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TRAINING METHODOLOGY FOR THE TEACHER





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SUMMARY AND JUSTIFICATION

ZERO_WASTE is a project whose main objective is to **promote social inclusion of rural areas** in the field of **education with contents related to reduction of food waste**, as well as to **improve the professional development of teachers** through the creation of an educational gamification tool with scientific content.

*According to the Food and Agriculture Organization of the United Nations (FAO), approximately **one third of the global production of food for human consumption is lost or wasted every year**. This is equal to 1.3 billion tonnes of food. In the European Union (EU), it is estimated that food waste is around 89 million tonnes, which represents 20% of the food produced in the EU with an associated cost of 143 billion euros. This situation is ironic in a world in which over 800 million people are suffering from malnutrition and around 36 million people can't afford a quality meal once every two days.*

Halving waste food is one the commitments assumed by the countries that are part of the United Nations (UN) in 2015, after the approval of the 2030 Agenda for sustainability and development with the purpose of ending poverty, protecting the planet and ensuring prosperity for everyone as part of a new sustainable development. Specifically, the Sustainable Development goal number 12 regarding responsible production and consumption includes the target 12.30 "By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses."

However, **the fight against food waste is a shared responsibility of society as a whole**. At an individual level, the consumer, as a final receptor of food, must also contribute to that end and it is fundamental that citizens are aware of the social and environmental implications of every decision they take when buying and consuming, change their attitudes and acquire responsible consumption habits. It is essential not to forget the importance of this stage in the food chain, as it is in households where most of the waste is produced (42%).

ZERO_WASTE is a Project that is born to address this problem from joint actions through education.



TRAINING METHODOLOGY OBJECTIVE

It is essential that **citizens** are aware of the social and environmental implications of all the decisions they take when buying and consuming, changing their attitudes and acquiring responsible consuming habits.

This product's objective is to develop an **innovative training methodology for teachers** whose main objective is to **support the teaching work** to accomplish higher educational achievements and abilities of quality teaching.

ZERO_WASTE is mainly aimed at:

- **Rural areas:** This project seeks to contribute to break the gap between rural and urban areas giving opportunities to access knowledge.
- **Adult education** by providing **didactic formation tools** based on gamification and using investigation methodologies based in evidence as a starting point to promote critical thinking.



ZERO WASTE METHODOLOGICAL PRINCIPLES

The **methodological principles** are the **theoretical and scientific basis** that support this formative program of Zero Waste.

One of the most relevant aspects when establishing the methodology about the teaching and learning method is choosing the different teaching modalities and methods that are going to be used for the students to acquire the required learning.

The **teaching method** must be specified in a variety of modes, ways, proceedings, strategies, techniques, activities and tasks for teaching and learning and their role requires of a teacher part above the “knowledge transmitter” to turn into a “problem formulator, situation causer or path architect”.

That is why the content is developed based in two orientations:

Gamification: Is a learning technique that brings games mechanics to the educational-professional field with objective of achieving better results, either to absorb better some knowledge, improve an ability or to reward specific actions, among many other objectives.

Learning based in knowledge: It is an active methodology that teaches students to think, reason, take decisions and construct their own learning through working the syllabus lessons. The objective is trying to make students acquire the syllabus knowledge while they develop skills and abilities related with thinking and can put them into practice in the future in an autonomous way.

This guide is designed to orient teachers in gamification apart from introducing the fundamental contents of the project.



GAMIFICATION

INTRODUCTION

The appearance of new active teaching methods that mean a work proposal in which creativity, critical thinking and motivation play a fundamental role and students turn into the centre of their own learning, being aware of the fact that learning is on their hands.

That is why this tool tries to use structures and elements belonging to game design in the teaching methodologies of the Zero Waste project.

The main reasons are:

- Trigger motivation of participants managing to accomplish the fundamental objective of the project. It makes their interest to arise and the learning experience to be more attractive. That is how it is managed to step from a passive learning to an active interest for the matter.
- It can be combined with other methodologies: It is flexible enough to combine with other teaching methods, so that participants can learn in a very active way (both individually and in teams)
- It allows feedback.

“Gamification is using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems.”

The Gamification of learning and instruction

Karl M. Kapp



ELEMENTS BELONGING TO GAME DESIGN

As commented previously, gamification is a tool that seeks to incorporate game-like structures and elements into non-gaming environments and in different contexts.

