaboration feature. It is likely to be effective and successful, technically feasible and competitive. The game is hardly replicable and adaptable.
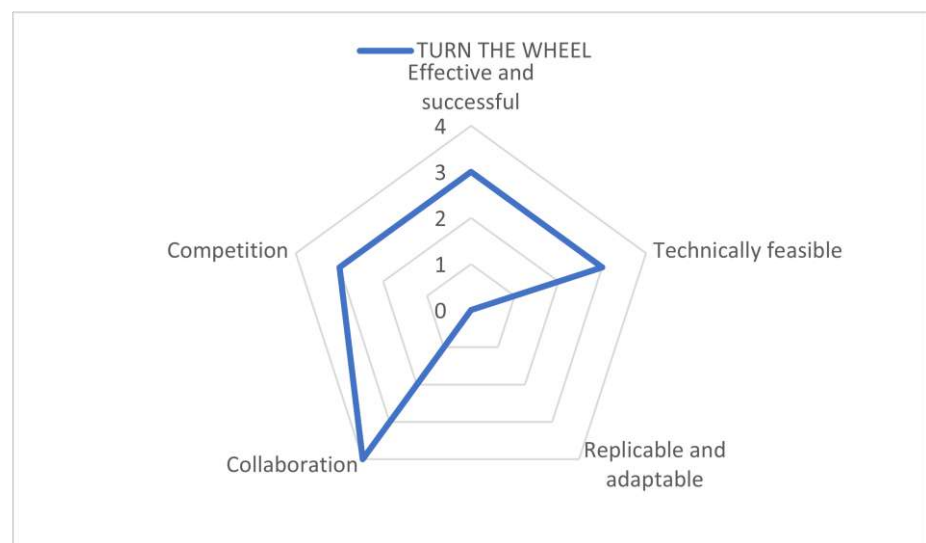
Source: Authors

On the whole, *Turn the Wheel* is a suitable game for collaboration, but it is low on flexibility in game administration. Also, the game elements are poorly aligned with learning objectives, but the game can be both used in online and face-to-face classrooms.

PLAY

42

2.9. Good practice 9 – Flashcards
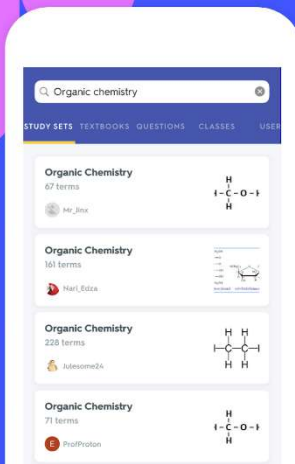
Good practice collected by Commercial College "Carol I", Romania

Face-to-face Online Individual & Teams 10 – 40 min	Economics, Geography, Social Science, Art and Humanities, Languages, Math, Science	Wifi Guided by teacher Smartphone
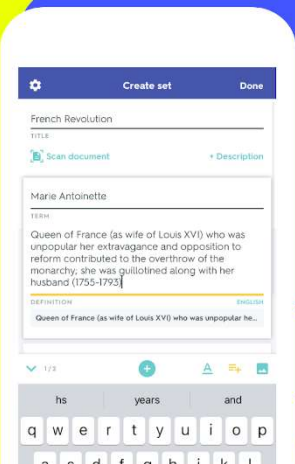
Free and easy to set up. Instantly turn your Quizlet study set into a Quizlet Live game.
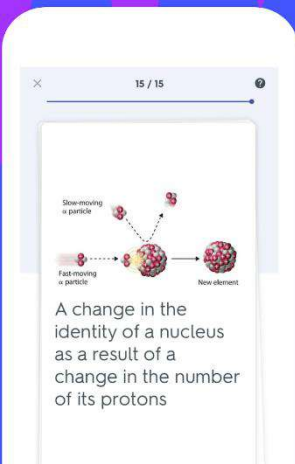
Source: Google Play

Flashcards engage students in lesson content through competition and collaboration.

The players learn with this game. Flashcards include in-game quizzes containing concept-based questions regarding Economics, Social Science, Chemistry, Languages and Math.

The players have a score measured in percentage. They know from the beginning the points that they might win.

Also, the players have more options on how to play because each flashcard has a new challenge.

The students are motivated and encouraged.

After each correct answer, they receive congratulatory messages:

Good job! You have succeeded! That's great! Excellent!

For each incorrect answer, the players are encouraged to try more:

No! You are still learning! No worries! Learning is a process!

Help students reinforce vocabulary and concepts they learned in class while engaging in a fun, competitive quiz game.

Flashcards increase classroom engagement. The lesson review is collaborative, competitive and engaging, customized with your lesson content.

Quizlet explanations show you step-by-step approaches to solving tough problems. Find solutions in 64 subjects, all written and verified by experts

Help every student confidently learn anything, no matter what they're striving to achieve.

It can be seen from the data below that *Flashcards* is maximum rated as replicable, adaptable, effective and successful. Also, competition and being technically feasible represent some of its features. The game doesn't really promote collaboration.
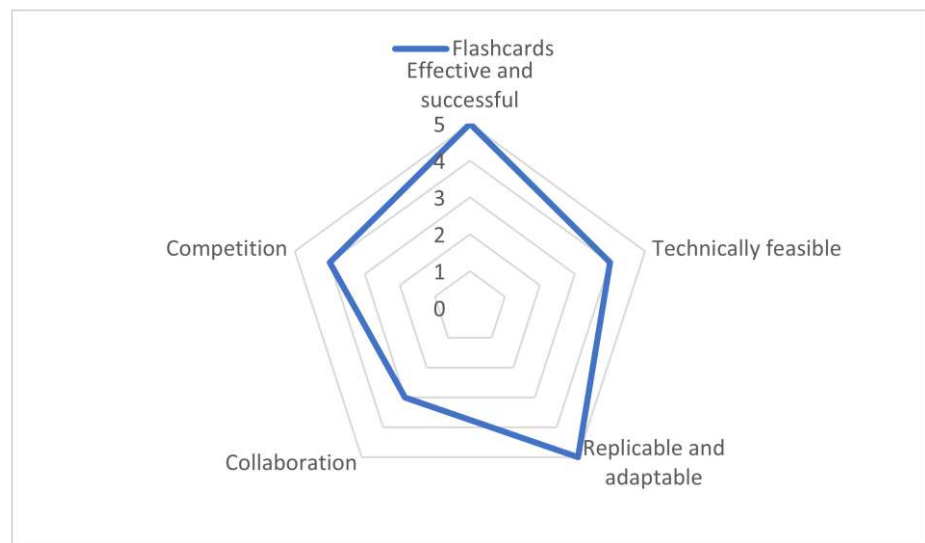
Source: Authors

All things considered, *Flashcard's* game elements align with learning objectives, being easily replicable and adaptable. Its features offer flexibility in game administration. Also, the level of achievement is high and the game can be both used in online and face-to-face classrooms.

PLAY

45

2.10. Good practice 10 – Kidibot

Good practice collected by Commercial College "Carol I", Romania

Face-to-face Online Individual & Teams 15 – 90 min	Economics, Geography, Social Science, Languages, Math, Science	Wifi Software Smartphone

The graphic is made like the characters in video games. Students choose for their profile the name of the secret agent that they use in missions.
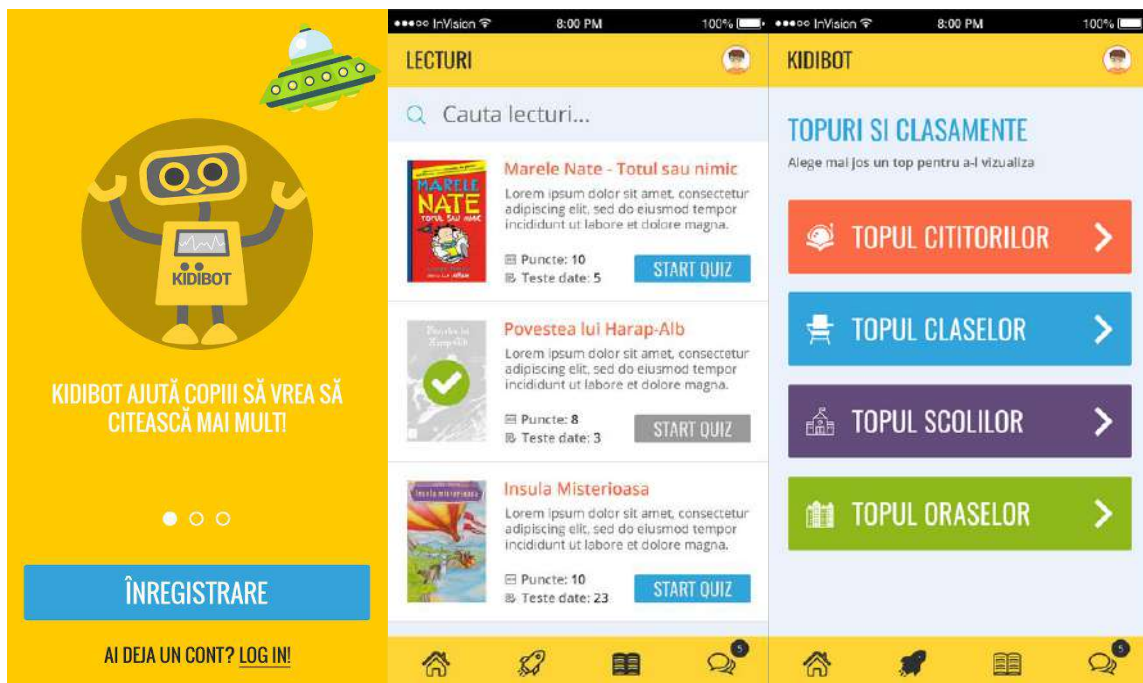
Source: Google Play

Each mission, test, and battle have a number of points that students know before starting the mission. Points are also awarded as bonuses.

In the quizzes section, there are multiple filters, by level, the most solved, the newest, and the most valuable. They are for almost all disciplines and classes.

The reward system consists of vkidibots. The profile of each participant in the game is listed. The game does not allow users to see the profile of colleagues because they require passwords. On the platform, there is the Tops section where you can see the Top Fighters, Top Teams, and Top Readers.

The rules of the game are set from the beginning: Whoever abandons a mission receives nothing.

Missions are posted from easiest to hardest. Each mission has a story that helps students associate the content with the story. The game has negative characters, designed in the form of aliens. The mission of the secret agents, the students, is to save the Earth from aliens – CROCOBETS.

The students are making progress by accumulating vKidibots after each mission. Many tasks are performed daily from a mission and upon successful completion, they can manually convert vKidibots to Kidibot cryptocurrency.

47

The goal is to motivate students to be more ambitious, to read and to learn more.

It can be seen from the data below that *Kidibot* is well-recognized for its competitive elements. Also, the game is considered technically feasible, effective and successful. Apart from that, Kidibot is not the easiest game for collaboration, replication and adaptability.
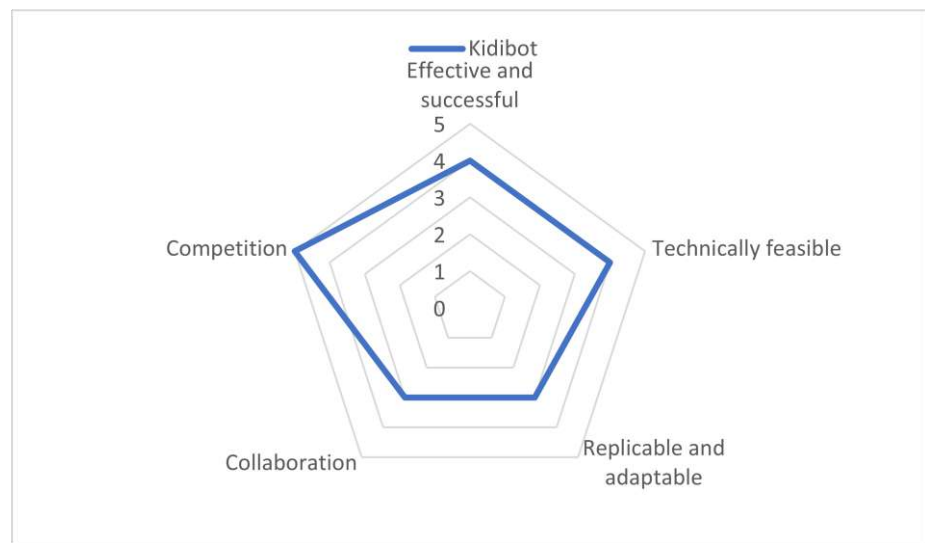
Source: Authors

In a nutshell, *Kidibot* presents a high level of achievement. It is appropriate for creating a competitive environment, but a less collaborative one. Its features offer flexibility in game administration and its elements are aligned with learning objectives.

PLAY

2.11. Good practice 11 – Chess Game

Good practice collected by Team4Excellence, Romania

Online classrooms

Individual & teams

60-90 minutes

No specific subject

Wifi

software

A chessboard is a gameboard used to play chess. It consists of 64 squares, 8 rows by 8 columns, on which the chess pieces are placed. It is square in shape and uses two colours of squares, one light and one dark, in a checkered pattern.

