App.Mod.E. – Apprenticeship Model for developing Entrepreneurial skills

Trainers' Guide

Apprenticeship Model

for developing

Entrepreneurial skills

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Contents

The "Trainers' Guide" is a guide for trainers in VET organizations and companies that aims to support the design, implementation, management, evaluation, and validation of the apprenticeship model.

The main objective is to offer you a set of instructions, suggestions, and successful examples in partners' countries (France, Greece, Italy, Bulgaria, Spain and Romania) to enhance the apprenticeship programme among new coming enterprises. This guide will help you understand the notion of entrepreneurial spirit and allow you to develop the capacity to transfer the entrepreneurial spirit to apprentices. This guide will also demonstrate the wide applicability of the apprenticeship model to every sector and country.

The trainers' guide is composed of a main text consisting of six chapters and two annexes.

In the first chapter, we present you in brief the **apprenticeship model,** explaining its objectives, the involved parties and their responsibilities.

The second chapter is about the entrepreneurial education and a short presentation of the *Entrepreneurship Competence Framework (EntreComp)*

The third chapter is dedicated to the learning outcomes, based on the Entrepreneurship Competence Framework *(EntreComp)* and the assessment of learning outcomes.

The fourth and fifth chapters explain the two core learning methodologies that are used in the apprenticeship model: **Problem-based learning** and **Game-based learning**.

The last chapter **"The App.Mode: Integrating gamification and PBL approach"** provides a concrete methodology, step by step, to develop an apprenticeship model based on the integration of PBL approach and gamification elements. In this chapter a successful apprenticeship stories derived by the experimentation phase and some successful case studies. It provides concrete examples of the application of the model within partners' countries, emphasizing on their challenges and recommendations.

At the end, you will find two Annexes:

Annex 1: The **learning outcomes** of the three levels of proficiency (foundation, intermediate, advanced) in the *Entrepreneurship Competence Framework (EntreComp)*.

Annex 2: A **template** for enterprises/VET trainers to follow for the apprenticeship programme design.

Aim and objectives

The apprenticeship model is meant to be a pillar for upper secondary and higher VET students and its purpose is to support them to acquire entrepreneurial mindset and competencies.

The direct target group are VET trainers and companies involved in apprenticeship programmes, yet, the final beneficiaries are students enrolled in upper secondary and higher VET schools and centers.

Entrepreneurship refers to the ability to turn idea into action and it includes three main competence areas, based on the Entrepreneurship Competence Framework (EntreComp):

Into action
- Taking initiative
- Planning & management
- Coping with uncertainty & risk
- Working with others
- Learning through experience

Resources
- Self-awareness
- Motivation & perseveranve
- Mobilising resources
- Financial & economic literacy
- Mobilising others

Ideas & opportunities
- Spotting opportunities
- Creativity
- Vision
- Valuing ideas
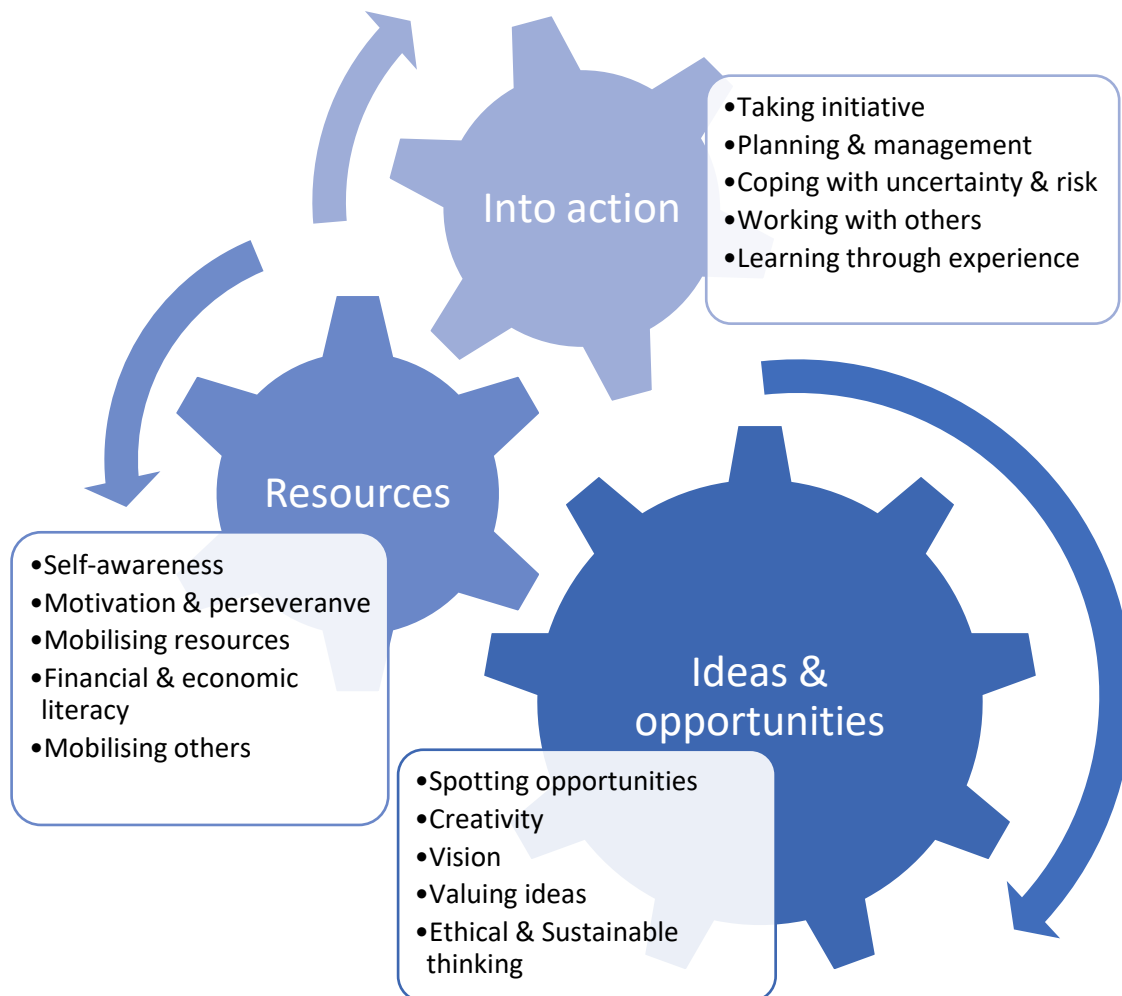- Ethical & Sustainable thinking

Figure 1. Main competence areas based on the Entrepreneurship Competence Framework

The entrepreneurial mindset is not a personal predisposition but can be developed through learning and experience, and can be achieved with the education system.

The model for apprenticeship implementation is oriented to the acquisition of entrepreneurial mindset and competences and is based on the adoption of problem-based learning methods with gamification elements. These two innovative learning techniques build a different mental dispose to innovation and creation.

1. The **problem-based learning (PBL)** is the core learning methodology that is going to be used. This learning approach develops crucial awareness and connections with real life. It allows apprentices to create and run a business, be tested by challenges and setbacks, take leaps and reap rewards, all in a dynamic, rapidly changing environment that is completely risk-free. A short description of the methodology is:

   Each apprentice has to solve a real-life open-ended problem and has at disposal some resources and support. The learner has to come up to a viable solution, following a learner-centered learning process, during which, will develop entrepreneurial skills in the three competence areas. The level, duration and other parameters of the challenge are defined by the trainers, depending on different parameters, like the duration of apprenticeship, the specific vocation, the level of the training etc. The proposed challenges need to be relevant to the needs and expectation of the individual learners, challenging and engaging of appropriate difficulty and complexity.

2. The **gamification methodology** is a complimentary approach that is proposed in the apprenticeship model. Gamification elements are used to create motivation and engagement, i.e. constrains (limited resources, time), rewards (achievement badges, extra resources), ownership (autonomy, choices), luck (new opportunities and obstacles). Game elements are categorized and described in the apprenticeship model, as well as methods to introduce them in a learning process together with specific illustrating examples.

Involved parties: benefits and responsibilities
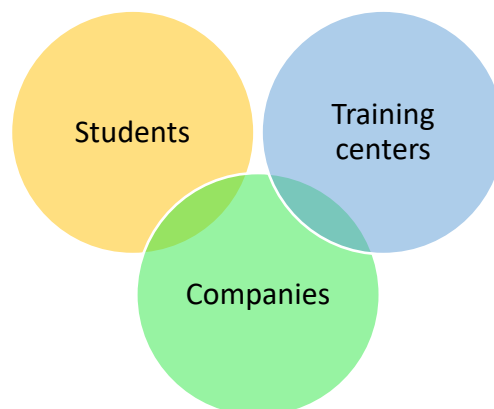
Figure 2. Involved parties in the apprenticeship programme

The parties involved are students, companies, and training centers, interconnected with each other with an agreement or a contract, detailing the training that will be carried out in the company in alternate periods to those of learning in college. This agreement outlines the obligations of all parties, including:

- The duration of the traineeship
- The facilities and amenities that need to be provided by the employer to safeguard the health and safety of the trainee.