As a starting point, we are going to differentiate two similar concepts that can lead to misunderstanding:

- Serious games: They are games or video games created specifically for another purpose besides play, such as simulations, advertising games and Edu gaming or educational games.
- Game-based Learning: It consists of incorporating games or video games into the didactic activity as a complement to regular teaching.

Although along with this guide, we occasionally explore some of these resources:

- Gamification is not creating or using games and video games.
- Even though we can use the support of ICT, gamification does not imply using any specific digital tool or software.
- Gamification is not only using technology, it's a didactic methodology.

The elements belonging to game design which are the base of this new methodology: MDA (Mechanics, Dynamics and Aesthetics framework).

Mechanics

Game mechanics are the rules, actions, and objectives that are used to make games fun or challenging. They are the triggers for the action of building, exploring, running, winning ... that would answer to what should be done? In short, what in education is known as methodological strategies:

Three basic mechanics stand out for their popularity and presence in games, they are known as PBL; Points, Badges and Leader boards:

- Points are numerical values that are used to direct participant actions towards a specific goal. The point system should be established from the beginning and be consistent. In our methodology, we are going to highlight **experience points** that act as a measure of the learning experience.



- Badges are a system of rewards that are obtained by completing various tasks. The effort must be according to the reward.
- Leaderboards: This element is essential in any gamified system. The leader boards must be visible and the way to get the points must be clear and simple, besides, it allows social comparison that leads to a range of competitive attitudes.

Dynamics

Dynamics are the effect, the motivation and the desires that we want to achieve in the participants. They allow to assume a challenge and test physical or intellectual abilities to overcome it. They try to satisfy the intrinsic motivation, such as the desire for reward, status, self-expression, achievement or competition

Some of the most used dynamics in games are:

- Reward. Rewards are something of value given for some kind of action.
- Status. Status is the acquisition of recognition and prestige by passing a series of obstacles and scores.
- Achievement. Their most satisfying reward is the recognition of their achievements.
- Competition. Competition is comparing our performance to that of others.
- Altruism. Altruism is caring about the welfare of other people without expecting something in return.
- Feedback. Feedback lets players know what their progress is. The participant shows a series of attitudes during the game that allows us to know if a modification or correction of the elements is necessary.

Emotions

The aesthetical part is necessary, as it helps arising attention and the interest of participants. The story on which the game is based and its duration is a very important point for its development that allows the introduction of challenges of different complexity to develop skills and abilities.

For the response to be positive, it is important to remember that the objectives proposed cannot be too easy or too difficult.

Una vez definidos los elementos básicos de la gamificación, es imprescindible conocer qué características pueden tener los jugadores que nos podemos encontrar, de esta forma, podremos conocer qué les gusta y motiva. Por ello, debemos saber diferenciar entre trabajo, tarea y reto.

Once the basic elements of gamification have been defined, it is essential to know players characteristics, as a way to know what they like and motivate them. Therefore, we must know how to differentiate between work, task and challenge.



All teaching activity implies a workload and type of work for the student.

The task is usually a type of work imposed by a person and whose performance is linked to external objectives that do not allow the participant to measure or express their personality.

However, the challenge involves assuming an objective that is perceived as a challenge for ourselves, of which we don't know if we can do it or not, but this situation stimulates us because it is linked to a sense of novelty, testing and overcoming. The challenge has set rules and objectives, but it is not a narrow path from which we cannot get out, but rather establishes a certain margin of freedom and creativity that will allow us to choose personal and unique solutions.

Effective gamification must transform tasks into challenges that make the student feel ready to perform it rather than an imposition to feel tempted by the challenge, and, therefore, surrendering to it with the feeling of doing it voluntarily, which will inspire their pursuit for an achievement.



GAMIFICATION EXAMPLES

Here are 5 examples of excellent use of gamification in different contexts of daily life.

Business context

HR managers use gamification to manage projects and motivate their employees to meet their goals and objectives.

An example of this is the Spanish bank BBVA, which has implemented a [gamification strategy](#) to promote the use of online banking. Customers accept challenges and perform actions on the bank's website, so they win points and prizes.

Its objective is to familiarize its customers with online banking to free up branch offices, which are often crowded.

Loyalty programs

E-commerce can build a good relationship with its customer's thanks to gamification. This allows them to offer loyalty programs that go beyond the classic models, making them feel more motivated to buy.

For example, [Starbucks](#) launched a campaign to promote the consumption of its products through a points card: the more products consumed, the more stars accumulated, and the more stars accumulated, the user goes up in level and gets rewarded.