Source: Chess

Chess teaches you to think logically, develop strategies and improve your memory. The brain works like a muscle and needs constant exercise to keep it healthy.

The skills developed in the game of chess help adults improve the quality of their decisions in their daily lives, develop plans and strategies and follow rules.

If the player chooses to play in the online environment, the chess can be structured on different levels, more precisely by the chosen degree of difficulty.

At the end of each level, each player's statistics are collected into a ranking board that compares the results obtained by the individual with those of the other students participating in the game. The final leaderboard who has the most games won will be the champion. After that, another game will be organized which will be more difficult.

In case of a wrong move, the player risks losing, if this game is played online, the player will probably be penalized and will lose a number of points.

At the end of each level, the player's score flows into a ranking, which compares the results with those of the other players. The final rankings take into account the number of coins collected until the end of the game. Throughout the game, the player can visualize their achievements.

Analyze your life before the game of chess. Students can visualize their achievement throughout the learning journey: developing intelligence, improving school performance, developing logical thinking, helping to make decisions.

50

Chess is a worldwide phenomenon, considered as a sport, art and science, becoming the most popular game of the mind in the world, with a history of over 1300 years. Chess is a universal game in which there are no barriers to age, gender, race, nationality or disability.

It can be seen from the data below that *Chess Game* is effective and successful. It promotes competition and it is easily replicable and adaptable. Furthermore, it is likely technically feasible. Collaboration is not one of its features.
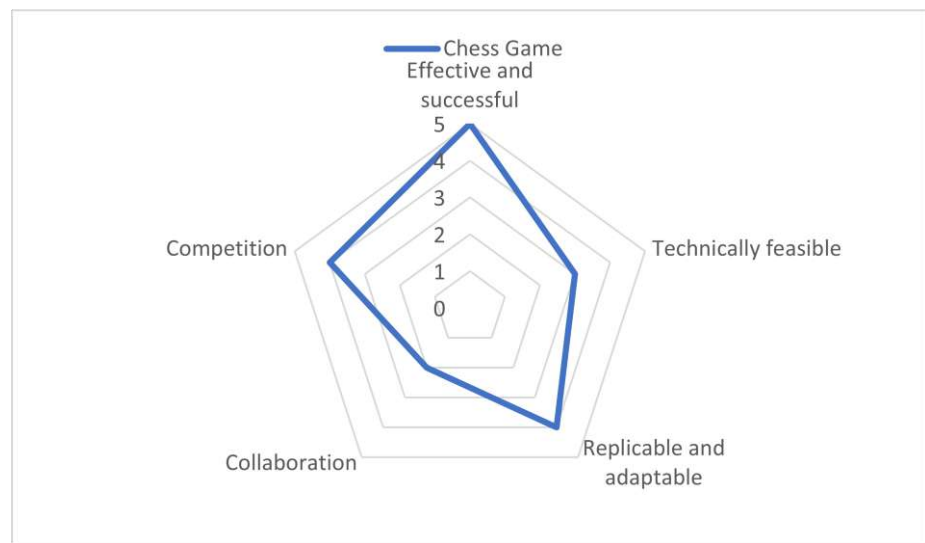
Source: Authors

It can be seen from the information above that *Chess Game* is very good for competition and ranking. It helps participants to think logically, develop strategies and improve their memory. It cannot be used for specific subjects and it is difficult to be replicated.

PLAY

51

2.12. Good practice 12 – Triviador

Good practice collected by Team4Excellence, Romania

Online classrooms	General knowledge	Wifi
Teams		Software
60-90 minutes		Smartphone

Triviador is a dynamically developing strategy quiz game for three players. Players conquer territories in an atmospheric setting combining elements of the Middle Ages and the times of the Great Discoveries. Battles take place on a map of a country and the map is divided into territories. The victory belongs to the player with the most points who won in the fight against the three players.

Source: Magazin Play

Triviador offers participants to answer general questions in a limited time. It bears little resemblance to the lives of the great conquerors and losers of history, but much more synthesized. The fight is given exclusively through the knowledge of general culture or "school of life".

The game is played between 3 players who face each other on a virtual playing field and try for several rounds, through the correct answers to multiple choice questions or quick questions, to conquer and defend territories.

Each player can conquer a country if they have a correct answer. A game contains 4 stages:

    I.   Choosing the base region – players place their fortress
    II.   Conquest – Players choose a neighboring region that, if answered correctly, they occupy.
    III.   The division of free territories – there is a quick, intuitive question
    IV.   War – attack.

The players can't be blocked or unlocked, if they choose a wrong answer, they should wait for another game.

If a player gives a wrong answer, he risks losing his territory, in which case he will go to war. If he chooses several wrong answers to his questions, he may lose all the territories in his possession.

Throughout the game, the player can visualize their achievements. At the end of the experience, the success of each player is related to the place occupied on the final territory.

The student's growth and development path and the sense of progression are represented by the increase in the difficulty of the questions through the different levels, by the visualization of progress made throughout the game and by the final positioning. The best players will participate in a competition.

In this game there exists a big community, because this game is expanding internationally.

Improving general knowledge funnily.

It can be seen from the data below that Triviador is highly effective and successful. Also, it promotes competition. Moreover, it is likely technically feasible. Collaboration is not one of its features, because it is more of an individual game.
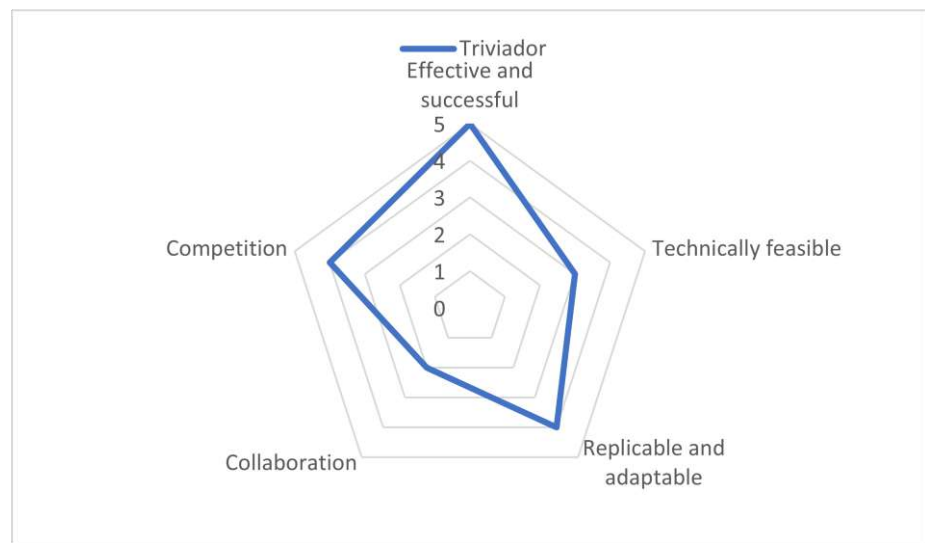
Source: Authors

All things considered, Triviador is very good for competition and evaluation. Participants respond to questions with different levels of difficulty from various subject areas. It is difficult to be replicated, but once replicated it can be very engaging.

PLAY

54

2.13. Good practice 13 – Crossword Labs

Good practice collected by Team4Excellence, Romania

Face-to-face classrooms Individual & Teams 30 – 45 minutes	Any subject	Guided by teacher

A word game in which you have to guess the answers to clues and write the words into numbered squares that go across and down

Elements and Principles of Design 2022-10-19
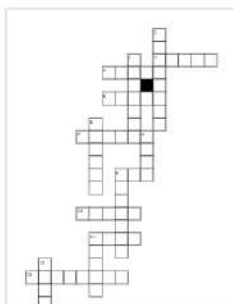
15 Clues: refers to the distribution • how light or dark element looks • line marked between two points • Point When you emphasize an element • area around or between elements of design • Geometric and organic are the two types of • used to generate emotion and visual interest • refers to the actual dimensions of an element • Guide the viewer's eye through the composition • ...

Cell organelles and structures 2022-10-19
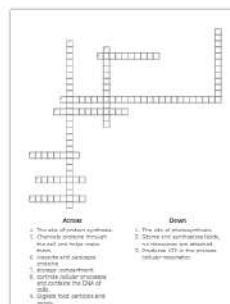
9 Clues: storage compartment. • The site of photosynthesis. • The site of protein synthesis. • inspects and packages proteins. • Digests food particles and debris. • Produces ATP in the process cellular respiration • Channels proteins through the cell and helps make them. • Stores and synthesizes lipids, no ribosomes are attached. • ...

Source: Crossword Labs

Through these simple games, the teacher attracts students to the educational environment in an easy way. Through this approach, students do not feel the information coming to them because everything is in the form of a game. This game can be adapted at any matter.

Crossword Labs can be adapted for any field and that aspect can be a plus for teachers. Teachers can give badges to students to motivate them. In this way, the students can be motivated to collect more badges.

This game is not structured in levels, but when you finished a unit, you can pass to another unit.

Crossword Labs can be adapted for any field and that aspect can be a plus for teachers. Teachers can give badges to students to motivate them. In this way, the students can be motivated to collect more badges.

The progress of the players will be observed over the time, if the student wants to gain as many experience points as possible, he will have more knowledge about that discipline.

As in any game to create suspense and to help the student to think faster, the teacher can use a stopwatch.

The success will be seen over time.

If this game has been adopted in schools and can be kept, it means that it is a good thing for the class.

By implementing this game in schools, teachers can adapt it to any subject they need. The progress will come with time as a student's results. The success of teachers will also be seen in this regard.

Improving general knowledge funnily.

It can be seen from the data below that *Crossword Labs* is highly effective, successful and technically feasible. It promotes competition and it can be replicable and adaptable. Collaboration is not one of its best features.
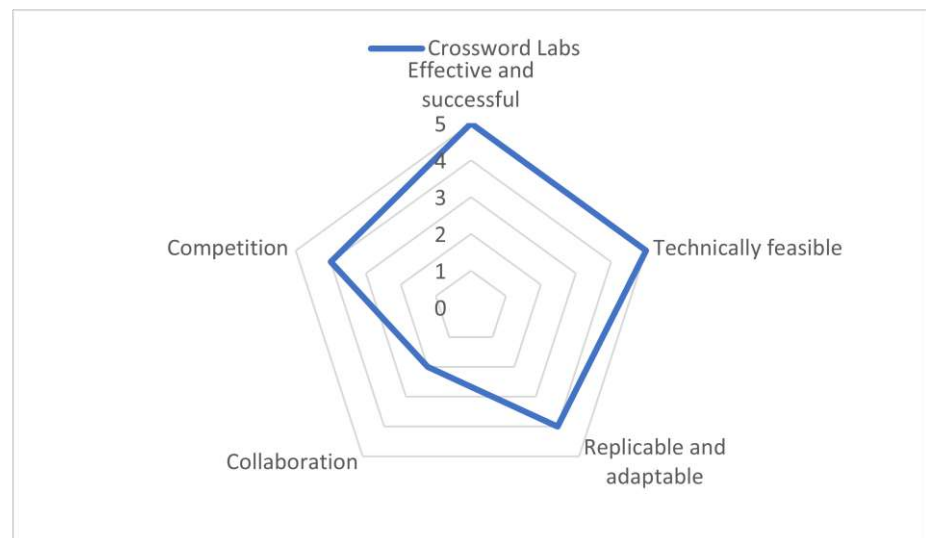
Source: Authors

All things considered, *Crossword Labs* is suitable for the assessment at the end of the lesson. Participants fill in responses with different levels of difficulties from various subject areas. Also, it can be developed for different subjects and topics.

PLAY

2.14. Good practice 14 – Play and discover with E.U.

Good practice collected by Team4Excellence, Romania

Face-to-face & online Individual	Social Science, Geography	Technical Software CD-ROM

The graphical assets produced are original: the avatars and icons were created in 3D and exported in 2D in the game, based on the 2.5D paradigm.

Source: Soft4Kids

Players will find information about the history of the EU, institutions and symbols and they will play with the avatar, which they will have to help to reach a tower, going through a route full of obstacles and puzzles.

The game has multiple quizzes about European culture and its personalities, History, Geography and Human Rights. The game consists of gathering the 27 flags of the EU member states after playing minigames about European culture and Geography.

If the players solve the tasks correctly, they will earn euros as points, which they will be able to spend in the last chapter.

As you progress in the game, new quizzes and puzzles will unlock. The player's progress is highlighted on the lower side of the player's screen with a coin icon so they can visualize the number of coins collected

The player can't unlock all quizzes and puzzles from the beginning. It has to gain coins and flags of the UE countries to go forwards.

As an individual game, players help their avatar to solve puzzles on the European Union map by gaining more knowledge about the countries, history, art and cultures. With the coins they earn they can buy online visits for their avatars in E.U. countries. The game is done when they earn all 27 flags.

They can see their progress on the map: the more countries they earn, the more levels they pass. With coins gained in the game they can have virtual city tours across the Europe, which means they can also check their progress directly in the "On the trip" category.

The participants will gain knowledge of European values and European institutions by learning and respecting the rights of the child. The game is promoting the intercultural dimension and cultural diversity and also the ability to perform complex reasoning.