The framework for the collaboration between the training centre and the company is established in accordance of the national, or regional, disposition in each partner's country.

Apprenticeships formally combine and alternate company-based training with school-based education and lead to a nationally recognized qualification upon successful completion. Generally, it may involve students attending apprenticeship programs, young people dropped out from school (with no diploma nor any qualification) or after their compulsory education, also adult job-seekers, and employees in the private sector.

It is a win-win scheme for all: the company, the learner and the society as a whole.

- Companies providing apprenticeships benefit from a net profit on their investment, either during the apprenticeship or soon after by employing a fully trained worker:
    - Apprentices can remain in the company after their graduation
    - Faster integration of graduates into company's work environment
    - Reducing the cost of external recruitment and internal induction
    - Opportunity to get to know future employees
    - Address the problem of inadequate skills supply
    - Lower future training costs
    - Higher productivity by hiring the former apprentices
    - Enhancement of company image and reputation
    - Positive impact on organization's performance and profitability

- VET students and apprentices learn valuable workplace skills in a professional environment, ensuring a greater degree of future employability:
    - Gain working experience
    - Develop professional skills
    - Get familiar with working conditions, hierarchy and regulations
    - Learn how to interact with co-workers and develop professional relationships
    - Make sure that they made the right choice of career

- There are several society-related benefits derived by the apprenticeship programmes:
    - Increased employability through more effective preparation of learners for the labour market and fostering the acquisition of soft and employability skills
    - Developing more relevant and integrated curricula at VET schools

- Higher inclusion in society, helps social integration and participation, particularly for vulnerable groups
- Improvement of intergenerational exchange
- High societal trust since governments, companies and citizens contribute to improve provision of opportunities and results
- Reduced youth employment
- Improved active citizenship.

In order to get the full benefits from this experience, all the parties must behave according their responsibilities.

Apprentice or trainee responsibilities:

- Observe the conditions of the agreement;
- Work toward achieving the qualification or statement of attainment stated in the training contract;
- Behave professionally and obey all workplace health and safety (including dress and equipment) and code of conduct workplace rules: not waste, damage or injure the property, goods or business of the employer;
- Follow all lawful instructions and undertake training and assessment as required under the training plan;
- Work toward achieving the competencies of the training plan;
- Keep the training record and produce this when requested (to who request it, which may be the employer, training organization, and/or the Department of Education and Training).

Employer responsibilities:

- Ensure a training contract is signed by the parties;
- Negotiate a training plan;
- Deliver training and provide the facilities, range of work and supervision;
- Provide entitlements;
- Discharge all lawful obligations, including those relating to workplace health and safety;
- Check the training record updated;
- Show, demonstrate and explain the apprentices the work;
- Watch, guide and correct the work performed by the trainees;
- Help the trainees understand the benefits of having such a job;
- Evaluate apprentices' activity during the apprenticeship;
- Provide general information to apprentices about company;
- Be in contact with the training center for common agreements.

Training tips with the purpose to get the most out of the apprenticeship:

- Support a good communication, giving clear instructions, taking the time to explain the correct way to do things, and providing regular feedback (both positive or negative)

- Maintain a comfortable and dynamic working environment;
- Make the tasks stimulating and challenging;
- Apply motivation techniques to the trainees;
- Be patient and open minded and answer to questions addressed by apprentices regularly;
- Try to understand the youth' needs, interests and feelings;
- Schedule and follow up an activity plan for apprentices;
- Show tolerance to differences in people and generation gaps;
- Encourage the apprentices and share your passion for the job.

Chapter 2. Entrepreneurial education and EntreComp framework

Entrepreneurship is viewed as the capacity to recognize and pursue opportunities in any environment. As such, it has an important role to play in all discipline areas, and can apply to both commercial and non-profit endeavours. Entrepreneurship education is about enabling the student to develop creativity, innovation and risk-taking skills, as well as an ability to plan and manage projects in order to achieve objectives. Essentially, Entrepreneurship is about taking initiative and turning ideas into action.

The *Entrepreneurship Competence Framework*, also known as EntreComp, aims to build a common understanding of entrepreneurship competence and offers a tool to improve entrepreneurial capacity of European citizens and organizations.

In order to stress entrepreneurship competence as the ability to transform ideas and opportunities into action, the main competencies are grouped under **three areas**: '**ideas and opportunity**', '**resources'**, and '**into action**'. These three competencies areas are tightly intertwined, and they comprehend **15 competencies** that, together, make up the building blocks of the entrepreneurship as a competence for all citizens. All these competences are interrelated and interconnected and should be treated as part of a whole.

The table 1[1], shows the entrepreneurship competencies and learning outcomes broken down into its constituent parts. Competencies are numbered for ease of reference and the order in which they are presented does not imply a sequence in the acquisition process or hierarchy: no one element comes first, and none of them is more important than the others.

The learner doesn't have to acquire the highest level of proficiency in all 15 competences or have the same proficiency across all the competences. Depending on the context of take-up, it is reasonable to expect that more emphasis may be put on some of the competencies and less on others, or else the competencies are streamlined to mirror an entrepreneurial process created to foster learning through entrepreneurship.

This can be seen as a starting point for the interpretation of the entrepreneurship competence, which over time will be further elaborated and refined to address the particular needs of specific target groups.

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[1] European Commission, EntreComp conceptual model, JRC Science for Policy Report, *EntreComp: The Entrepreneurship Competence Framework*, 2016.

Table 1. Entrepreneurship competencies.

Area	Competence	Hints	Description
IDEAS AND OPPORTUNITIES	Spotting opportunities	• Identify opportunities to create value.	• Identify and seize opportunities to create value by exploring the social, cultural and economic landscape. • Identify needs and challenges that need to be met. • Establish new connections and bring together scattered elements of the landscape to create opportunities to create value.
	Creativity	• Develop creative and purposeful ideas	• Develop several ideas and opportunities to create value, including better solutions to existing and new challenges. • Explore and experiment with innovative approaches. • Combine knowledge and resources to achieve valuable effects.
	Vision	• Work towards your vision of future	• Imagine the future. • Develop a vision to turn ideas into action. • Visualise future scenarios to help guide effort and action.
	Valuing ideas	• Make the most of ideas and opportunities	• Judge what value is in social, cultural and economic terms. • Recognise the potential an idea has for creating value and identify suitable ways of making the most out of it.
	Ethical & sustainable thinking	• Assess the consequences and impact of ideas, opportunities and actions	• Assess the consequences of ideas that bring value and the effect of entrepreneurial action on the target community, the market, society and the environment. • Reflect on how sustainable long-term social, cultural and economic goals are, and the course of action chosen. • Act responsibly.

RESOURCES	Self-awareness and self-efficacy	• Believe in yourself and keep developing	• Reflect on your needs, aspirations and wants in the short, medium and long term • Identify and assess your individual and group strengths and weaknesses. • Believe in your ability to influence the course of events, despite uncertainty, setbacks and temporary failures.
	Motivation and perseverance	• Stay focused and don't give up	• Be determined to turn ideas into action and satisfy your need to achieve. • Be prepared to be patient and keep trying to achieve your long-term individual or group aims. • Be resilient under pressure, adversity, and temporary failure.
	Mobilising resources	• Gather and manage the resources you need	• Get and manage the material, non-material and digital resources needed to turn ideas into action. • Make the most of limited resources. • Get and manage the competences needed at any stage, including technical, legal, tax and digital competences (for example through suitable partnerships, networking, outsourcing and crowdsourcing).
	Financial and economic literacy	• Develop financial and economic know how	• Estimate the cost of turning an idea into a value-creating activity. • Plan, put in place and evaluate financial decisions over time. • Manage financing to make sure my value-creating activity can last over the long term.
	Mobilising others	• Inspire, enthuse and get others on board	• Inspire and enthuse relevant stakeholders. • Get the support needed to achieve valuable outcomes. • Demonstrate effective communication, persuasion, negotiation and leadership.

INTO ACTION	Taking the initiative	• Go for it	• Initiate processes that create value. • Take up challenges. • Act and work independently to achieve goals, stick to intentions and carry out planned tasks.
	Planning and management	• Prioritize, organize, follow-up	• Set long-, medium- and short-term goals. • Define priorities and action plans. • Adapt to unforeseen changes.
	Coping with uncertainty, ambiguity and risk	• Make decisions dealing with uncertainty, ambiguity and risk	• Make decisions when the result of that decision is uncertain, when the information available is partial or ambiguous, or when there is a risk of unintended outcomes. • Within the value-creating process, include structured ways of testing ideas and prototypes from the early stages, to reduce risks of failing. • Handle fast- moving situations promptly and flexibly.
	Working with others	• Team up, collaborate and network	• Work together and co- operate with others to develop ideas and turn them into action. • Network. • Solve conflicts and face up to competition positively when necessary.
	Learning through experience	• Learning by doing	• Use any initiative for value creation as a learning opportunity. • Learn with others, including peers and mentors. • Reflect and learn from both success and failure (your own and other people's).