A simple idea that emphasized a level up reward system, a fundamental aspect of the game dynamics.

Health & wellness

Gamification has also been widely used in the field of health and wellness. Campaigns have been created to instill a healthy lifestyle, to sensitize people about certain diseases, or to motivate citizens to take care of themselves, either through the practice of sports activities or by the adoption of a healthier diet.

In 2015, the Spanish Society of Cardiology (SEC) launched [a challenge for health professionals](#) in the form of a league, in which doctors periodically published clinical cases of cardiology and multiple-choice questions.



The participants obtained scores through the answers until reaching a final phase that ends with an awards ceremony.

Education and entertainment

This is perhaps the most widespread area of application for gamification. This strategy has proven to be very effective in training students and encouraging them to achieve their academic and athletic goals.

Many running fans are familiar with [Nike +](#), an application in which the user competes against himself and the Nike community, by recording speeds, distances and calories burned during physical activity.

Social media

Social networks themselves are a clear example of gamification applied to entertainment, from immediate rewards with "Like" or "Retweet" to progress bars when filling out profiles. How many elements related to gamification can you identify?

And if you still need more examples, watch this [video](#).



STEPS TO CONSIDER ABOUT GAMIFICATION

For this methodology applied to the Zero Waste project to be successful, it must be planned correctly. Once we know the basics of gamification, it will be easier for us to incorporate some of those elements into our classes.

Here are some key steps to prevent failure during the implementation:

1. To define the goals and objectives applied to the project

We must establish which knowledge skills or attitudes we want our students to acquire through the activity. You can also have the purpose of promoting certain behaviours, developing certain skills or competences. It is important to define the objectives before starting to plan the gamified activity.

Lessons should include hands-on inquiry and open-ended exploration. A teacher's lesson content should first guide students and then allow them to control their ideas and design their investigations to apply newfound knowledge. In that way, critical thinking skills are developed.

2. To transform learning in gamified activities

It consists of turning the traditional learning process into a playful and fun approach. With focused activities, creativity will lead to innovation.

Remember to turn tasks into challenges. The challenge involves assuming an objective that is perceived as a challenge, of which the students don't know whether they can do it or not, but this situation stimulates them because it is linked to something new, such as a test and an improvement.

3. To propose a specific challenge

Remember that the aims and objectives are clear so students know how they can achieve them. The final goal must be understood correctly, because sometimes when making concepts more complicated, students lose their motivation and interest since they don't have a clear idea about what they are getting for their work. For this reason, it is advisable to define a specific and motivating challenge that students know and keep in mind at all times, before, during and after the development of the activity.

Also, focus on real-world facts and problems.



4. To establish game and teamwork rules

The rules serve to reinforce the objective of the game, but they also prevent chaos from taking over its development, define behaviours, promote fair competition or facilitate certain events or crossroads that may interest you.

5. To award with individual or collective medals and rewards

The reward is a fundamental part of gamified activities. There are gamification systems that are based only on establishing scores or awards that are applied in the traditional development of the class and serve as a tool to assess the knowledge and understanding of content, but also the behaviours, the ability to work in a team, classroom participation, extra work, etc.

You can create rubrics that enhance the use of each student's skill set during a group assignment, rather than simply checking that a challenge has been completed.

6. To propose a competition

Healthy competition is an essential element. Direct and individual confrontation is not necessary, you can go for cooperative games.

Also, try to redesign your lesson plans to include failure as a necessary part of the learning process. Failure creates an opportunity to develop other attitudes such as perseverance and other equally important skills when solving problems.

7. To build levels of increasing difficulty

The objective of a gamified activity is based on the balance between the difficulty of a challenge and the satisfaction obtained from overcoming it. Therefore, as the student progress and practices, the level of difficulty must increase to adapt to the knowledge acquired. In this way, the student's motivation to continue playing and improving themselves.

8. To pay attention to flow theory

In gamification, the state of flow can be defined as “a state of optimal experience characterised being fully focused and engaged in an activity”. If we achieve this when teaching, we ensure success in understanding the concepts to be taught.