It can be seen from the data below that *Play and Discover with E.U.* is highly technically feasible, effective and successful. It is a competitive game, but collaboration is not promoted. Also, it can be easily replicable and adaptable.
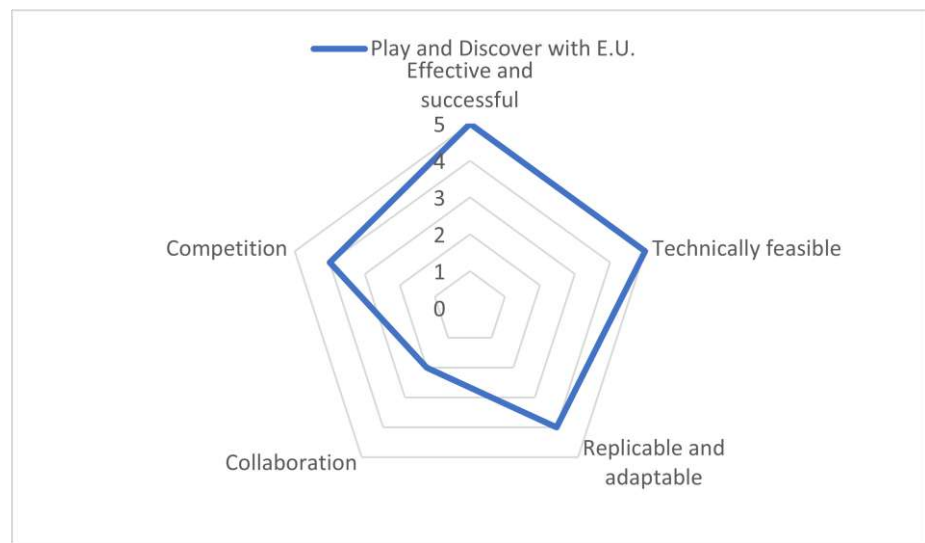
Source: Authors

To sum up, *Play and Discover with E.U.* is very good for learning about different topics. Participants read topics and solve tasks, quizzes and puzzles. It is good for achievement. Also, it can be developed for an entire subject curriculum or specific for various lessons.

PLAY

60

2.15. Good practice 15 – Seterra

Good practice collected by Team4Excellence, Romania

Online Individual 15 – 20 minutes	Geography	Wifi Software Smartphone

Seterra is an educational game in the field of geography, with a high degree of difficulty. Learn more about countries, capitals, oceans, flags, and cities in Africa, Europe, South America, North America, Asia, and Australia with practical exercises on the map.

Source: Seterra

This game can take the place of many hours of meditation being a good help. At the same time working with the map helps players to fix the information much easier. Each correct answer in a short time can help players get a good grade on the exam or help them accomplish what they set out to do.

This game is not structured in levels, but when you finish a map, for example, the map of capitals from Europe, you can move to another continent or another map with rivers. At the end of each route map, players have a ranking of their progress.

The progress of the players will be observed over time. If the learners access the game more often, they will have more geography knowledge.

On the upper left, there is a clock that helps you to see the progress. If you got the wrong answer a few times, the game will help you. It will give you the right answer but you will get penalties.

Throughout the game, the players can visualize their time. At the end of the experience, the success of each player will be seen by grades.

The student's growth and development path and the sense of progression are represented by the difficulty of the map or how old is that map. Also, can be difficult to find the correct location on the map.

Students can visualize their achievement throughout the learning journey: knowing the location of a city, a capital, or a river. Also, they can see where are embedded the seven wonders of the world.

63

The participants gain world geography knowledge.

It can be seen from the data below that *Seterra* is highly effective and successful. It promotes competition without collaboration. Also, it is likely technically feasible and it can be easily replicable and adaptable.
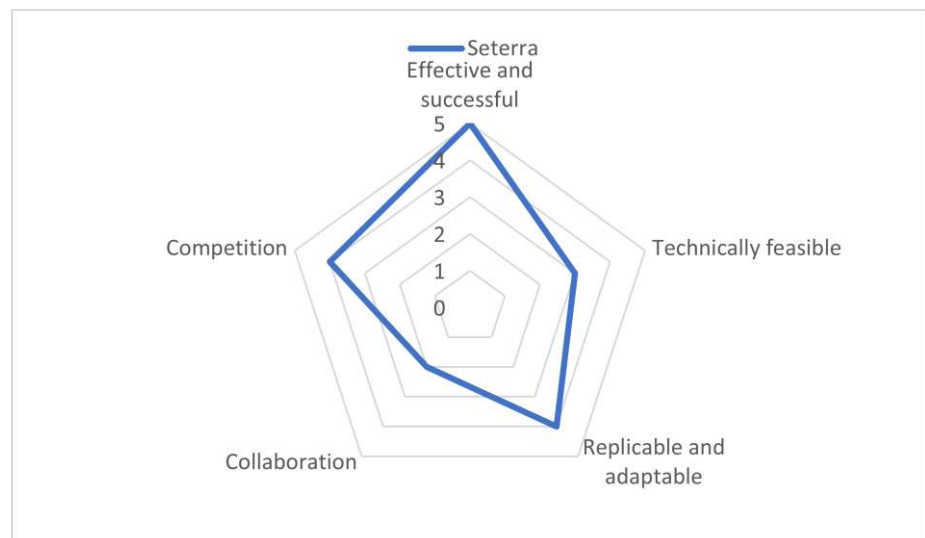
Source: Authors

All things considered, *Seterra* is very good for learning and for using it as an educational game. Participants learn and solve quizzes to complete a geography map. Also, it is good for achievement. It can be developed for an entire subject curriculum or specific for various lessons.

PLAY

2.16. Good practice 16 – Classroom Taboo

Good practice collected by KMEM, Turkey

Face-to-face

Teams

20 – 40 minutes

Multiple topics

Technical

Guided by teacher

The game is usually played at the end of the lessons as a cool-off and review activity.

Spring Taboo cards

spring	bee	butterfly
tulips	bird	nest
egg	flowers	sun
rain	puddle	rainbow
lamb	umbrella	robin
worm	blossom	chicks
grass	bulb	rabbit
(rain) shower	caterpillar	seeds
bulb	Easter	April

Source: ESL Games

This game is a simplified version of the board game "Taboo". It can be used at the end of each lesson to reinforce the taught subject and the important terms/vocabulary learned within the class.

The goal is for students to get their teammates to guess the circled word. They can say anything they like trying to make them guess, except for the words written on the card.

Points are collected by guessing the given word by avoiding the "taboo" words. When students guess the word, another group comes up. When all the groups have done it, they do it again and the teammates switch roles.

The team's progress is shown on the board with stars for each winning game. The winning team is decorated with a ribbon or a medal of achievement made of paper.

Divide the class into groups of two and write each group on the board to keep track of points. Place a desk in the front of the room facing the class, so that someone who sitting has their back to the board and can't read it. Place another desk in front of it, so the teammates are facing each other. Pick a team to go first and have them choose a card.

Ask the teammates to decide who will guess and who will talk. The guesser sits with their back to the board. On the board, making sure the guesser can't see, write the circled word as well as the other taboo words. The talker then has to try to make their partner guess the circled word without saying it, or any of the other words.

The team that guesses the most words within 1 minute, gets 1 point at the end of the round. The team that collects the highest point, wins the game at the end of the session.

The game stimulates collaboration, teamwork, excitement, friendly competition and empathy for the opposing team. As the game can be played by students regardless of their educational success, it provides every single student in the classroom to partake and enjoy the game.

The game can be used not only to practice terms that are taught in the lesson but also to create a friendly atmosphere where students cool off, play a game, relax and bond with each other to overcome obstacles. The achievement is rewarded by a ribbon of success which boosts the students' interest in the given topic.

It can be seen from the data below that *Taboo* promotes competition and collaboration. Also, it proved to be very effective, successful, replicable and adaptable. It is likely technically feasible
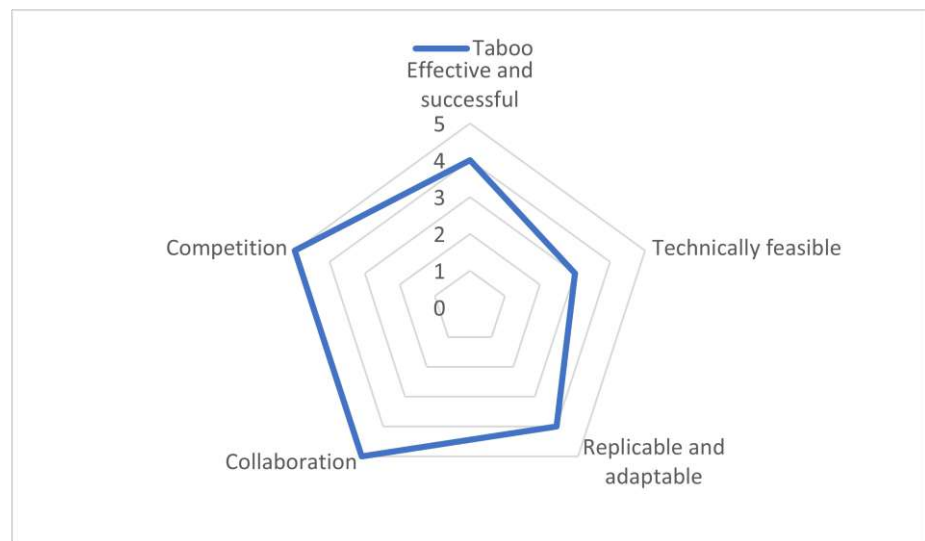
Source: Authors

All things considered, *Taboo* is very good for learning and for using it as an educational game. The game creates a competitive environment where students have to collaborate in order to succeed. It has huge flexibility in game administration and it can be developed no matter the subject.

PLAY

66

2.17.   Good practice 17 – Healthy taboo

Good practice collected by KMEM, Turkey

Face-to-face Teams 30 – 40 minutes	Systematic Diseases	Guided by teacher

Taboo cards: each card has got a disease name and four or five words about it.

Game Time
⏱ 53 seconds

⏸ PAUSE   ↻ RESTART

HELP

SOS
ASSIST
NEED
ACCOMPLISH
CALL

‹ PREV   › NEXT

☰ SCORE SHEET
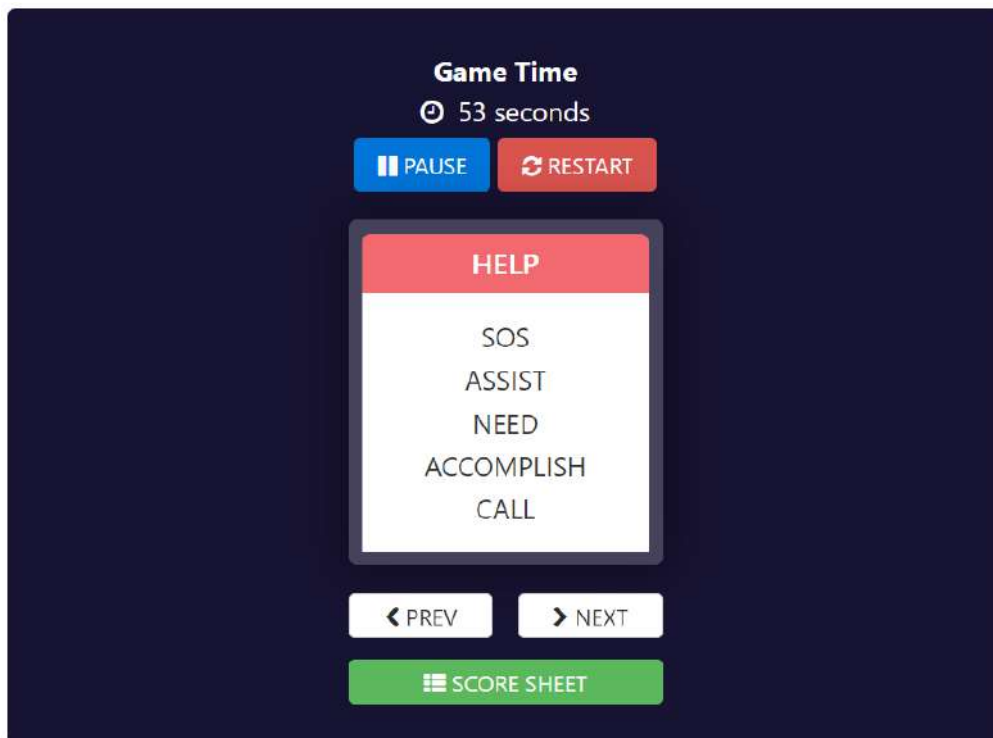
Source: Play Taboo

It is the adaptation of the taboo game we all know to the system diseases course, which is one of the most difficult courses for health vocational high school students. The aim of the game is to enable students to learn about these diseases.

Each group must have a minimum of 2 and a maximum of 4 students. It should consist of at least 2 and at most 6 groups. Each group must draw at least 5 cards. The control of this game is under the control of the teacher, and he can give brief information about the diseases on the card when he deems it necessary.

A disease is named on each card, and under this name are the words used to describe that disease. According to the rule of the taboo game, the student must be able to explain the illness to his friend without using the words on the card. If the banned person uses these words, he loses points. Each forbidden word loses 5 points. If the other student finds the word without losing points, they get 20 points.