Source: The Entrepreneurship Competence Framework. 2016

Entrepreneurship as a competence is developed through action by individuals or collective entities to create value for others. Hence, entrepreneurial learning advances through two aspects:

1. Developing increasing autonomy and responsibility in acting upon ideas and opportunities to create value;
2. Developing the capacity to generate value from simple and predictable contexts up to complex, constantly changing environments.

As previously stated, there is not a linear sequence of steps that must be taken to become proficiently entrepreneurial. Instead, as it is visible in the progression model[2], the boundaries of individual and collective entrepreneurial competencies can be pushed forward, to achieve greater impact through value creating endeavours. This Progression Model aims to provide a reference for the development of proficiency starting from value creation achieved though external support, up to transformative value creation. It consists of four main levels: Foundation, Intermediate, Advanced and Expert. Each level is in turn split into two sub-levels, as illustrated in Table 2. At Foundation level, entrepreneurial value is created with external support. At Intermediate level, entrepreneurial value is created with increasing autonomy. At Advanced level, responsibility to transform ideas into action is developed. At Expert level, the value created has considerable impact in its reference domain.

These proficiency levels provide a way for the reader to look at the learning outcomes. It aims to be comprehensive and to offer a tool that can be adapted to different needs. It is not prescriptive and it does not suggest that all learners should acquire the highest level of proficiency in the competences, or that they should reach the same proficiency across all the competences. If the entrepreneurial learning experience targets the employees of a shoe-making district in a certain region, the programme could focus at an advanced level, for instance, in the development of proficiency in competencies like 'spotting opportunities', 'vision', 'mobilizing resources', 'mobilizing others', 'planning and organizing'. At the same time, it would be possible to achieve an intermediate level of proficiency in 'financial economic literacy'. It is essential to choose which skills prioritize depending on the needs of the learners. So, returning to the previous example, we can choose to prioritize the skill to understand the financial viability of their ideas, rather than the development of double-entry bookkeeping skills, which would require an advanced level of proficiency.

It has to be noted that entrepreneurial value creation and entrepreneurial learning can take place in any sphere of life.

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[2] European Commission, EntreComp conceptual model, JRC Science for Policy Report, *EntreComp: The Entrepreneurship Competence Framework*, 2016.

Table 2. EntreComp Progression Model.

PROGRESSION MODEL			
Foundation		**Intermediate**	
Relying on support from others		**Building independence**	
Under direct supervision	With reduced support from others, some autonomy and together with my peers	On my own and together with my peers	Taking and sharing some responsibilities
Level 1. Discover	**Level 2. Explore**	**Level 3. Experiment**	**Level 4. Dare**
Discover your qualities, potential, interests and wishes. Recognise different types of problems and needs that can be solved creatively.	Explore different approaches to problems, concentrating on diversity and developing social skills and attitudes.	Develop critical thinking and experiment with creating value, for instance through practical entrepreneurial experience.	Turn ideas into action in 'real life' and take responsibility for this.
Advanced		**Expert**	
Taking responsibility		**Driving transformation, innovation and growth**	
With some guidance and together with others	Taking responsibility for making decisions and working with others	Taking responsibility for contributing to complex developments in a specific field	Contributing substantially to the development a specific field
Level 5. Improve	**Level 6. Reinforce**	**Level 7. Expand**	**Level 8. Transform**
Improve your skills for turning ideas into action. Take increasing responsibility for creating develop knowledge about entrepreneurship.	Work with others, using the knowledge you have to generate value, dealing with increasingly complex challenges.	Focus on the competences needed to deal with complex challenges, handling a constantly changing environment where the degree of uncertainty is high.	Focus on emerging challenges by developing new knowledge, through research and development and innovation capabilities to achieve excellence and transform the ways things are done.

Source: The Entrepreneurship Competence Framework. 2016

Chapter 3. Methodology to define and assess learning outcomes

Methodology to define expected learning outcomes

"To relate previous knowledge to new knowledge", *"to relate theoretical ideas to everyday experience"*

Ramsden, 2003

Learning outcomes are specific and clear statements of what a learner is expected to learn and be able to demonstrate at the end of a learning process. They have an extremely important role to improve the quality and relevance of education and training. Once the goal for the apprenticeship has been established, it will be necessary to identify the information needed to meet the objective and which skills are needed to achieve the goal, as well as the right behavior to maintain to complete the tasks. They are desired targets, expression of intentions, therefore, it is necessary to form a continuous dialogue between intended and actual outcomes, seeking to improve stated expectations (intended learning outcomes) based on the actually achieved outcomes.

They are used as a common reference point in the *European Qualification Framework*[3] in order to facilitate comparison and transfer of qualifications between countries, systems and institutions. The *European Qualification Frameworks* defines eight level of qualifications, from the basic level 1 to the advanced level 8, in order to improve the clearness and transferability of qualifications.

Learning outcomes statements help to clarify programme and qualifications intentions and make it easier for those involved to work towards these expectations. They bring **benefits** for the **learner**, since they clarify what s/he is expected to know, understand, and be able to do at the end of a learning sequence or a programme; for the **instructor**, since they will help him/her to orient the programme, to select methods, and to orient the learning process; for **labour market**, since they clarify what are the skills needed and to respond to these in a relevant way; for the **training institution**, since they provide an important reference point for quality and provide important input to the continuous review and development; and for the **assessor**, since learning outcomes approach support assessment by clarifying the criteria for success/failure and performance. Their relevance lies in the transparency they offer, allowing to verify the match between society's need and the qualifications offered within education and training. Not all learnings, however, can be fully defined in learning outcomes. The learning process can rarely be fully predicted and described; it has intended as well as unintended, desirable as well as undesirable outcomes.

Learning outcomes need to **focus always on the learner** and on what s/he is expected to know, be able to do, and understand, in terms of knowledge, skills, and competencies.

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[3] http://www.cedefop.europa.eu/en/events-and-projects/projects/european-qualifications-framework-eqf

Table 3. Basic structure of learning outcomes

Learning outcomes				
Actions	**Performance criteria**	**Knowledge**	**Skills**	**Competencies**
What the learner will be able to do at the end of the course.	How the learner will demonstrate his/her knowledge, abilities, and competencies.	**Theoretical** and/or factual,	**Cognitive** (involving the use of logical, intuitive, and creative thinking) or **practical** (involving manual dexterity, and the use of methods, material, tools, and instruments).	**Responsibility** and **autonomy**.

Writing learning outcomes requires **reflection on the purposes addressed**, the interests involved, and the implications of available alternatives. They have to be defined within a broader context where **learning inputs** are considered, and written in ways which **reflect different interests**. They can be used to establish descriptors of qualification frameworks, define qualifications, design curricula, assessment, etc. So, the priority would be given, for instance, to tangible outcomes or to broader leaning outcomes depending on different interests and on expected results.

The experiences from the achieved outcomes should be used systematically to improve statements of intentions, as for example found in qualification standards and curricula. It will be important to consult experiences from others throughout the process, however, learning outcome statements should be **authentic** and reflect the particular context being addressed.

The relevance of learning outcomes statements to the learners depends on their ability to specify and balance general knowledge subjects with occupation-specific skills and transversal competencies. This is possible through a constant dialogue between vocational education and training stakeholders. Learning outcomes should be written with **simplicity** and **concision**, limiting the number of statements and avoiding too much detail. While learning outcomes **provide an important orientation** for learners and institutions, they **do not aim fully to predict and control the learning process**.

This way it will be possible to foster learners and trainers to relate to the statements, to make it easier to plan teaching, to facilitate learning, and eventually to carry out assessments.

It is possible to use **national qualifications frameworks** (NQF) as a good reference resource to define and write learning outcomes, aiding consistent interpretation and application of learning outcomes. The role of the level descriptors in a framework is to identify the focal point of the programme or qualification, not to rigidly force all statements to comply with one particular NQF level.

Writing learning outcomes

As previously explained, learning outcomes are statements that describe significant and essential learnings that learners have achieved, and can reliably demonstrate at the end of a course. For this reason, learning outcomes should/must be expressed in a manner that refer to individual learners in the third person and should/must start with the statement:

"The learner will… (Be able to; define; identify…)

Table 4. Basic structure of learning outcomes - Example

Basic structure of learning outcomes			
…should address the learner.	…should use an action verb to signal the level of learning expected.	…should indicate the object and scope (the depth and breadth) of the expected learning.	…should clarify the occupational and/or social context in which the qualification is relevant.
Examples			
The learner…	Will be able to take action…	…dealing with problems…	…that affect his/her surroundings.

Source: Cedefop. 2017

Learning outcomes in the European Qualification Framework

As previously stated, the *European Qualification Framework* is "a bridge between national qualification systems[4]" and, therefore, it is essential to design learning outcomes according to the eight reference levels in order to make them more understandable across different countries and systems.