9. Create a narrative thread

The table of contents of a syllabus are usually divided into topics, categories, chapters, section, subtopics, etc. and choose to mark the temporary thread of the course according to:



- Chronology. We distribute the contents by their historicity, we start with antecedents from a certain point to reach the present and even end with prospects for the future.
- The evolution from general to particular. It is the line that goes from the theoretical frameworks to particular cases.
- The typologies. Classifications of the types of contents according to their common characteristics.
- The analytical description of contents. It is the typical syllabus where we show the breakdown of parts of content, their relationships and interdependencies.
- The technical (not technological) description of a task. It consists of a set of resources and procedures to perform a task. A type of syllabus suitable for experiential learning.

In gamified activities, though they may contain some of these structures, the main thing is to develop any type of content in the form of a story or playful experience to achieve the objective, by carrying out a set of actions by one or more characters in a conflictive framework and they aspire to resolve. This is essentially the narrative.

Therefore, we will have to integrate the teaching content into a narrative environment for play and learning, which will allow:

- Giving a global objective to the subject or task to be gamified.
- Letting students be the protagonists in their learning.
- Linking teaching tasks to the achievement of the final goal which will make sense to students.
- Show the objective as a challenge and thereby boost motivation.



BASIC PRINCIPLES RELATED

In general, the idea of the theoretical content is focused on food waste and its implications on the global and local context, as well as awareness of the responsibilities, good practices oriented to prevention and responsible consumption and methods for reduction, recycling and reusing.

That is why learning based in knowledge is an active methodology that teaches students to think, reason, take decisions and construct their own learning through working the lessons of the syllabus. Therefore, the objective intends that students acquire the syllabus knowledge while they develop skills and abilities related with thinking and can put them into practice in the future autonomously.

In this section the basic concepts that support the base for the Zero Waste project are defined so that they can be gamified according to the methodology presented in this guide.

Food: any substance –whether processed, semi-processed or raw – that is intended for human consumption. It includes drink, and any substance that has been used in the manufacture, preparation or treatment of food.

Food chain: Is the complete process of food production and it is divided into four parts (Agricultural production, processing and manufacturing, distribution and consumer)

Food loss refers to food that spills, spoils, incurs an abnormal reduction in quality or otherwise gets lost before it reaches the consumer. It typically occurs at the production, storage, processing and distribution stages of the food value chain.

Food waste refers to food that is of good quality and fit for human consumption but that is not consumed because it is discarded before or after it spoils. It occurs most at the consumer stage in households.

Food losses: Reduction of the amount of food originally destined to human consumption through the stages of the food chain.

Habits: context-behaviour associations in memory that develop as people repeatedly experience rewards for a given action in a given context. Habitual behaviour is cued directly by context and does not require supporting goals and conscious intentions



Motivation (to prevent food waste): A person's willingness to perform actions that reduce the likelihood or amount of food waste being generated. Relevant aspects of motivation are attitude, awareness, and social norms

Sustainable Development Goals: are a collection of 17 interlinked global goals adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. They recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability

Food information means information concerning a food and made available to the final consumer by means of a label, other accompanying material, or any other means including modern technology tools or verbal communication.

Food redistribution is a process whereby surplus food that might otherwise be wasted is recovered, collected and provided to people, in particular to those in need.

Labelling means any words, particulars, trademarks, brand name, pictorial matter or symbol relating to a food and placed on any packaging, document, notice, label, ring or collar accompanying or referring to such food..

Nutrient reference values (NRVs) are a set of values used in nutrition labelling derived from authoritative recommendations for daily nutrient intake. These recommendations are based on best available scientific knowledge of the daily amount of energy or nutrient needed for good health.

Open life is the period of time during which a food will remain safe and/or of a suitable quality for consumption after the primary product packaging has been opened and it is stored as instructed.

Ready-to-eat food (RTE) means food intended by the producer or the manufacturer for direct human consumption without the need for cooking or other processing effective to eliminate or reduce to an acceptable level microorganisms of concern.

Shelf-life is the period in which a food remains safe to consume and/or retains its quality in reasonable foreseeable distribution, storage and usage conditions.

Traceability means the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution.



Circular economy: an economic proposal to close the cycles of production and consumption as much as possible, contributing to reduce consumption and emissions and to get a sustainable economy.

Sustainable food chain: food supply chain organization so as all its stages avoid the depletion of natural resources and the generation of emissions and waste in order to maintain an ecological balance in all **the steps of the chain.**

Food processing: Transformation of agricultural products into food, or of one form of food into other forms.

“Best before”: refers to quality and means that the food will be at its best before the date given. After this date, although it might not be at its best, it will still be safe to eat.

“Use by”: refers to safety and means that you must not eat food past the ‘use by’ date.