The group with the most points overall wins. Groups are ranked according to the scores obtained, starting with the highest score. The cards are divided into easy-medium-hard (levels 2 3). The first game starts with easy cards, then continues with medium and hard cards.

While each group is competing, they have to explain the word on their card to the other students in their group at a certain time without using the banned words.

While playing this game, students cannot use forbidden words while defining the word they need to tell. The more words each group can say without using the forbidden words, the more points they get. The group with the most points wins.

The whole game is based on collaboration between players into the groups. This game is designed to make students find the words and learn the words meanings.

68

When the cards are drawn and the words are found, the students learn the desired diseases. As a result of each group saying the word on the card, the diseases on the card and their symptoms are learned.

It can be seen from the data below that *Healthy taboo* highly promotes collaboration. Also, this game proved to create a competitive environment and to be technically feasible, replicable and adaptable. It is likely effective and successful.
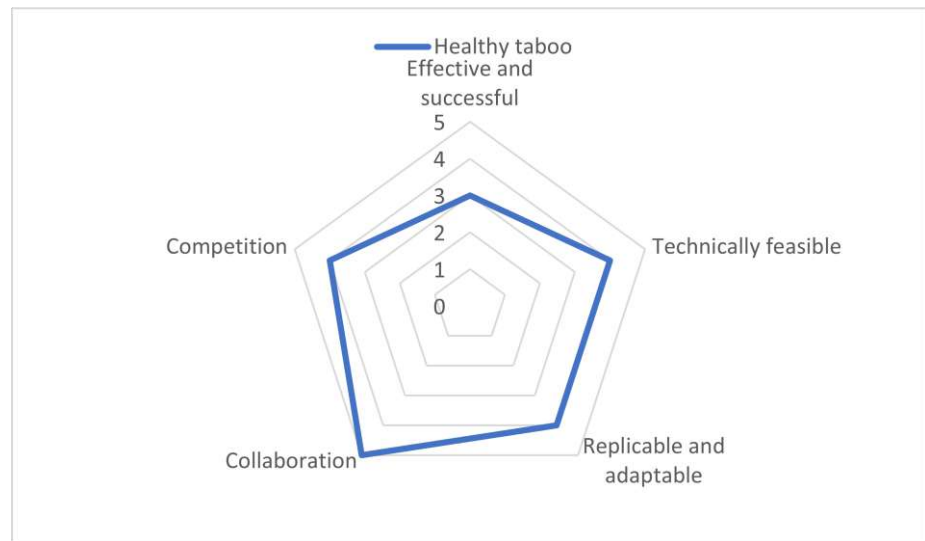
Source: Authors

All things considered, *Healthy Taboo* is very good for learning, cooperation and for using it as an educational game. It is appropriate for working in a team because it promotes a high level of collaboration. Although, it is difficult to adapt to subject-specific classes.

PLAY

2.18. Good practice 18 – Hangman

Good practice collected by KMEM, Turkey

Online Individual 10 – 20 minutes	Anatomy, English	Wifi Software Smartphone

This game allows students to remember the words they know by competing. It also allows students to learn words they do not know.
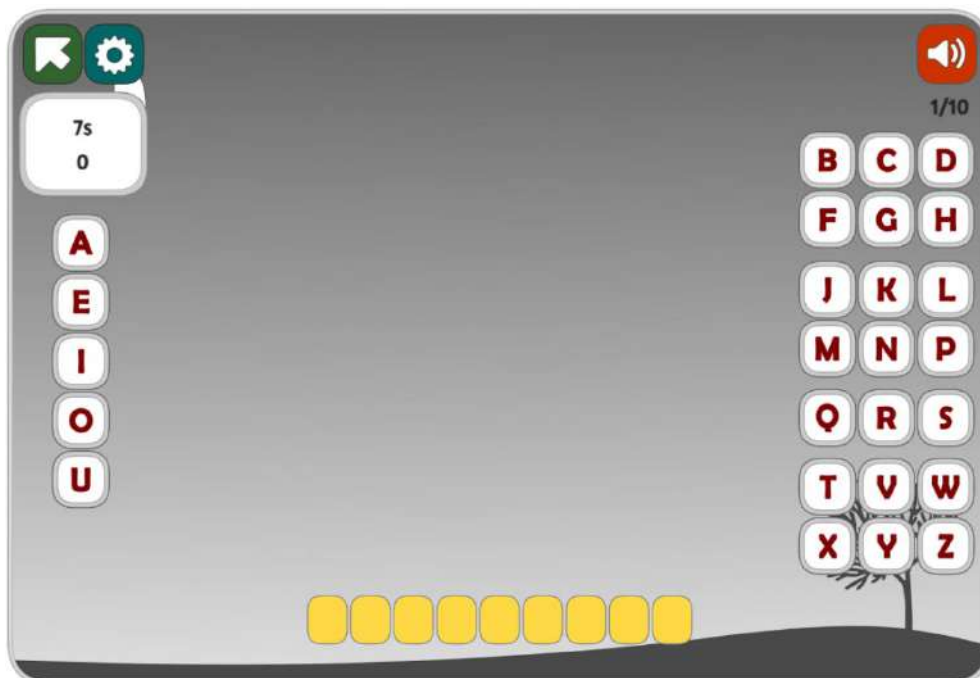
Source: Hangman

The game includes a computer program.

The game is structured into different cycles, lasting approximately 6-10 minutes each, with increasing difficulty levels. In detail:

- in the first cycle, students will get to find the basic or simple words.
- in the second cycle, students have to find longer words;
- from the third cycle, students have to find hard words.

Students have to find the words if not, they find the man hang. Firstly, students choose a letter. If it is not a correct letter, the man starts to hang. Secondly, students have to find all the letters before the man hangs.

When you find a letter, you take 200 points. If you don't find the true letter you lose 20 points. Each student will be able to constantly view their performance based on finding the true letters and words.

Students can choose random letters to find the words they do not know, which can help them find the word by throwing them.

In this game, students compete with themselves. After each new word they find, they encounter longer and more difficult words. The goal is to find the words and get the highest score before the man gets hanged.

Each group of students/players will be able to strive to increase his own score even higher. The goal is to collect the highest score.

When each student finds a word without hanging the man, he switches to the other word, so he can make unlimited progress.

This game allows each student to learn many words by playing this game with their computer or mobile phone.

It can be seen from the data below that *Hangman* is easily replicable and adaptable. It proved to be effective and successful. Also, it is likely technically feasible. Competition and collaboration are low-rated.
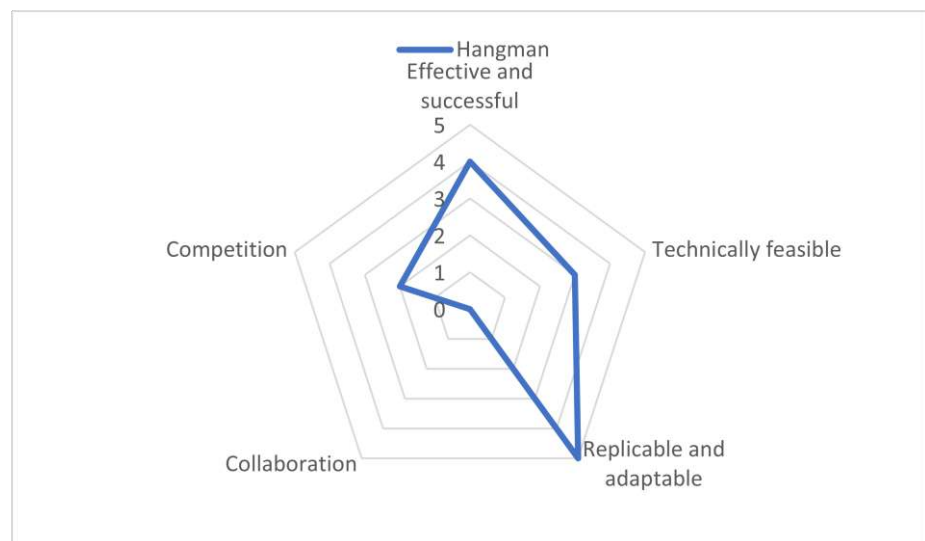
Source: Authors

On the whole, *Hangman* is a game that has a high level of achievement. It is appropriate for individual work because it promotes a low level of collaboration.
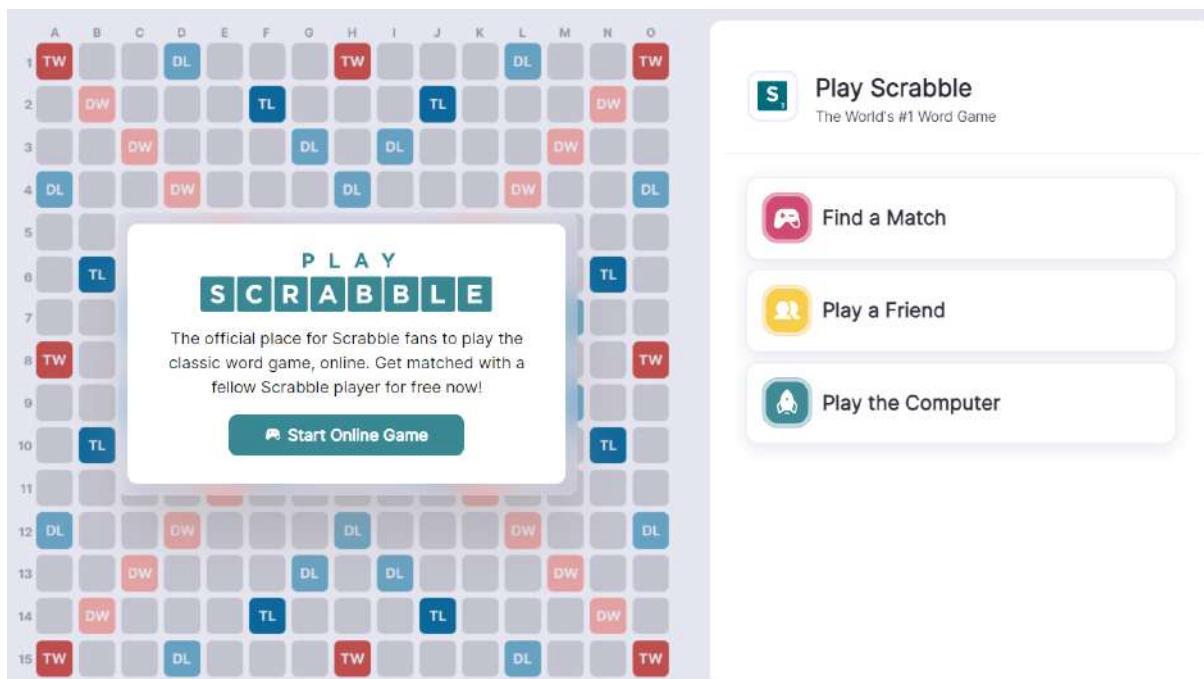
PLAY

2.19. Good practice 19 – Cube Scrabble

Good practice collected by KMEM, Turkey

Face-to-face Individual 30 – 40 minutes	English	Guided by teacher

Wooden/cartoon cubes: each cube has got six English letters.

Source: Play Scrabble

The aim of the game is for students to remember the words they have learned and to reinforce their learning. They correct the wrong words together. It also allows students to learn the correct spelling of words. Develops team spirit as they work in groups of four.

Different letters are written on the six surfaces of the wooden cube. Students are divided into groups of four and 40 mixed cubes are given to each group from these cubes. Students derive words related to the chosen topic.

The group that creates the most words by using all the cubes in the shortest time gets 20 points. The 2nd group that generates the most words gets 10 points. The game is done in 5 rounds in this way, but the subject is changed in each round, so that students are able to derive different words from the previous round. Whoever reaches 100 points first becomes the champion.

Each team will be able to constantly view its performance based on the find the words.

Students can't use the same words during the same game or other games too. No typos are allowed.

While each group is competing, they have to derive many words in a limited time.

The more words each group can say without using the forbidden words, the more points they get. The group with the most points wins.

The whole game is based on collaboration between players in the groups. This game is designed to make students find the words and learn the meanings of the words. Develops team spirit as they work in groups of four. They correct the wrong words together.

As students derive words from letter cubes, they learn new words and reinforce the spelling of words they know.

It can be seen from the data below that *Cube and scrabble* promotes a competitive environment, but no collaboration. It proved to be effective, successful, replicable and adaptable. Also, it is likely technically feasible.
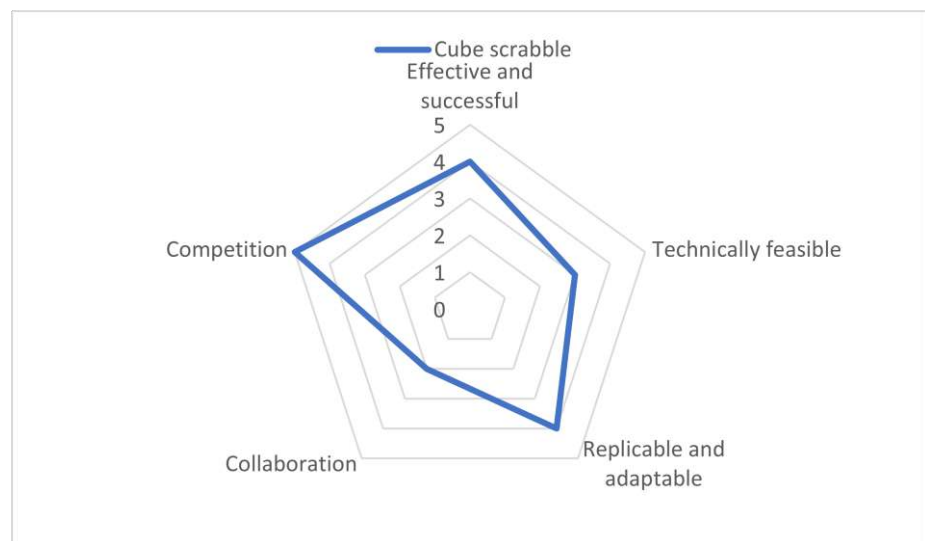
Source: Authors

On the whole, Cube and scrabble is a very good game that has a high level of achievement. It is suitable for competition and individual work because it promotes a low level of collaboration.