Table 5 provides some examples of learning outcomes according to the different EQF levels (from level 3 to level 5) and also some key verbs and actions related to each level, taking into account the *full Entrecomp framework* noted/presented at the end of this chapter.

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[4] http://www.cedefop.europa.eu

Table 5. EQF descriptors for learning outcomes

EQF descriptors for learning outcomes				
	The learner	**The action**	**The object**	**The context**
EQF level 3	The learner will be able to…	- Explain - Identify - Judge - Discuss	- Completion of tasks - Opportunities - His/her strengths - The principles	Adapting own behavior to circumstances in solving problem
EQF level 4	The learner will be able to…	- Decide - Produce - Take responsibility - Manage - Supervise - Evaluate and improve	- Routine work of others - Work activities - Value-creating activities - Short-term goals	Within the guidelines of work contexts that are usually predictable, but are subject to change
EQF level 5	The learner will be able to…	- Face obstacles; take action - Apply - Encourage others - Define	- Personal performance and others' - Changes - Decisions - Priorities	In contexts of work activities where there is unpredictable change

Source: Cedefop. 2017

Learning outcomes in the EntreComp Framework

The EntreComp framework is made up of three competence areas: Ideas and Opportunities, Resources, and Into Action. Each of these areas has five competencies, spread across an 8 level progression model, which includes learning outcomes. On table 1 is a list of the competencies defined in this framework.

Entrecomp provides a framework to write learning outcomes in specific areas of entrepreneurship and different progression levels. Learning outcomes based on Entrecomp framework and categorised into the first three levels (foundation, intermediated and advance) are available in Annex 1.

The trainer will select the learning outcomes from the table in Annex 1 or develop different learning outcomes according with their students specific needs.

Assessment of learning outcomes

Assessment criteria

Having identified the learning outcomes, the next step is to define **assessment criteria** and methods to find out if apprentices have achieved these intended learning outcomes. Clear designed assessment tasks allow apprentices to demonstrate achievement of learning outcomes. One of the challenges of effective

assessment is to ensure that there is a close alignment between the learning goals, the activities aimed to achieve the outcomes, and the assessment tasks used to assess whether learning goals have been met. Assessment must be aligned to learning goals which focus not only on content knowledge but also process and capabilities.

It is important to define:

- **Who** will assess the apprentice: the VET teacher, a workplace instructor (or an employee), and the apprentice (for self-assessment). The combination of these assessors would ensure high quality of the assessment process.
- **How** learning outcomes will be assessed, in **what context**, and **where**: it should be clear from the very beginning what the assessment approach will be and what records should be kept. The methods are selected based on what is most suitable and relevant for the assessment of each learning outcome. Any restrictions and obstacles should be taken into consideration.
- **When** assessment will take place: apprentices should be informed about what to expect.
- **What** procedures are in place to ensure the quality of assessment: it is important to apply some quality procedures and select transparent criteria that will ensure the validity and reliability of the assessment results.

Key points to consider when writing assessment criteria
- Each learning outcome should be associated with one or more assessment criteria
- Assessment criteria should/must specify the standard that the apprentice is expected to meet to demonstrate that the learning outcomes related to that have been achieved.
- They should be detailed enough to support reliable, valid, and consistent judgments that a learning outcome has been achieved, without creating an excessive burden for apprentices and assessors.
- They should not include any explicit reference to the methods or instruments of assessment to be used.

Assessment methods

While assessment criteria specify the standard a learner must meet; the assessment methods are the instruments, strategies, techniques, and tools used to provide evidence that the standard has been met[5].

It is important to use multiple methods for the assessments: first of all because it may be difficult to assess using only one method; and also because through only one method we will be able to see only one part of apprentice's achievement. Therefore, for each learning outcome should be used a combination of **direct and indirect assessment methods**. The first ones ask learners to **demonstrate their learning**, while the latter ones ask them to reflect on their learning.

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[5] Qualifications & Credit Framework, *Guidelines for writing credits-based units of assessment for the Qualifications and Credit Framework*, 2010, www.linkinglondon.ac.uk

When selecting which assessment methods use, must be considered those that will provide the most useful and relevant information for the purpose identified within the programme. Take also into account what questions need to be answered, the availability of resources, and the usefulness of the results.

There are different methods of assessment to different types of learning outcomes.

- Formative assessment

- Provides feedback to learners to adjust learning activities
- Integrated into the learning process

- Summative assessment

- Assess learning at the end of a programme/module
- Generates a mark/grade
- Assesses only a sample of learning outcomes

- Combination

- Written: tests, examinations, assignments

- Practical: skills testing; lab/workshop practice

- Oral: interviews, various formats

- Aural: listening tests

- Project work: individual/group; research/design

- Field work: data collection and reporting

- Competence testing: threshold standards

- Portfolio: combination of techniques

For Example:

Level Foundation				
Area	**Competence**	**Learning outcome**	**Assessment Criteria**	**Assessment methods**
Ideas and opportunities	Spotting opportunities	The apprentice will be able to find ideas and opportunities to help others.	The apprentice will learn that discovering and creating opportunities is the central notion of entrepreneurship. Using the Learning Passport Tool, the apprentice will develop four different activities in this objective and once he/she has done it well, it will receive a stamp in the passport as an evidence of the successful achievement. This objective will be performed in one week following the trainer's instructions.	When the apprentice finishes all the activities for this objective, there will be a feedback about the assessment results. The feedback will combine an oral interview with the apprentice where the activities developed will been discussed and the presentation of an entrepreneur idea.

Background of PBL method

This student-centered institutional approach allows apprenticeships to enact problems usually faced in the workplace, whilst enhancing transferable skills such as **teamwork**, **problem solving**, **risk assumption**, **public speaking**, **confidence**, **self-motivation**, and **creativity**.

Originally adopted in medical universities in order to test the knowledge base of students, this methodology is spreading rapidly within schools as an innovative educational strategy. The students can learn new subjects, solving open-ended problems, choosing desirable skills and attribute to develop in complete freedom.

This methodology is considered extremely important in vocational education since it consists of knowledge acquisition, increased group collaboration and communication, letting the students develop skills used for their future practice. Apprentices can fill the gaps in their theoretical knowledge, they can apply their learning to develop solutions. Through collaboration and inquiry, they can cultivate problem solving, metacognitive skills, and engagement in learning[6].

Problem-based learning is extremely important for apprenticeship for the benefits gained by both the learner and the employer. The learner acquires more competencies and skills, and the employer is able to assume more qualified personnel with a basic experience of the job.

Scope of the methodology

The main reason why we use problem-based learning in apprenticeship is due to the necessity for better preparation of the students, which most of the times is considered inadequate. Usually, during their studies they acquire theoretical basics, but they have no experience nor idea of work-life activities.

Problem-based learning is the favourable solution to provide students with the skills required by employers. Through this methodology, the students are to get acquainted and experience work-life and understand all the problems related to it. They have the opportunity not only to have an idea of the issues within a company, but also to face them and handle ambiguity and pressure finding viable and alternative solutions, working in autonomy and also in group, making decisions, cooperating, organizing the tasks, etc.

Each apprentice is challenged to solve a real-life open-ended problem, having at his/her disposal some resources and support to come up to a viable solution. During the process, the apprentice needs to

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[6] https://www.facultyfocus.com

develop a strategy, organize and plan his/her work, find the resources needed, ensure the collaboration of supervisors and colleagues, make decisions, solve problems, and deliver results of a certain quality.

Self-directed learning it is fundamental, however it needs a certain level of guidance and reassurance when the apprentices are first introduced to PBL, and they may also need some encouragement in their participation and engagement during group discussions.

Problem-based learning aims to activate critical thinking and development, management skills (personal, team, information, time, resources etc.) and evaluation. Apprentices have to evolve in autonomy and in team collaboration (group efficacy and problem solving, networking) and improve in communication. Growing and showing confidence and initiative is important. Problem-based learning is, indeed, an active learning, since it is focused on the identification of real-life problems and developing solutions in team. The apprentices present their progress through the process analyzing what was effective and what wasn't, based on the analysis of the evaluation of results.

To sum up, the combination of practical work-based learning (apprenticeship) with problem-based learning fosters greater competence development which apart from technical mastery includes:

- autonomy and responsibility in learning (initiative, motivation, drive, engagement)
- Development of personal competences and attitudes (commitment, resilience, flexibility, openness to risk…)
- Experience of collaborative methods and project development (process design and implementation, critical thinking and analysis, results focus, problem solving, environmental awareness, corporate responsibility, evaluation, continuous improvement, excellence…)
- Interpersonal competence (team work, communication, conflict resolution…)

How to plan PBL to promote entrepreneurial skills

Entrepreneurial competence development has much to do with practical training in the workplace (whether in FCT/WBL modules or during apprenticeships/dual training) where the need for innovation and competences related to entrepreneurial spirit becomes evident. It has undoubtedly much to do with specific initiatives in the curricula and entrepreneurial programmes offered to students as an integral part of their learning development. However, the basic development of competences is sustained at root level by the whole model (way) of learning and methodological innovation. How students learn and evolve in their own learning process is what ultimately develops entrepreneurial spirit and activity.

It is recognized that companies demand professionals who not only need technical competence, but also a range of capacities, skills and attitudes that allow them to adapt to the current competitive environment. Competences to be developed are those such as: responsibility, commitment, personal initiative, capacity to generate ideas, result orientation, teamwork, decision making etc. As such it is recognized that teaching methods need to be transformed and adapted to boost the development of competences associated with competitiveness and employability.

The main objective for trainers should be to develop a learning process which includes developing technical competences, transversal competences, entrepreneurial culture and creative thinking - all of which offer more competitiveness for companies and organizations in the future.

The design of a problem-based learning activity requires information about the apprentices, such as their academic background, professional experience, learning needs and other qualifications.

For this reason, it is essential to collect data about the starting level of the apprentices, in order to understand their level of proficiency and identify any entrepreneurial skills. The collection of information can be performed through standard questionnaires and/or interviews with the apprentices.

Having this initial informal assessment of competences will help later to measure the progress of the apprentice after the end of the apprenticeship. It also gives an important input to the trainer regarding the strong and weak points of the student and helps him plan efficiently specific activities that will strengthen the student's entrepreneurial mindset. Any specific needs will be identified and appropriate support will be provided to the student.

The next steps are to define the general framework of the PBL:

- Core competency (-ies) focus
- Level of proficiency
- Specific objectives within the various fields of learning
- Scenario description
- Challenge title
- Duration and time planning/ setting milestones for progress evaluation/ deadlines
- Resources needed
- Resources for consultation
- Assessment criteria
- Methods of assessment

The content and structure of problem-based learning courses may differ depending on the different stakeholders' interests, and on what they need from the apprentices. A decisive factor for a successful implementation of problem-based learning consists in the selection of the right problem. It must be related to real life and encourage apprentices engagement in order to develop specific competencies.

The challenge should be structured around the technical competences which each individual VET course covers as well as strategic transversal competences identified such as autonomy, teamwork, focus on goals and extraordinary results etc.

Learning in this way requires a reinterpretation of the mechanics of learning. The interpretation that best adjusts to this model is that learning is a process of evolution; the student is responsible for his/her own learning. Learning around challenges provides a launch pad, a setting and a relevant space of time for individual students and teams to get into action and produce a result. The result is interpreted and analyzed to see what worked and what didn't work and a decision is taken with regards to future challenges to be able to obtain better results.

The most commonly used problems are related to:

- **Making decision**: chose a solution from numerous alternatives;
- **Problem-solving**: recognition of errors and viable solutions;
- **Strategic performance**: solve highly complex/structured problems that need a broad perspective and more approaches.

The level, duration, and other parameters of the challenge will be defined by the trainers, depending on different parameters like the duration of apprenticeship, the specific vocation, the level of the training etc. The proposed challenges need to be relevant to the needs and expectations of the individual learners, challenging and engaging of appropriate difficulty and complexity.

For the implementation of problem-based learning is important the collaboration with external stakeholders. Strong networks with external partners may indeed be a key success factor.

PBL in Politeknika Txorierri as an example

Problem based learning has formed part of methodological innovation longest and is well known in the Basque country. It has been used to develop student competences and learning development in Txorierri since 2005.

PBL - project or problem based learning, often described as *hands on* or active learning, is at root, learning through the identification of a real life problem and developing its solution in teams. An open-ended problem is triggered by input material, which student teams must apply their attitudes, skills and knowledge to solving. Students use team collaboration and enquiry to establish a working process (which includes group/team process, communication, problem solving etc.) and attempt to resolve the problem which is then presented. Students also present how they progressed through the process and analyse what was effective and what wasn't - not only basing their analysis on evaluation of the end result.

The problem presented to students can be local or global and involves the use of wide research methods and digital tools for developing and presenting their project. PBL takes a relevant period of time to work through. Another key feature of PBL is working together and employing peer evaluation strategies.

PBL and TEAMS: team collaboration is an essential feature of PBL. Supporting the definition and composition of a project team (and team self-awareness) is important. Teachers in the college provide students with self-evaluation tools to define their innate character tendencies, preferred learning style(s) and key skills. One tool used interprets results of this self-analysis by colour:

Need to manage **Presentations are boring** **I am direct with others** **I take risks** **I like multi-tasking**	**I have the tendency to speak fluently using verbal persuasion** **I want to be likeable and sociable. I fear social exclusion** **I am involved in practically everything** **I am used to show my feelings**
I like order and stability, I have the tendency to follow the processes **To follow the rules is for me the first rule to manage** **Disciplined to solve errors** **I like to compete only with myself** **I collect data. I am systematic and detailed thinker**	**I am always the one who helps to finish a task** **I am not used to change jobs** **I look relaxed and calm** **I develop relations with my team** **To finish things is essential**

- Red are leaders who need challenges, express themselves frankly and are good multi-taskers.
- Yellow are those with good communication skills, sociable, avoid conflict, involved and emotional.
- Blue are those who like order and definition, disciplined, competitive, detailed, good researchers and systematic
- Green are collaborators, stable, reliable, calm and relaxed, good at completing tasks

Working teams are then formed that combine persons of all different skill sets and learning styles.

One of the key advantages of all PBL work is the possibility to energies, motivate and engage students in creating their methods and their own way towards an outcome.

A PBL will involve most or all of the following: a real life scenario (problem of some kind), blended learning (blended writing, reading, communicating, publishing…), team work and collaboration, real world continuous appraisal/evaluation (self-evaluation as well as from team leader, team colleagues, peers and manager/teacher), real world input - authentic research sources/including input from experts if possible, and multiple competence development…

PBL aims to activate critical thinking and development, management skills (both of self (E.I.), team (E.I), information, time, resources etc.) and evaluation. Students have to evolve in independence both in

methods and strategies employed and in team collaboration (group efficacy and problem solving, networking) and improve on communication. Growing and showing confidence and initiative is important.

Cases differ only slightly from Projects in that they are much more concrete and shorter, students often being able to tackle the example real life "case" and work towards a solution in one learning session.

As mentioned above, most packages of learning in Txorierri are now designed and presented in terms of collaborative challenges; "projects" or "cases" may be contributing components within the wider challenge based methodology now in use.

Staff at Txorierri have received workshops (either externally from TKNIKA or other agencies through TKNIKA and from colleagues with experience in the innovative methodological tools). On the MOODLE platform, documents and presentations from these workshops are available to all staff. The documents in Spanish and or Basque include:

- Creating Schools of the Future
- The importance of transversal competences
- Forming Teams and Groups (team roles, team contract models etc.)
- Problem Solving (**IDEAL** method: identify, define, explore, act, logros achievements)
- ANALYSES
- CASES
- SIMULATIONS
- DESIGNING PROJECTS (PBL)
- Models for Competence evaluation / project programme design and evaluation
- Teacher skills: the observer, listening, judging

Chapter 5. Methodology to incorporate gamification elements

Gamification background and benefits

It is already well known that enjoyment heightens engagement and retention, and that play and learning are strictly connected. Therefore, games have long been used as a means of education. Gamification is the concept of applying game mechanics and game design techniques to engage and motivate people to achieve their goals.

For this reason the problem-based learning methodology should be enhanced with gamification elements, which will provide the right motivation and engagement that will lead the apprentices to complete the mission successfully.

This methodology has defined learning outcomes and it is explicitly designed for educational purposes. It is a socially interactive mechanism within a rich communication environment that encourages feedback and reinforcement between instructor and apprentice, and also between the students themselves. This framework with the proper level of control for encouragement and discipline, can be designed in effective ways to create "fun" learning situations.

Gamification principles in education are classified into two categories: Rules (course design) and Play (course implementation).

Rules	
Learning by doing	Learning is an active process, therefore, it needs to engage players in production, not just consumption.
Risk taking	Games are open environments to be explored and manipulated. Failures are made "low-stakes", so the apprentices are encouraged to take some risk.
Open-ended challenges	To allow the apprentices to customize their progress and choose from multiple solutions.
Goal- and task-oriented	The activities should be structured around goals and tasks rather than instructions. Tasks are usually achieved in a "cycle of expertise", created by activities that promote an alternation of challenge and consolidation.
Level of skills	The challenge faced should be perfectly balances with the apprentices' level of skills and abilities, in order to let them in the conditions to accomplish the task focusing on it blocking out distractions and a high level of effort.

Play	
Agency	Apprentices should feel like they are in control of what is happenings. Games should let them create their own identity.
Safe environment for failures	Failure is treated as a natural component of learning. Players are not judged nor punished for it. Feedbacks should reflect this and consider failures as an experience component as well as a rule component.
Performance before competence	Apprentices should practice before they prove that they are experts. It should not be given a test from the start to prove they can do something. The information should be provided "just in time" and "on demand".
Situated meaning	Learning should be put in context and be given its real value, depending where, when, and how an activity is implemented.