PLAY

2.20. Good practice 20 – Bookworm Adventures

Good practice collected by KMEM, Turkey

Face-to-face & Online Individual & Teams 60 minutes	English	Software

There are different storylines for this game and the player moves through the story of their choice in the game.

As you move through the game you face new and more challenging opponents who force players to construct longer words.

Source: Double Games

Help the Bookworm chomp letters to make words and score points. Help the Bookworm chomp letters to make words and score points. Students collaborate to construct longer words and brainstorm a strategy about when to use certain bonuses and equipment presented in the game.

As the students make progress through the game, they face tougher opponents which require them to construct longer English words to beat them and proceed to the next level.

As the students move through the story, they unlock certain superpowers to help make it easier to construct words but at the same time, they unlock certain traps that make it difficult to construct words.

During the game, they progress through a map and in a story context. Each level unlocks new opponents. Each rival is visually different which helps engagement in the game.

Students are curious, ambitious and usually excited as they move forward in the game. Of course, at some point, the game becomes frustrating and difficult to pass a level. At this point, the students feel disappointed as well as competitive and collaborative and they unite their knowledge.

The storyline differs according to students' choice. From outer space to monkey king to pirates, students can choose a narrative according to their liking.

As students complete each level and face new opponents, the story continues just as reading a storybook. In the end, they reach a happy ending.

Students not only face the game's opponents but also compete with their peers in order to construct the longest word possible. This enhances peer work and positive competition.

The objective of this application is to help students practice their vocabulary while playing a game and collaborating with their peers to learn new words through peer learning.

It can be seen from the data below that *Bookworm Adventures* is maximum rated as effective and successful, replicable and adaptable, and for its competition and collaboration features. Also, it is likely technically feasible.
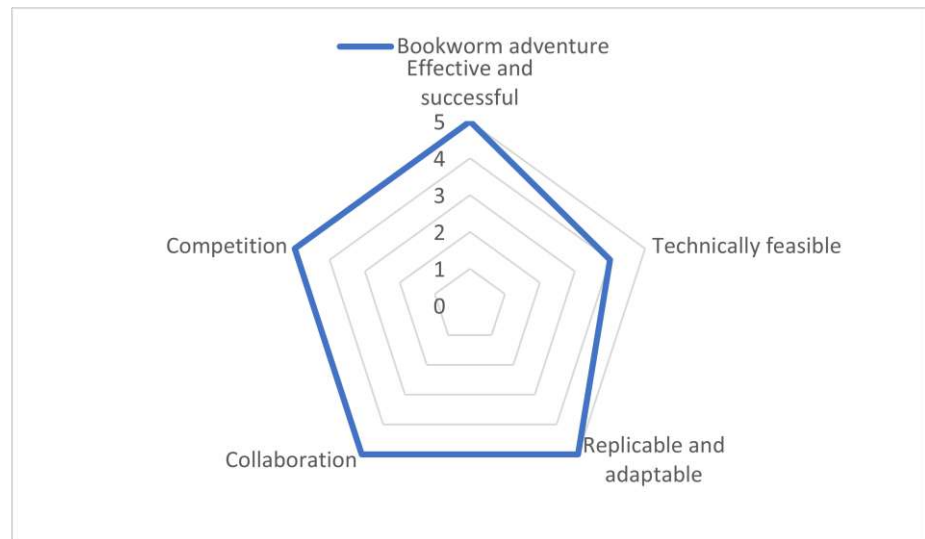
Source: Authors

All things considered, *Bookworm Adventure* is a very good game that promotes both competition and collaboration. It has a high level of achievement and its game element are easily aligned with learning objectives.

PLAY

3. Focus group national reports

Four focus groups were conducted as part of the research program that explored the target groups' needs, features and game elements they would find more effective and engage in Game-based Learning Programs. Each partner organisation implemented one focus group with 10 VET teachers and trainers.

Game-based learning: Consists of incorporating games or video games into teaching, as a complement to ordinary teaching.

The objectives were to:

1. Understand the opinion of the participants about gamification for the VET disciplines;
2. Determine the most appropriate elements that can be integrated at different stages of learning experience.

The Focus Group aimed to:

1. Gather the VET teachers and trainers' opinion about the game elements that would be more effective for achieving the learning outcomes.
2. Review the collection of good practices to select the relevant game elements that can be used at various stages of e-learning.

The focus-group coordinator guided the participants for presentation and selection of the most appropriate transferable elements that can be integrated in the following phase for design and development of game-based solutions analysis for digital learning environments.

Focus-groups were organized face to face or by using online conference platforms: MS Teams, Moodle or ZOOM. The flow of the activities followed these steps:

- The partners identified relevant participants;
- Send invitation (set up the online meeting/ conference room and transmit the agenda)

In the day of the meeting, it was made a brief introduction to the topic to be discussed, mentioning its objectives. The partners presented selected good practices. The focus group collaborated to evaluate the good practices in accordance with initial criteria, discussed specific questions on the collected good practices to select transferable elements and formulate recommendations. In the end, the report was shared with all project partners.

The method adopted to implement the Focus Group is the questioning route, a sequence of questions in complete, conversational sentences. Specific questions on the collected good practices were decided by the researchers' team once the collection of practices was finalized. Focus group results were used in the overall research program to agree on the quality criteria for each type of game.

3.1.   Focus group 1 – Romania

METHODOLOGY

The focus group was conducted on 12nd July 2022 in Constanta, Romania. The group consisted of 10 VET teachers and trainers. These people were selected because they fulfil the selection criteria due to their professional experience. The focus group was photographed.

THEMATIC ANALYSIS

The focus group participants identified the following expectations, fears and contributions to applying the presented good practices:

Expectations:

- to increase interactivity;
- to improve communication and understanding;
- to make teaching more efficient for students.

Fears:

- students will not be receptive;
- the teaching method will only work for a short period of time;
- gamification methods will not be effective.

Contributions:

- to explain at the beginning the steps of the gamification method we will use;
- to share good practices;
- to be open to implementing students' feedback.

Regarding the gamification of classes, the focus group emphasized:

Access to the knowledge of digital tools and platforms for gamifying lessons:
- Positive answers;
- Digital skills;
- Examples of platforms: Padlet, Kahoot!, Genially, LiveWorksheets and The Bamboozle.

Learners' motivation to join an online educational game:
- competition;
- prizes or other stimulation;
- accessibility for everyone;
- communication;
- Examples: group work, competitive quizzes, open space for feedback, one-to-one communication

Online socialization during the online course:
- Activities for different groups;
- Video with questions for students;
- Group work (e.g., research, activities)
- Introductory forums;
- Welcome discussions;
- Personalised homepages.

Appropriate game elements throughout the lesson:

- Visually explosive graphics;
- Sounds;
- Voiceovers;
- Narration;
- Avatars or characters
- Progress bars or maps;
- Score competition;
- Timers;
- Badges
- Keys that open learning doors;
- Collectibles;
- Leader boards;
- Course currency;
- Points;
- Virtual raffle tickets;
- Certificates.

Effective game elements during a specific stage of learning:
- All stages;
- During the lesson.

Game elements for measuring learners' abilities:
- Video;
- Illustration;
- Puzzles;
- Spider diagrams;
- Brainstorming in group;
- Quizzes;
- Crosswords
- Visually explosive graphics;
- Sounds.

Relevant aspects to a game:
- Introduction;
- Content connection;
- Catchy;
- Interactive.

Motivation for adding game elements in a lesson:
- Interactive learning process;
- Thought-provoking;
- Engaging.

SUMMARY AND RECOMMENDATIONS

VET professors came to the conclusion that gamification components might positively affect students' engagement in the teaching-learning process and expressed their satisfaction with the utilization of such materials.

3.2.   Focus group 2 – Romania

METHODOLOGY

The focus group was conducted on 7th June 2022 at „Carol I" Commercial College, Constanta, Romania. The group consisted of 10 VET college teachers. These people were selected because they fulfil the selection criteria due to their professional experience. The focus group was photographed and the event lasted two hours.

THEMATIC ANALYSIS

The focus group participants identified the following expectations, fears and contributions for applying the presented good practices:

Expectations:

- stimulating learning through discovery;
- facilitates a better fixation of knowledge;
- increasing interest in the study;
- stimulating active, individual and group participation in solving work tasks;
- captivating students and a better understanding of the contents;
- facilitating learning;
- increasing students' motivation;
- capturing students' interest in fixing new acquisitions.

Fears:

- the games must refer to essential elements of content;
- the risk of inefficient management of the time resource;
- Is the learning process easy?
- IT logistics;
- distrust on the part of some students;
- few content elements will be transmitted through the game;
- time to prepare the game.

Contributions:

- fixing and consolidating knowledge through play;
- stimulating students' creativity;
- active browsing of the contents;
- stimulating several functions of students' thinking;
- development of students' psyche;
- stimulating students' interest in learning;
- development of critical thinking;
- efficient implementation in the learning process;
- facilitates self-knowledge.

SUMMARY AND RECOMMENDATIONS

Vet teachers concluded that the use of gamification elements could have a favourable impact on students' involvement in the teaching-learning process and said they were pleased with the use of such resources.

3.3.   Focus group 3 – Italy

METHODOLOGY

The focus group was conducted online on 10th June 2022. The group consisted of 10 VET teachers and trainers. These people were selected because they fulfil the selection criteria due to their professional experience.

THEMATIC ANALYSIS

The Focus Group was implemented following the common questioning route defined by the researchers of the INNOVET consortium.

Access to the knowledge of digital tools and platforms for gamifying lessons:
- Positive answers;
- Examples of platforms: Centrical, Classcraft, EdApp, Educaplay, Flippity, Game Salad, Gametize, LearningApps, Kahoot, Minecraft, PuzzleMaker, Quizalize, Quizizz, Quizlet, Socrative, Scratch, WordWall.

Learners' motivation to join an online educational game:
- Instant or daily rewards for learners' first accesses;
- Engaging storytelling;
- The provision of badges and prizes to reward consistency in the first actions (e.g., accesses, the discovery of the learning environment and preliminary lessons);
- Self-motivation;
- Unlocks, bonus-malus and surprise elements;
- Increasingly difficult levels.

Online socialization during online course:
- Opportunities for collaboration and competition;
- Missions/challenges/quests to be implemented in teams;
- Dedicated spaces for sharing and discussing (e.g., forum and chat);
- Badges to reward interactions and collaboration.
- "Collect and trade" dynamics (e.g., trading points or notes with other learners to gain hints or notes or to unlock other learning resources);
- Encouraging peer-to-peer evaluations;
- Sharing group leader boards.

Appropriate game elements throughout the lesson:
- Competition;
- Collaboration;
- Visual progress;
- Consistent storytelling;
- A clear path towards mastery, with objectives, levels and a sense of progression;
- Individual, group and general leader boards;
- Rewarding system.

Effective game elements during a specific stage of learning:

- First four stages of e-Learning, such as Access and motivation, Online socialization, Information exchange and Knowledge construction

Game elements for measuring learners' abilities:

- Missions (apply);
- Challenges (apply);
- Quests (apply);
- Simulations (competence-based assessments);
- Quizzes (knowledge-based assessments);
- puzzles (knowledge-based assessments).

Relevant aspects to a game:

- Collaboration and competition;
- Clear objectives and pathway towards mastery;
- Levels and missions;
- Sense of progression and visual progress;
- Feedback.
- Noteworthy individual responses:
- Quality of the gameplay and playability;
- Ease of use and time to be spent to learn the game mechanics;
- Novelty, surprises and changes;
- Rewarding system;
- Narrative and storytelling.

Motivation for adding game elements in a lesson:

- Engagement;
- Motivation;
- Interaction;
- Active participation;
- Sense of autonomy;
- Confidence;
- Feeling of competence and accomplishment;
- Creative thinking;
- Critical thinking;
- Problem-solving skills.

SUMMARY AND RECOMMENDATIONS

Vet teachers reached the conclusion that gamification elements could have a beneficial impact on students' learning process and they, as VET teachers and trainers, have access to such practices.

3.4. Focus group 4 – Turkey

METHODOLOGY

The focus group was conducted online on 13rd – 17th June 2022. The group consisted of 10 VET teachers and trainers. These people were selected because they fulfil the selection criteria due to their professional experience.