Most common game elements

The apprentices are invited to work on quests to accomplish a specific goal (learning objective) by choosing actions and experimenting along the way. They can earn badges and experience points when they make certain progress or achievements.

The gamification may include i.e. constrains (limited resources, time), rewards (achievement badges, extra resources), ownership (autonomy, choices), and luck (new opportunities and obstacles).

There are various **elements** that can be applied to the apprenticeship:

Table 6. Gamify elements

1.	**Curiosity/mystery** (all types of players)	Foster students' sense of wonder answering to questions, solving mysteries, finding out how to do something.
2.	**Tracking progresses/feedback** (all types of players)	It is motivating for the apprentices to see their progress and how much they have accomplished. Through the implementation of "experience points", rather than grades, apprentices progress toward levels of mastery which are aligned with skills, and they are also able to see the knowledge they are developing.
3.	**Time pressure** (all types of players)	Timed objective to achieve help to engage the apprentices to a more fun activity. They will focus more on the activity at hand and make sure they get the project done in the time period allotted.
4.	**Competition** (socializer type)	Apprentices are motivated to learn the material and practice in order to complete tasks before or better that their peers. This activity shouldn't be used excessively, but it should be balanced with other activities that put all the apprentices on an equal level, for example, team-based competition.
5.	**Guilds** (socializer type)	Team-based competitions help to balance skill levels, collaboration, build teamwork. Apprentices are encouraged to help each other rather than independently competing with each other.
6.	**Exploration** (free spirit type)	Apprentices with free spirit feel motivated to explore specific topics with some freedom to engage their own curiosity.

7. **Customization** (free spirit type)	Apprentices have some freedom to customize their projects and assignments, hence, they have the possibility to show some originality personalizing their experiences.
8. **Challenges** (achiever type)	To motivate apprentices to apply their knowledge completing objectives even facing difficulties. Challenges should not be too difficult nor too easy to achieve.
9. **Quests** (achiever type)	A series of challenges that will help the apprentices to reach larger objectives breaking down tasks into smaller chunks. Each challenge in a quest will build onto the next and bring apprentices closer to reach the final goal.
10. **Sharing knowledge** (philanthropist type)	Apprentices can learn from each other. They can be motivated helping others and answering their peer's questions.
11. **Innovative platform** (disruptor type)	Allow the apprentices to innovate and think outside the box. They have the chance to challenge current designs and bring new ideas. Disruptor user types will take control over their assignments and develop new ways of doing things.
12. **Voting / voice** (disruptor type)	Apprentices can vote and decide over the tasks to accomplish and the changes to make. This element will help engage disruptors who like to influence changes.
13. **Leader board** (player type)	Display progress on activities, to encourage to perform better.
14. **Prizes** (player type)	Rewards motivate participation and assignments performance, but should be used on moderation and not abused.

Examples of gamification

The participants in the internship will be given during an open-ended challenge to carry out. The purpose of this challenge is to develop their entrepreneurial skills. In the context of gamification, the following initiatives are proposed:

Social Media

Each apprentice will create a page in a social media (Facebook, Instagram) in which a sample of his work will be displayed. The apprentice has to update frequently the fan page with information about his/her project or news related with it. This platform will also works for solve any questions and share different ideas between the participants and their followers. The person responsible for the task will join all the fan pages and be available for questions and support. The fan page with most followers will earn points in his/her work that will count in the final evaluation.

- *Gamify elements using on this initiative*:
  - Tracking Progress feedback
  - Competition
  - Exploration
  - Challenges
  - Sharing knowledge
  - Prizes

Apprentice of the Month

At the end of each month of the apprenticeship, each apprentice will make a short update of his/her project develop and all the apprentices will vote for, in which their opinion, is the best project. The Apprentice of the Month will earn points in his/her work that will count in the final evaluation. The Apprentice will not have the right to vote for himself/herself.

- *Gamify elements using on this initiative*:
    o Tracking Progress feedback
    o Time pressure
    o Exploration
    o Challenges
    o Sharing knowledge
    o Voting/voice
    o Prizes

Apprentices' Chat Room

The apprentices will create a chat room on internet (Messenger/Viber) to discuss their subject, exchange information, ideas and knowledge about the challenge they have been given. This will help them become more communicative, get to know each other and solve any questions they are reluctant to ask during their work. Some people do love competition, but in learning situations people tend to do better when the game play is cooperative. Competition can mean one person or team wins and all other teams lose. The cooperation tends to get all the players involved, and they are immersed and avoids the one winner/ many losers approach that so many people fear in games. Cooperation also mirrors what organizations hope their employees do within an organization. Sharing knowledge gives apprentices an outlet to share what they know, and helps them to learn from one another.

- *Gamify elements using on this initiative*:
    o Curiosity/Mystery
    o Tracking Progress feedback
    o Guilds
    o Sharing knowledge

Wii's Photo Channel to make the slideshow project presentation

The Wii's Photo Channel allows apprentices to upload photos or videos from an SD Card and make a slideshow interactive presentations. Each apprentice will create a slideshow presentation of his/her project using the Wii console to edit, share, display, and have fun with photos or videos of the project. The apprentice will also do a spoken presentation to the group. The apprentices will vote, which in their opinion, is the best presentation (evaluation criteria: creativity, self-confidence, clarity of thought). They will not have the right to vote for himself. The winner will earn points in his/her work that will count in the final evaluation.

Source:

- ***Gamify elements using on this initiative*:**
    - Curiosity/Mystery
    - Guilds
    - Exploration
    - Customization
    - Sharing knowledge
    - Innovative platform
    - Voting/voice
    - Prizes

TV Spot

The apprentices will develop a 30 seconds "TV spot" of his/her project and present it to the group. The group will vote for each one, giving scores for originality, relevance, professionalism and if they would "buy" the product or service explained in the project, based on the TV Spot. The winner will earn points in his/her work that will count in the final evaluation.

Source:

- ***Gamify elements using on this initiative*:**
    - Curiosity/Mystery
    - Competition
    - Guilds
    - Customization
    - Innovative platform
    - Voting/voice
    - Prizes

The Imaginary Budget

Each apprentice will receive an imaginary budget to develop his/her project. Each apprentice will explain the project's budget, justifying the expenses. The person responsible for the task will also check the budget progress two times (depends of the project time) in order to share ideas, solve questions and review the progress. Finally the person responsible for the task will decide if the imaginary budget was best developed according to different assessment criteria.

Source:

- ***Gamify elements using on this initiative*:**
    - Tracking Progress feedback
    - Time pressure
    - Guilds

- o Exploration
- o Challenges
- o Sharing knowledge
- o Prizes

Create your project App

Each apprentice will create a mobile application proposal where, through gamification, the project can be developed. The platform for the creation of the mobile application will be http://www.mobincube.com. The apprentice will explain the App's operation. At the same time, the apprentices will create a chat room on the internet to share ideas, exchange of information and easy access to comments, doubts and experiences of the participants. The platform will provide teachers and students a space where they can disseminate materials or documents related to its objectives. The apprentice who has the most downloads of his/her app in a month will be the winner.

Note: a workshop to explain the participants how to create mobile applications will be develop.

Source:
https://www.researchgate.net/publication/317717280_Gamificacion_y_aplicaciones_moviles_para_emprender_una_propuesta_educativa_en_la_ensenanza_superior

- • *Gamify elements using on this initiative*:
  - o Curiosity/Mystery
  - o Time pressure
  - o Competition
  - o Guilds
  - o Exploration
  - o Customization
  - o Challenges
  - o Innovative platform
  - o Sharing knowledge
  - o Prizes

Online role play game:

Using the UTOPIA platform, the trainer will create a storyboard which defines the starting point of the game (description of the challenge, a maximum available time, group and individual goals, characters involved, avatars' features and variables of success). Each apprentice will be faced the challenge of getting into the role of their avatar to develop his/her project in order to accomplish the challenge. Within this structure, learners are free to adopt strategies necessary to reach the prearranged goals. Often used for distance learning.

Source:https://pearl.plymouth.ac.uk/bitstream/handle/10026.1/6538/Using%20Online%20Role-Playing%20for%20Entrepreneurship%20Training.pdf?sequence=1&isAllowed=y

- *Gamify elements using on this initiative:*
  - Competition
  - Guilds
  - Exploration
  - Customization
  - Challenges
  - Quest
  - Sharing knowledge
  - Innovative platform
  - Tracking Progress feedback
  - Time pressure
  - Prizes

Learning Passport

The participants will have a learning passport which contains three areas or modules. Each module contains five objectives related to the development of different entrepreneurship skills. The participants must develop different activities in each objective for each module, related with his/her project. He/she will receive a stamp for each activity he/she has done well. At the end, the participant who has accomplished all the activities proposed in the passport, will earn points in his/her work that will count in the final evaluation of the project. This learning tool is based on the competency-based approach to action.

- *Gamify elements using on this initiative:*
  - *Curiosity/Mystery*
  - *Tracking Progress feedback*
  - *Challenges*
  - *Quest*
  - *Leader board*
  - *Prizes*
  - *Customization*
  - *Innovative platform*

These initiatives can be applied either for groups or individually.

Initiative	Groups	Individually
Social Media	x	
Student of the Month	x	
TV Spot	x	
The Imaginary Budget		x
Learning Passport		x
Participants' Chat Room	x	
Wii's Photo Channel to make the slideshow project presentation	x	x
Online role play game	x	
Create your project App	x	x

More about the Learning Passport tool

The journey to entrepreneurial learning, throughout the Learning Passport tool, consists of an itinerary of activities that will allow the apprentice to acquire the necessary skills to be an entrepreneur and transform the ideas into actions that generates value. It's an individual game.

Within the framework of EntreComp, the Learning Passport tool contains three areas or modules with five objectives each, related to the development of different entrepreneurship skills.

JOURNEY TO ENTREPRENEURIAL LEARNING

Ideas and opportunities. Do you know how to identify ideas and opportunities to create value by exploring the social, cultural and economic landscape?

Resources. Believe in your-self and manage all the resources you need to develop your ideas.

Into action. Go for it and learn by doing.

PASSPORT

Ideas and opportunities. Do you know how to identify ideas and opportunities to create value by exploring the social, cultural and economic landscape?

Objective 1: Spotting opportunities	Objective 2: Creativity	Objective 3: Vision	Objective 4: Valuing ideas	Objective 5: Ethical and sustainable thinking
Use your imagination and abilities to identify opportunities for creating value	Develop creative and purposeful ideas	Work towards your vision of the future	Make the most of ideas and opportunities	Assess the consequences and impact of ideas, opportunities and actions

Resources. Believe in your-self and manage all the resources you need to develop your ideas

Objective 1: Self-awareness and self-efficacy	Objective 2: Motivation and perseverance	Objective 3: Mobilising resources	Objective 4: Financial and economic literacy	Objective 5: Mobilising others
Believe in yourself and keep developing	Stay focused and don't give up	Get and manage the resources you need	Make the most of ideas and opportunities	Inspire, engage and get others on board

Into action. Go for it and learn by doing

Objective 1: Taking the initiative	Objective 2: Planning and management	Objective 3: Coping with uncertainty, ambiguity and risk	Objective 4: Working with others	Objective 5: Learning through experience
Go for it	Prioritise, organise and follow up	Make decisions dealing with uncertainty, ambiguity and risk	Team up, work together, and network	Learn by doing

Figure 3. Learning Passport

As it's shown in figure 3 each page of the passport contains a description of the objectives that will be develop on each area of the entrepreneurial learning journey and it's also shown a page where a stamp will be given to the apprentice that complete all the activities proposed. The person in charge for the apprentices will be responsible to design the activities in the Passport and give the apprentice the corresponding stamp that indicate the competence was been developed according to the instructions. Once the apprentice fulfill the Passport by developing all the activities on it, he/she will obtain a certificate that indicate that he/she has successfully acquired the entrepreneur skills proposed in the project.

The Learning Passport combine different gamify elements like: curiosity/mystery, tracking progress/feedback, customization, challenges, quest, innovative platform, leader board and prizes, which allows, throughout gamify, accomplished the learning outcomes proposed in this Guide.

Chapter 6. The App.Mod.e: Integrating PBL approach and gamification

The App.Mod.e aims to help trainers in VET organizations to integrate the design of a problem-based approach with gamification techniques in order to develop an innovative apprenticeship model to enhance entrepreneurial spirit in the apprentices, offering more competitiveness for companies and organizations in the future.

In this chapter, the steps of how to 'gamify' an apprenticeship based on PBL are explained.

How to "gamify" an apprenticeship based on PBL

Step 1: Define a clear objectives and goals

Establish what knowledge or attitudes you want the apprentices to acquire or practice in the apprenticeship. You can also aim to enhance certain behaviors, develop certain skills or competencies. It is important that you define the objectives and goals as clearly as possible, before beginning to design the Problem Based Learning and the gamification tool. Keep also in mind how the objectives will be measured.

You can use the SMART framework to approach objectives and goals setting. The acronym for SMART is: "Specific, Measurable, Achievable, Relevant, and Time-based."

Specific	Measurable	Achievable	Relevant	Time-based
What exactly do you want to achieve? Do you know exactly when you've achieved the goal? The benefit of a specific and measurable goal is this: you'll know when you're done.	Measurable goals means that you identify exactly what you will see, hear and feel when you reach your goal. You'll need concrete evidence. Defining the physical manifestations of your goal or objective makes it clearer, and easier to reach.	Is the goal really acceptable to you? Too much ambition can result in you not getting anything done and then feeling bad about it.	Relevance is the key. The value of relevance is motivation. What is relevant for the apprentices and for the companies nowadays?	What's your deadline? How long will be the apprenticeship? The deadline for your goal has a huge impact on how you define your goal, **that's why you should think about this first**. Pick a deadline by which you'd like to celebrate a concrete some level of success.

For example:

Within six months, we will develop the capacity of 20 apprentices in environmental management, governance, and entrepreneurship, and support them in establishing their own environmental and entrepreneurial initiatives in the company in 2019.

Relevant   Time based

- Key Questions in this step:
  - *How will the apprentices know when they finish the apprenticeship?*
  - *What's your deadline?*
  - *What results should we get at the end of the mission? (brainstorming of possible learning outcomes)*
  - *How are we going to get started on that goal?*
  - *How can they accomplish the mission? (brainstorming of possible assessments)*

Step 2: Define the learning outcomes

Using the Entrecomp framework and the information collected in step one, define the learning outcomes that you will want the apprentices get at the end of the apprenticeship. The learning outputs proposed by Entrecomp aims to be comprehensive tool that can be adapted to different needs. Prioritize the skills that you will want to enhance depending on the needs of the apprentices and also keep in mind the competences that the companies may looking for in future employees, related to entrepreneurship.

Use the information given in chapter three to define the learning outcomes.

Step 3: Identify the apprentices profile and the user types for gamification

Once a clear goal (or goals) is set for the apprenticeship project, it's also important to consider at whom this project is directed and what the characteristics of the target group are. To properly design a gamification process based on PBL, the innate character tendencies, preferred learning style(s) and key skills of the apprentices should be defined (see self-analysis by colour in page 26).

After determining the target group profile, another important thing to consider is identify the user type for the gamification design. In a gamify project, the players can be classified into four types: achievers, explorers, socialisers, and killers (Kim, 2015):

- "Achievers regard points-gathering and rising in levels as their main goal" or players.
- "Explorers delight when the game reveals its internal machinations. They try progressively esoteric actions in wild, out-of-the-way places, looking for interesting features and figuring out how things work" or free spirits.
- "Socialisers are interested in people, and what they have to say. The game is merely a backdrop, a common ground where things happen to players. Inter-player relationships are important:

empathising with people, sympathising, joking, entertaining, listening; even merely observing people play can be rewarding—seeing them grow as individuals, maturing over time."

- "Killers get their kicks from imposing themselves on [and causing distress to] others" or philanthropist.

These user types are theoretical abstractions, and people in the real world are likely to display characteristics of more than one of these types to different degrees. Nevertheless, they provide a useful guide in understanding how different motivations are involved in gamification and how a gamified application can be designed to appeal to those with different motivations. In the context of education, thinking about these different types of users and their motivation in relation to different learning styles can also be beneficial (Kim, 2015).

To collect and analyze information about the potential users of the gamified system, several methods are suggested: interviews, observations, and measurements of actual user behavior, surveys, diaries and focus groups (Morschheuser et al., 2017).

- Key Questions in this step:
  - *Which techniques should I use to identify the apprentice profile and user type?*
  - *Do the apprentices need to learn something before they can solve the case problem?*

Step 4: Design the App.Mod.e project

1. **Context analysis**

Define a general narrative or theme and proposed the challenge. Identify and understand the context where the PBL and gamification should be applied. Establish a storyline (can be very sophisticated, but also very simple) to engage the apprentices and to motivate them to continue with the game and solve the problem that was given. Narrative-driven open-ended learning environments, are likely to be best for promoting hypothesis testing and problem solving (Kim, 2015).

- Key Questions in this step:
  - *What the company does?*
  - *What is the company Mission and Vision?*
  - *What are the principal challenges that the company is facing?*

2. **Design the PBL scenario**

Next you design the PBL scenario with an embedded problem that will emerge through apprentices brainstorming. Think of a real, complex issue related to the organization. The key is writing a scenario where the apprentices will elicit the types of thinking, discussion, research, and learning that need to take place to meet the learning outcomes. Scenarios should be motivating, interesting, and generate good discussion. Use the information in chapter 4 to define the PBL scenario.