THEMATIC ANALYSIS

The Focus Group was implemented following the common questioning route defined by the researchers of the INNOVET consortium.

Access to the knowledge of digital tools and platforms for gamifying lessons:
- Positive answers;
- Examples of platforms: hangman, scrabble, puzzle, word games, smart board application, board games, Q&A questions, online games.

Learners' motivation to join an online educational game:
- Rewards;
- Competition;
- Grades.

Online socialization during online course:
- Discussion environment;
- Peer learning;
- Peer evaluation;
- Team work;
- Cooperative environment.

Appropriate game elements throughout the lesson:
- Progressive games;
- Skip levels;
- Reward;
- Ranking.

Effective game elements during a specific stage of learning:
- Consolidation;
- Evaluation;
- Introduction;
- When students' attention is lost;
- End of the lesson.

Game elements for measuring learners' abilities:
- Recall;
- Creativity.

Relevant aspects to a game:
- Relevance;
- Competition;
- Reward;
- Cooperation;
- Ranking.

Motivation for adding game elements in a lesson:
- Facilitate learning;
- Fun;
- Relaxing.

SUMMARY AND RECOMMENDATIONS

VET instructors came to the opinion that gamification may positively affect students' learning and improve their involvement in the educational process.

4. Validation survey

For the identification of relevant stakeholders, the research team selected organizations and individuals working with young people, which may have an interest in using gamification. Each partner organization proposed a map of stakeholders ensuring that all relevant parts are targeted: VET students under 18, aged between 18-25 years old or over 25.

The research team discussed and agreed on a five-question survey. They concluded that the questionnaire covers all important sections of implementing gamification in the classroom. The final version of the survey was transferred to Google Forms.

Because professional feedback was envisaged, the research team transmitted the questionnaire only to relevant individuals. The invitation was transmitted via e-mail and WhatsApp. The online survey was advertised as being available from the 7th of June to the 10th of August 2022. The goal was to collect 100 responses. On the 10th of August 2022, the survey closed with 132 responses. The research team analysed the responses and presented the findings in the below section.

4.1. Distribution of respondents

The survey consisted of a total of 132 complete responses collected from VET students under 18, aged between 18-25 years old or over 25 from the partners' countries: Romania, Italy and Turkey.

Country	Age			No. of respondents
	Under 18	18 – 25	Over 25	
Romania	19	29	2	50
Italy		17	8	25
Turkey	50	7		57
Total	69	53	10	132

4.2. Detailed findings

This section summarized the responses received from the participants in the survey with regard to the pedagogical approach for developing gamification in classrooms. The set of questions addressed tools and methods that can be used during various stages of teaching and assessment to create engagement, foster interactivity and lead to skills development. The first two tools/resources that scored higher in respondents' preferences were highlighted in grey.

Q1. Imagine that you join an online course. How would you like to be welcomed at the beginning of the course?

Online course greetings	No. of respondents
A course welcome video from the instructor	65
Welcome letter from the instructor	12
By a message from the instructor which offers online office hours	15
By an online discussion forum where all students and instructors to introduce themselves	39

Conference (e.g., Zoom) with all registered people and presentation from the organization	1

Q2. How do you see the online socialization during the online course?

Online socialization	No. of respondents
Forum discussions between classmates	26
Community of learning with classroom discussions on different topics	25
Debates facilitated by instructors, where learners formulate and critique arguments	81

Q3. What type of game elements would motivate you to remain engaged in a course (choose three, the most important for you)?

Game elements	No. of respondents
POINTS system should be established from the beginning and be consistent.	62
BADGES are a system of rewards that are obtained by fulfilling the different tasks.	50
LEADERBOARD provides analytics and helps learners focus on terminal objectives.	53
LEVELS show how users reach a milestone, program status, or areas of accomplishment	56
MISSION provides objectives for users to accomplish as a team or as an individual.	53
UNLOCKS can be deployed with quizzes, activities, and missions containing badges where there is a determined linear progression.	34
EVENTS FEED enables users to see how everybody else in the gamification is doing; for example, a user may read on the Events Feed that a colleague has completed a mission and progressed to the next level.	35
QUIZ allows users to test their knowledge.	55
VISUAL PROGRESS shows users where they are in completing missions, challenges and in the overall Gamification user journey.	40

Q4. Imagine that you participate in face-to-face classes with a duration of 40 minutes. Where would you like to have the game elements?

Game elements during lesson sequence	No. of respondents
At the beginning of the lessons to evaluate prior knowledge	15
During the course as video lessons, missions, and rewards on completion	69
At the end of the lesson to evaluate the achievements	48

Q5. During the evaluation stage, how would you like to demonstrate your abilities and knowledge on the newly completed topic?

Evaluation	No. of respondents
By completing missions and levels during the course	38
By taking a quiz	24
By playing a game	71

4.3. Summary of key findings

The main objective of the survey was to gain an understanding of the most engaging teaching tools and methods appropriate for online education and their use in various steps of learning from the exploration of new concepts and explaining ideas to applying and evaluation. In this respect, the key findings are analysed considering the respondents' age.

Regarding how VET students prefer to be welcomed to an online course, the large majority under 18 and aged 18 – 25 indicated a welcome video from the instructor. The next preference is an online discussion forum between students and instructors. It is apparent from this chart that very few VET students prefer to be welcomed by letters or by an online conference.
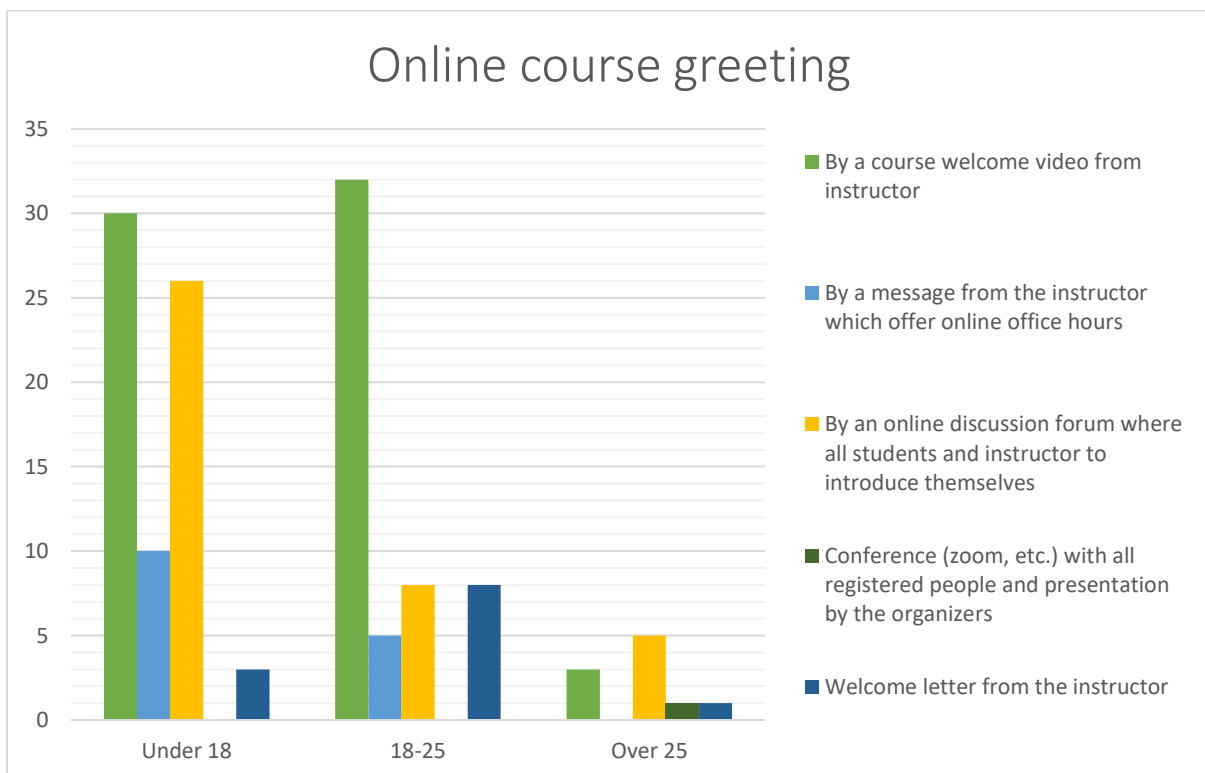
In terms of socialization during an online course, most of the VET students, no matter the age, prefer debates facilitated by instructors, where learners formulate and critique arguments. What is interesting in this data is that the next two possible choices, classroom discussion and forum discussion, are very close to each other in VET students' answers.
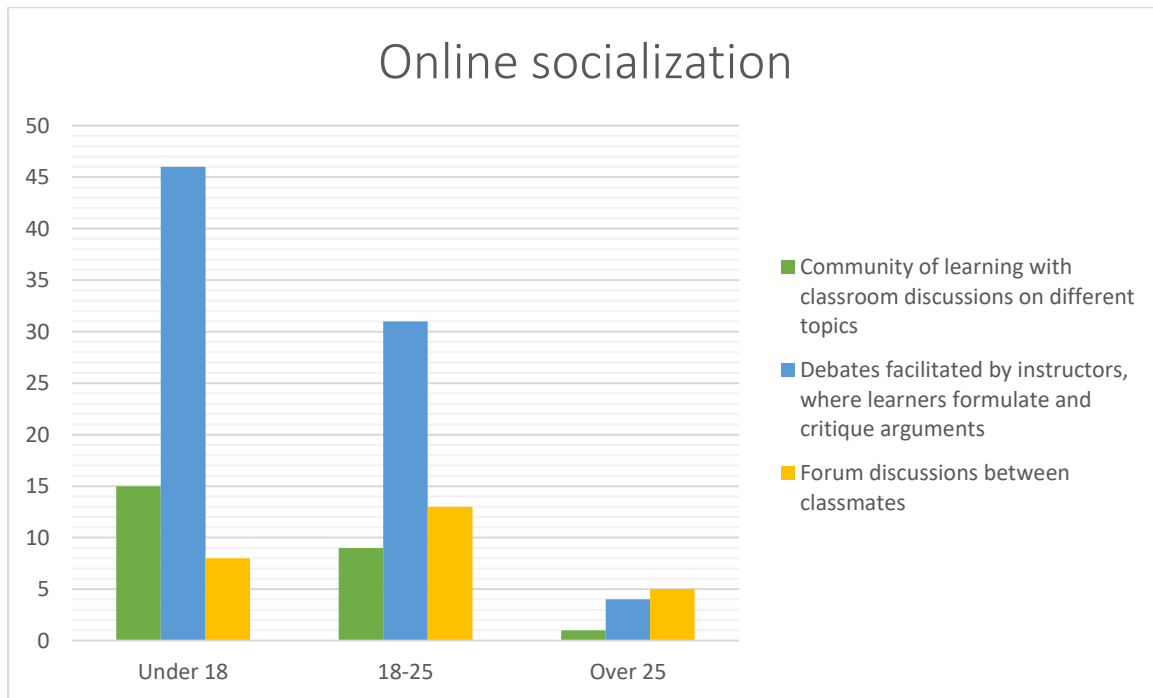
The figure below presents game elements with a positive impact on students' motivation when it comes to classroom engagement. To begin with under 18 VET students, these prefer mission, levels and points. In addition to this, 18 – 25 students prefer mission, quiz and levels. Whereas, over 25 VET students prefer mission, visual progress and quiz. On the whole, it can be seen from the information above that mission is the favourite game element for all categories.
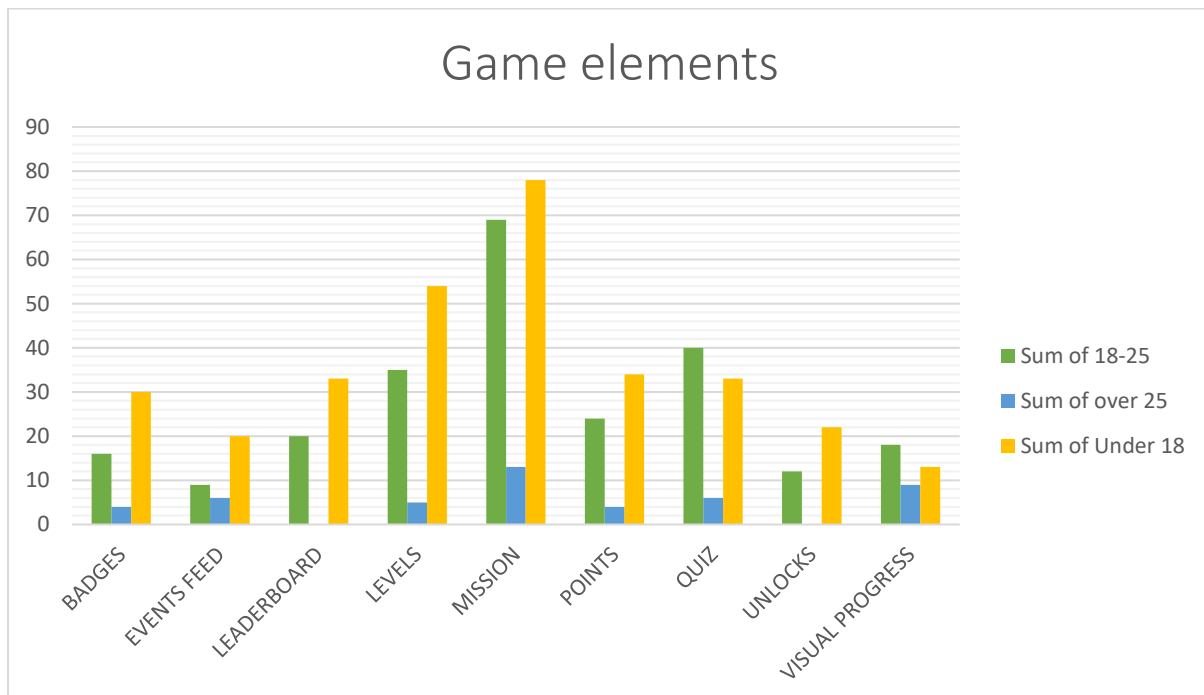
It can be seen from the data below that VET students under 18 and 18 − 25 have different visions when it comes to introducing game elements during a specific lesson sequence. Under 18 VET students prefer introducing them at the end of the lesson, while the vast majority of 18 − 25 students prefer during the lesson. Nevertheless, introducing game elements during the course is top-rated by over 25 students and under 18 students too.
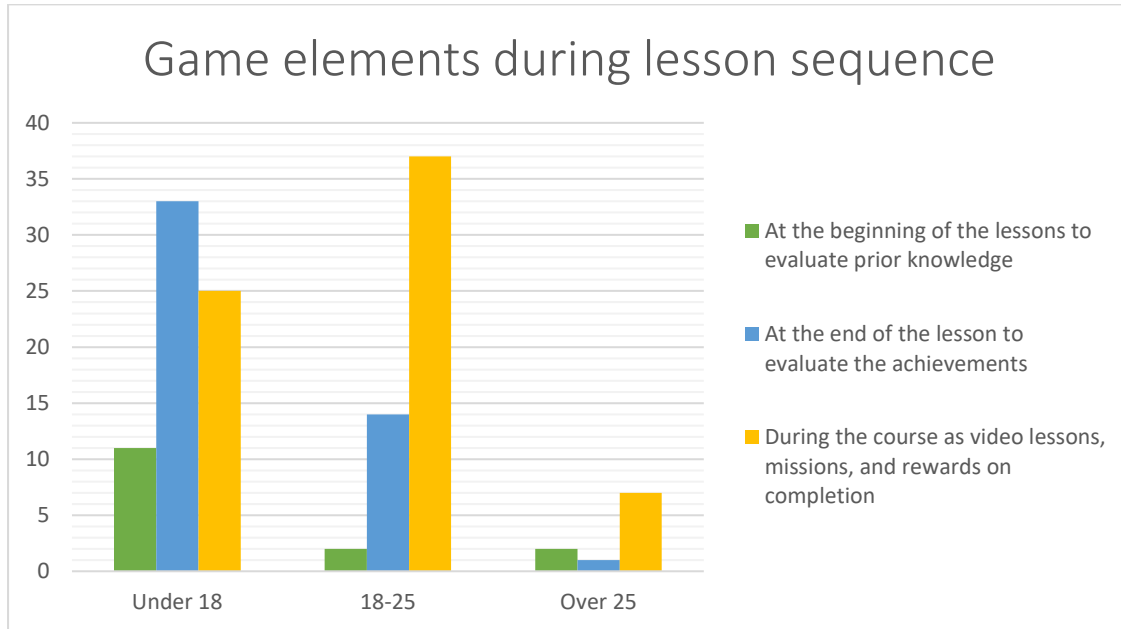
When it comes to the evaluation process, over 25 VET students' preferences are different from those under 18 and 18 − 25 VET students. People aged over 25 prefer to be evaluated by completing mission and levels during a course, whereas for 18 and 18 − 25 VET students this is their second choice. Under 18 and 18 − 25 students prefer to play a quiz in order to be evaluated.
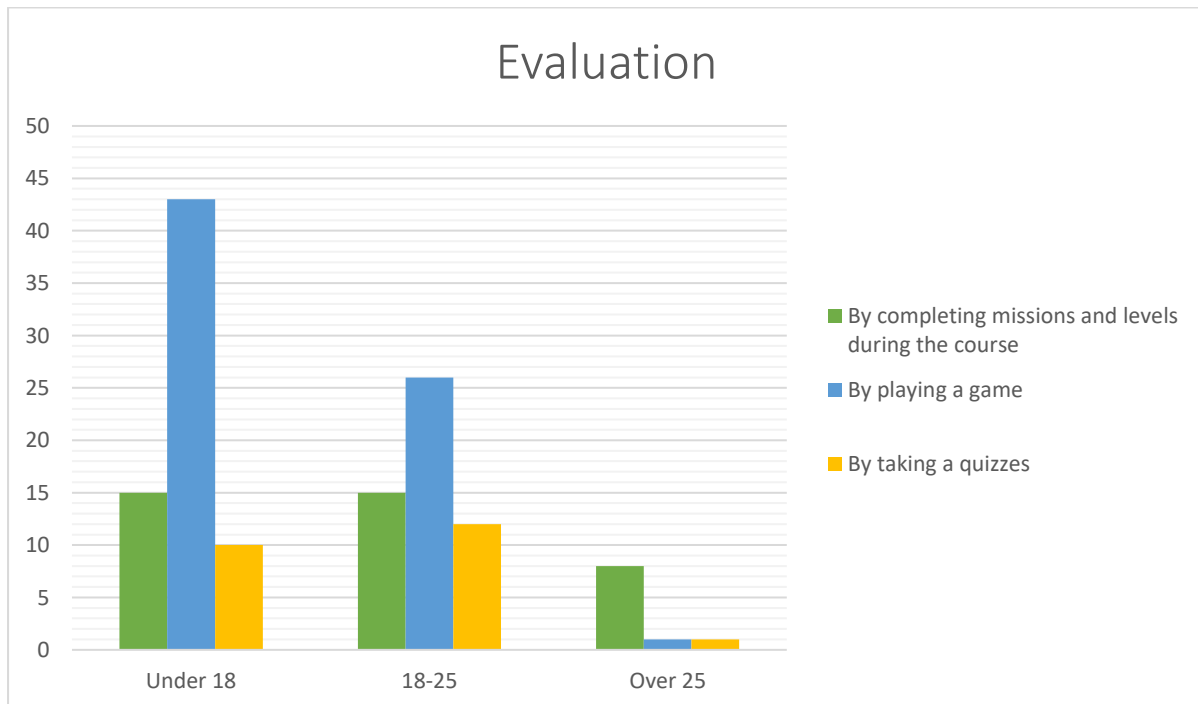
5. Conclusions and recommendations

Gamification has a lot of potential to be used in non-formal education to enhance learners' engagement and experiences in the new digital and online environment. The term "gamification" in education describes the use of game elements in activities that aren't often thought of as games.

In order to encourage creative game-based learning initiatives in the digital education ecosystem, this study set out to identify the possibilities and alternatives for gamifying non-formal vocational education. The research team envisioned a research approach that encompassed both secondary and primary research in order to accomplish the project goal.

The conclusions and recommendations of the study were included below, with the outlook of using these further in the INNOVET project for designing game-based learning programs and integrating these into a digital education ecosystem.

The first and perhaps most important conclusion drawn from this study is that gamification has the potential of increasing vocational students' motivation and engagement during the learning process. Therefore, when students' motivation is low, VET instructors may apply gamification tools in order to boost their engagement. It follows that vocational educators may need to change the lesson design if they want to generate a greater impact on students' motivation by adding game elements.

In addition, the study indicated that vocational teachers and trainers have various levels of knowledge of digital tools and platforms for gamifying lessons. In this regard, it is recommended that they follow continuous professional development paths in order to stay up to date with new gamification tools that can be applied in their teaching.

Another conclusion drawn from this research is that not all games are equally applicable in any educational context and therefore vocational teachers shall evaluate these games following a range of relevant criteria. The current paper provides such criteria, which take into consideration a holistic approach to each game.

Moreover, from the good practice examples and the focus groups which followed it can be concluded that game elements can be applied in different lesson sequences. Hence, vocational instructors can adapt and fit game elements at any lesson stage.

From the survey with vocational students, it was concluded that their gaming preferences depend on the age group they belong to. Therefore, vocational teachers and trainers need to adapt their gamification tools to the age of the target groups.

Another conclusion related to vocational students is that they prefer some specific game elements at the expense of others, in the context in which games are complex tools that have a wide range of features. Consequently, it is up to vocational instructors to consider this and apply in their courses those features that attract students and meet the learning objectives at the same time.

Equally important is that vocational students prefer gamified evaluation methods. In this regard, teachers may use games in the evaluation process to ensure full engagement from the students

Finally, there is still much work to be done to realise the full potential of gamification in vocational education, including further studies, upskilling teachers and applying gamification in classes.

Usability and transferability

This study is part of the Erasmus+ project "Game-Based Learning: Innovative e-learning pedagogies for VET educators" implemented by a consortium of four partners from Romania, Italy and Turkey. INNOVET project aims to develop an innovative high-performing digital education ecosystem with supportive tools for vocational education and training (VET) providers. The current research study is a precursory step in creating the ecosystem.

As shown by our research, educators need specific training to be able to engage learners in their turn. To support this, in this study the project researchers developed a research methodology and implemented it through desk research (finding and analysing good practices) and primary research (focus groups and surveys) to finally draw conclusions and recommendations for the use of gamification in vocational education.

The research addresses primarily vocational teachers and trainers. However, indirect beneficiaries are also vocational students, who may take advantage of the good practices and tools provided. Parents of vocational students may also find inspiration from this study on how to best assist their children. Beneficiaries of this research are also organizations and institutions such as vocational education and training centres, technological and economics highschools as well as professional schools.

In addition, the study may add the greatest value to disadvantaged learners and people with fewer opportunities, including people with disabilities and those facing economic difficulties. All these people can access the current material and the associated online support tools.

While the generic category of users includes vocational teachers and trainers, the study may also be utilized in other areas including school, higher education, adult and youth education. Therefore, the category of potential users of this study extends to teachers, researchers, university professors, adult educators, social workers and youth workers.

In the following paragraphs, we outline the elements that can be used by the direct target groups or transferred to other target groups. We define usability as the ways in which the content can be used to achieve the required goals effectively and efficiently (Jordan, 2002). In comparison, transferability is the degree to which the content is relevant and applicable to other similar situations (Lincoln & Guba, 1985).

The specific procedures or techniques used to identify, select, process, and analyse gamification good practices can be transferred to any qualitative research. The methodology used for primary and secondary research flows in a way suitable for any other research, no matter its topic.

Firstly, the structure of the study may be transferred to many other topics. It includes a summary, content, introduction to the subject matter, methodology, good practices, focus group and survey results, conclusions and recommendations, information about the authors and partner organisations and references.

The research methodology developed and implemented by the research consortium in line with the INNOVET project objectives, qualitative and quantitative performance indicators is transferable to any other similar research.

The primary research survey methodology including data collection and analysis of results is also transferable to other research endeavours. Moreover, the research results regarding the gamification

of vocational education may be used in other projects as a starting point, justification or development of educational materials.

The good practices identified and collected in Chapter 2 may be used by vocational teachers and their organisations to support their educational services for vocational students and students in general. These may be further explained to foster awareness or adapted and implemented in public institutions and private organisations active in the vocational education field.

The insights provided by the vocational teachers and trainers during the focus groups may clarify the extent to which games and game elements respond to the pedagogical needs of vocational educators, but also which features and game components would be more appealing and encourage participation in game-based learning programs.

Moreover, the survey with vocational students provides an important opportunity to advance the understanding of the most effective instructional techniques and instruments suitable for online education, taking into consideration VET students' perspectives on gamification based on their needs and preferences. The survey results may be used by vocational teachers to inform their curricula design and teaching/training methodology.

Finally, the conclusions and recommendations formulated in this manual may be used for other target groups and educational contexts.

All the items mentioned above are included in this written study for vocational teachers, trainers, instructors and managers. However, this study should be regarded as a complementary component of the entire educational package being developed and provided in the INNOVET project.

Currently, all the project deliverables and activities are freely available in various formats on the INNOVET project webpage. Upon the completion of the INNOVET project, the materials and their online references will be made available through the Erasmus+ Project Results Platform (EPRP).

But even if the materials are made available online, users' learning can take place virtually anywhere: at home in front of a computer, tablet or smartphone; at the premises of partner organisations, in vocational education and training centres and at work.

Another benefit of the INNOVET study is that the online is an environment that never sleeps, the project website is always open, the current study is always available online and anyone can learn anytime (not necessarily in the same place or at the same time). All these are made available to any vocational teacher and trainer to help them design their classes 24/7 around the year, every year, no matter of time zone. Everything will be maintained and updated for many years from now.

So far, we presented a comprehensive image of why we undertook this study, for whom, what is included in it, where is this available and when could be accessed. In the following, we focus on how can these educational materials be utilised by users and transferred to target groups. In this regard, it should be noted that the resources are available online for people with disabilities. Indeed, the project website is compatible with machine reading software which makes it available for learners and educators with special needs.

Last, but not least, our consortium adheres to a set of guiding principles in terms of transparency, integration and copyright.

Transparency is a principle that attracts possible partners and any person who is interested in this topic or a specific organization. The current study that has been created can be found online and accessed by anyone.

The project methodologies, resources, processes, results and outcomes were incorporated into partner organizations. This is the focal point of our approach since it enhances partners' capabilities (competences and resources) and demonstrates that our educational and managerial approach works. In the end, the goal is to make sure that other organizations adapt and use successfully the tools, techniques or lessons that we developed.

In terms of copyright, all the materials are provided for free with the Creative Commons CC BY attribution license. This lets others distribute, remix, adapt, and build upon your work, even commercially, as long as they credit you for the original creation. This is the most accommodating of licenses offered. Recommended for maximum dissemination and use of licensed materials.

About the authors

ACOMI Nicoleta, PhD is vice president of TEAM4Excellence Association, trainer in the areas of STEM, digitalisation and social inclusion, project manager PMP® of 30+ research, education and development projects, Assoc Prof and Vice-Dean at Constanta Maritime University with 20+ years' experience; rapporteur for research project evaluations of International Association of Maritime Universities, Vice-President of Women's International Shipping & Trading Association, Romania, President of Romanian Intermodal Transport Association, founder and director of Constanta Maritime University Training Centre; delegate to the NCSR Sub-Committee of the International Maritime Organisation. She authored eight books and 80+ academic articles covering the topics of education, teaching methodologies and engineering.

ACOMI Ovidiu holds an MBA from Robert Gordon University UK and is the author of one book and 20+ academic articles. Ovidiu is the president of TEAM4Excellence Association, a trainer at the National Institute of Administration in the areas of public communication and operations management, member of the Naval Supervisory Board within the Competition Council for a 5-year term, member of the Engineering Commission of ARACIS (public body for the accreditation of technical universities) for a 4-year term, EFQM trainer and international evaluator for the Global EFQM Awards, manager of European projects and management consultant, expert evaluator of the European Commission for research and innovation projects, chartered engineer of the Institute of Marine Engineering Science and Technology UK, chartered manager of the Chartered Management Institute UK and Project Management Professional (PMP)® Credential Holder.

AKINCI Eyyup is a project coordinator and English teacher. He speaks French, English, Italian and German languages fluently. He has expertise in providing training courses, cooperation and coordination in running EU-funded projects.

ANDREI Roxana Elena has a bachelor's degree in Pedagogy of Primary and Preschool Education. She has in-depth knowledge in the educational field, studying for two master's degrees in Train the Trainers and Mentoring in Education. Her area of expertise is tutoring, formal and nonformal education, training course development, communication and developmental psychology. Moreover, she is the author and co-author of academic articles and research. Currently, she is a trainer and project officer at TEAM4Excellence Association, where she eases teaching and learning opportunities for youth, adults and educational personnel.

AYDIN Ibrahim is an English teacher and a project coordinator. He is doing his master's degree in the field of foreign language teaching. He has deep knowledge and experience in writing and coordinating EU-funded projects.

BENCU Zoia is a first-degree professor specialised in Economics Trade, Tourism and Services, master's degree in Business administration in Trade, Tourism and Services; she carried out activities as an expert/school coordinator within the projects POSDRU/175/2.1./S/150682; You are young, be aFIRMAt, project financed from the European Social Fund through the Operational Program Human Capital 2017 - 2013, Priority Axis 2-„Correlation of lifelong learning on the labour market", Major field of intervention: 2.1. – „Transition from school to active life"; online entrepreneurship course trainer within the POCU project "Entrepreneur Diaspora: Come home!", MySMIS ID 107550; ordinary member and with honorary activity in the examination commission of the Romanian-German Chamber of Commerce and Industry for the School of books and trades project.

CONSTANDACHE Mihaela is a first-degree professor - engineer specializing in Food Technology, PhD in Engineering Sciences specializing in Technologies and Equipment in the Food Industry, PhD in Economic Sciences, specializing in Business Administration; member of the research teams of various projects such as Phare VET, POSDRU, Erasmus +; author of 3 books, co-author of 7 books, author/co-author of 62 academic research articles in the field of economics/engineering sciences; co-author of the curriculum in local development for service profile, high school education and vocational education; member of the county peer-assistance network for quality assurance; specialist of the Commission for the Authorization of Professional Training Providers of Adults Constanta, for the fields of Public Food; mentor in her field of expertise; trainer and evaluator of professional skills for the training fields of Tourism and Food.

DIMA Adriana as Director of the Carol I Commercial College Constanta since 2012, ensures the management of the educational institution, carrying out organization, coordination, guidance and control activities in this regard. Graduate of the Faculty of Commerce from the ASE Bucharest, a first-degree teacher with 32 years of experience in pre-university education, methodist, mentor, tutor for the pedagogical practice of students/beginners in education, trainer of adults in the field of Commerce, member of the Consultative Council of the Constanta County School Inspectorate, member of the National Body of Experts in Educational Management. She participated in numerous projects and programs such as Phare VET, Leonardo da Vinci, Comenius, POSDRU, ACES and Erasmus+; participated in various conferences, seminars and published articles in her specialized field; coordinating teachers with excellent results in preparing students for participation in Olympiads, contests, competitions in the specialized field, but also other types of extracurricular activities.

DUDAN Anghelina is a first-degree teacher specializing in Trade and Services with 32 years of experience. As deputy director of the Carol I Commercial College, she coordinates and organizes the entire activity carried out in the educational unit. Member of the National Body of Experts in Educational Management; member of the Consultative Council of the Constanta County School Inspectorate; member of the county peer-assistance network for quality assurance; methodist, mentor in her field of expertise; coordinator of the Institution's Quality Assurance and Evaluation Commission; responsible for the Curriculum Committee; outstanding results as a teacher coordinating students enrolled in various school and extracurricular contests and competitions; supervisor of professional skills certification projects; in charge of remedial and extracurricular activities. Co-author of the curriculum in local development for Trade, Tourism and Food, co-author of school textbooks, and author of specialized articles published in various publications or presented at various conferences and symposiums.

LANZETTA Miriam is a Project Manager and instructional designer, President of Associazione Akira. Holder of the PMP® Credential, Certified Green Project Manager by GPM Global, experienced in managing EU co-funded projects on innovation, digital transformation, innovation and inclusion. Ambassador of the Green Project Management Global organisation. Experienced in European projects, in the last 7 years, she has cooperated with more than 70 organisations, including universities, research centres, companies and non-profit organisations, in 25 countries, for advancing education and training.

ORDINE Francesco is co-founder and vice president of Associazione Akira. With 10+ years of experience in the Third Sector, he is a trainer experienced in non-formal education, gamification and game-based learning.

About partner organisations

TEAM4Excellence (T4E) is a Romanian association aiming to improve the quality of life through education, research and consulting activities. To address societal challenges, they provide learning opportunities and career advice for social inclusion, development and employability of people, and equip trainers with key competences and skills to foster personal as well as professional development. Within 30+ EU-funded projects, the association produce and transfer innovation, experience and know-how through cooperation with domestic and international partners. By hosting events, training courses and conferences, T4E strengthen collaboration between people, support organizations and bridge gaps between generations. The wide expertise in management enables T4E staff to provide consultancy to large companies and SMEs using EFQM Model and Business Model Canvas.

Akira is a non-profit and non-governmental organization founded in January 2017 in Naples (Italy). In the past 3 years, the organization reached over 3.000 youngsters (mainly secondary school and university students, young adults and young people Neither Employment Nor in Education or Training) and about 500 trainers, educators and youth workers, through workshops, debates, seminars and conferences on themes that vary from bullying and gender violence to personal development and entrepreneurship. The association works in partnership with non-profit organizations the at regional, national and EU level and public institute at local level, by promoting synergies and cooperation to promote and affirm the principles of solidarity, non-discrimination, equal opportunities, respect for the human being and social inclusion, the right to education, culture and lifelong learning.

Konya Provincial National Education Directorate (KMEM) is a state institution in charge of the planning and coordination of all kinds of educational and training activities in preschool, primary, secondary and adult education in Konya. Konya Province has 31 districts with 2.654 schools, 485.893 students and 33.770 teachers in total. Konya İl MEM is an umbrella organisation for all these. We are a big family. Konya İL MEM's mission is to ensure to boost of efficiency and productivity of associated institutions of employees and pleasure of labour and service fields; to develop the education teaching process by following modern innovations and advances, by carrying researches, to improve and to implement laws and other regulations through the general goals and fundamental principles of National Education System in Konya Province. We hold a variety of in-service training courses for our staff, students and young workless people to enhance the education quality of our city and to ensure to be trained the students the teachers that are innovators and followers of the modern formal, informal and non-formal education-teaching methods very closely. We as trainers and educators believe that it is our crucial duty to provide new opportunities to young generations to create a better world.

Carol I Commercial College (CCVET) was established in 1920 and it is situated in the centre of Constanta, Romania. It is the best commercial education institution in the South East region of Romania and it has more than 850 students and 60 teachers. The school follows a curriculum decided by the Ministry of National Education. The courses focus both on Science and Economic Studies, but the teaching of foreign languages is also considered essential. Our students are trained in the following areas: tourism, administration, accounting, commerce and culinary art. They are involved in various extracurricular activities (ecological workshops, trips) and very interesting curricular activities (practical activities, culinary exhibitions, promotional workshops and business classes). Our school is making progress with project-based learning, with the help of social clubs and debating clubs, students are interested in art, theatre and poetry. They are usually involved in competitions, exhibitions and social activities. In order to promote the competencies within the educational European Frame, we aim to make a difference in our region.

References

Anderson, L. W. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. New York: Longman.

Biworldwide. (2022). Game mechanics and game dynamics. Retrieved from https://www.biworldwide.com/gamification/game-mechanics/

Bloom, B.S. (1956) Taxonomy of Educational Objectives, Handbook: The Cognitive Domain. David McKay, New York. https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/

FAO. (2013). Good practices at FAO: Experience capitalization for continuous learning.

FAO. (2015). Retrieved from Good practices template.

Harlen, W., Gipps, C., & Broadfoot, P. &. (1992). Assessment and the improvement of education. The Curriculum Journal, 215-230. doi:10.1080/0958517920030302

Iskander, M., & Vikram, K. a. (2010). Technological Developments in Education and Automation. Springer Science and Business Media. doi:10.1007/978-90-481-3656-8

Jabbarifar, T. (2009). The importance of classroom assessment and evaluation in educational system. (M. INTI University College, Ed.) Proceedings of the 2nd International Conference of Teaching and Learning (ICTL 2009), 1-9.

Kapp, K. (2012). The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education.

Kim, Y.-S. &. (2019). Assessment to Inform Instruction: Formative Assessment. Washington, D.C.: USAID.

Lambdasolutions. (2018). Retrieved from Achieving Your Learning Objectives Using Effective Gamification: https://www.lambdasolutions.net/blog/achieving-learning-objectives-using-effective-gamification

Rukundo, A. &. (2010). Effective Test Administration in Schools: Principles and Good Practices for Test Administrators. AJOTE - African Journal of Teacher Education, 1, pp. 166-173. Retrieved 2021, from https://www.researchgate.net/publication/305289634_Effective_Test_Administration_in_Schools_Principles_and_Good_Practices_for_Test_A

Schnurr, M. &. (2021). Simulations and Student Learning. University of Torronto.

Stevens, D. &. (2013). Introduction to rubrics: an assessment tool to save grading time, convey effective feedback, and promote student learning. Sterling, Va. : Stylus.

Cuadrado, Alfonso. Gamificación educativa (https://urjconline.atavist.com/gamificacion-educativa)

Equipo Campuseducacion.com. Modelo, método, metodología.https://www.campuseducacion.com/blog/recursos/articulos-campuseducacion/modelo-metodo-metodologia-terminologia-emplear/?cn-reloaded=1

Mateos, Sara; Gómez, Clara Libro Blanco de las mujeres en el ámbito tecnológico. Ministerio de Economía y Empresa de España

Gamificación. http://www.dynamicgc.es/gamificacion/

Educación 3.0 Recursos biología para Secundaria y Bachillerato https://www.educaciontrespuntocero.com/recursos/recursos-biologia-secundaria-bachillerato/

BOXLIGHT mimio. La gran guía de STEM. https://www.culturaydeporte.gob.es/dam/jcr:44a0831d-c0c1-4496-896d-ad57f39f03ce/lagranguiadestem-bla.pdf

Campos, Sara. Claves para la gamificación: Octalysis. https://edintech.blog/2018/04/02/gamificacion-tipos-de-jugador-octalysis/

Fundación Riojana para la Innovación. Breakout Science. https://view.genially/5ffd5ca0c217200ce77d3575/game-breakout-scape-room?fbclid=IwAR3A9T4cIqYIm-crTJvuiForiHvy0Me4AOE7b-ALR-iA022YhzPQ8lo_t4Q

Exploratorium. The tinkering studio. Chain reaction. https://www.exploratorium.edu/tinkering/projects/chain-reaction

CONTACT

https://www.facebook.com/TrainingClubT4E

https://www.instagram.com/trainingclub.eu/

https://trainingclub.eu/innovet/

+40 723 194 474

office@team4excellence.ro

Co-funded by the
Erasmus+ Programme
of the European Union