- Key Questions in this step:
  - *What is the problem?*
  - *Do the apprentices understand words, terms and notions of the problem?*

- o *What elements of the real world should I bring in the learning experience?*
- o *What are the sub problems?*

3. Gamification design

Transforms learning skills and knowledge into play. Capture the Problem Based Learning process in a fun and entertaining proposal. Design of gamification approaches is a creative process and require an ideation phase. The first step is typically an iterative brainstorming activity (with the goal to come up with a large amount of ideas). Explorative brainstorming has been highlighted as an important approach to understand the so called "design space". Subsequently, the ideas are usually consolidated in order to create a list of ideas for the design phase. Some experts have mentioned the importance of user involvement in the ideation phase, in order to ensure the focus on user needs (Morschheuser et al., 2017).

The second step, after collecting ideas, concrete gamification designs that can be developed. This step is strongly related to the ideation phase and focuses on the elaboration of evaluable and, therefore, "playable" prototypes (Morschheuser et al., 2017). You also have to select the appropriate game elements and described how are they can be related or associated to a certain personality (philanthropist, achiever, free spirit).

Use the information in chapter 5 to define the gamification design.

Within the gamification design, the reward is a fundamental part of the game. There are gamification systems that are only based on establishing scores. Create a reward system (badges, leaderboard, etc) is important to encourage the players and keep them motivated. People value status and attention as well as feeling that they're progressing. The reward should be clear and accessible or visible to maintain motivation.

- Key questions in this step:
    - o *What emotions/experiences match with the desired competences?*
    - o *What do we have to achieve?*
    - o *What are the rules of the game?*

4. Assessment criteria and methods

Define the assessment criteria and methods according with the PBL scenario and the gamification elements chosen in the previous steps. Use the information in chapter 3 to develop this step.

- Key questions in this step:
    - o *Who will assess the apprentice?*
    - o *How the learning outcomes will be assessed, in what context and where?*
    - o *When the assessment will take place, and what procedures are in place to ensure the quality of assessment?*

Use the information in chapter 3 to define the assessment criteria and methods.

Step 5: Game implementation and performance evaluation

Develop a pilot which can be used for field evaluation of the apprentice's model design. Aim of the performance evaluation is to investigate, whether the apprentice's model meets the defined objectives and goals. Playtesting is one of the most important evaluation methods. Playtesting refers to the observation of users while undertaking a task. Several experts have highlighted that observing user behavior is more effective than interviewing, as users often have problems to describe experiences verbally (Morschheuser et al., 2017).

- Key questions in this step:
  - *What elements should I take into account to measure and set the levels of performance?*

Step 6: Monitoring

A launch and post-launch monitoring is recommend. The collected data is used to evaluate the implemented PBL and gamification mechanics, to identify irregularities and to check whether the desired apprentice behavior is achieved. Based on the gathered insights, mechanics, rules and contents should be balanced and tweaked in order to keep the system engaging and to adapt it to changing objectives. A typical outcome of this phase is a list of a possible improvements.
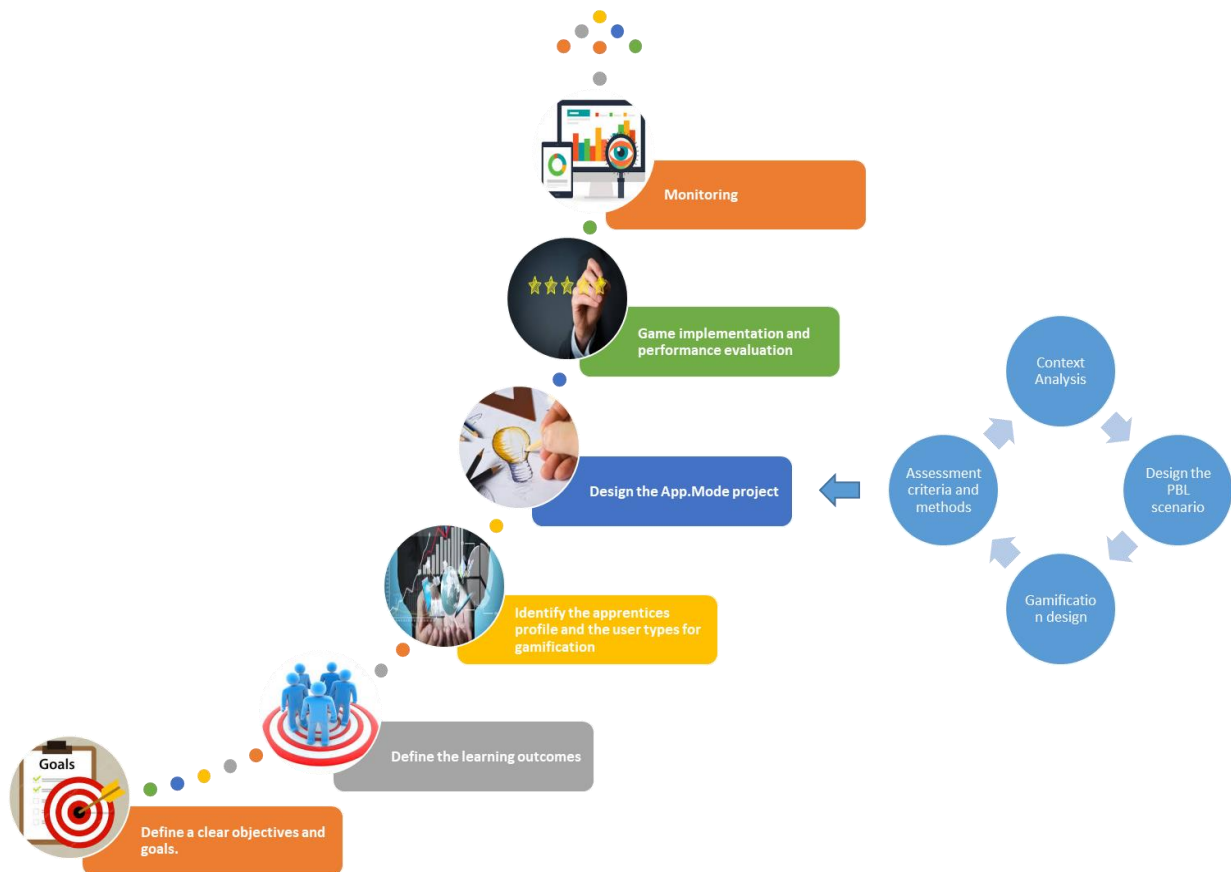
Figure 4. Steps to "gamify" an apprenticeship based on PBL

General tips to take into consideration

- It is fundamental to find a balance among all the activities assigned, taking into account the different personalities, putting all the apprentices on an equal level, and let them develop various skills and knowledge. For this reason:
  o Individual activities should be harmonized with group activities;
  o Feedbacks should not be only positive or only negative;
  o The prizes should be limited;
  o The tasks should not be too easy nor too difficult to achieve in order to avoid to get them bored or unable to achieve the goals.
- In designing gamification, one should also be aware of the fact that variables such as gender, age, and cultural orientations can play a role in variance in the reception of game. Take this into account in order to improve the apprentices' expected outcomes.

Case Studies

1. Case Study: Project G.R.E.E.N. and the Game with Impact

The project G.R.E.E.N. (Garbage Recycling and Environmental Education Nationwide) is a national educational initiative on environment protection and green entrepreneurship with the focus particularly on waste prevention and management. It was organized in February – June 2014 in three large cities in Moldova (Chisinau, Balti, and Comrat) by MEGA and a partner organization Medium.

The gamification process and elements applied in G.R.E.E.N. are described below:

Step 1. Define a clear objectives and goals	The **goal** of the G.R.E.E.N. project was to **develop the capacity of 300 young people** from three cities in Moldova **in environmental management, governance, and entrepreneurship, and support them in establishing their own environmental and entrepreneurial initiatives in the country in 2014**. The **objective** of implementing gamification within the project was to **maintain at least 90% participation rate of these young people throughout G.R.E.E.N. and increase their motivation and engagement in environmental management and entrepreneurship during and after the project.**
Step 2: Target group and user types	The category of **young people targeted** with the G.R.E.E.N. gamification design is **pupils of classes 10 – 12 from three schools** in the cities Chisinau, Balti, and Comrat. The G.R.E.E.N. participants were mostly **Achievers** aiming at reaching certain level of knowledge, experience, and status and **Socializers**, who would like to benefit from the project through networking and interacting with their peers. This implies that in project gamification it is appropriate to use the elements offering progression and skills/experience acquisition, as well as social interaction and teamwork experience.
Step 3: Context analysis	In order to provide an interesting and engaging learning experience, G.R.E.E.N. project added fun in the form of: a) a **storyline of waste pollution invading Moldova and the experience of youth as secret agents saving the country**; b) collaboration and networking in accomplishing **game missions**; c) exploration of

	different approaches and tools to complete the missions, as well as freedom of choice to select the bonus ones; d) **competition of the G.R.E.E.N. Agent status and rewards**.
Step 4. Gamification design	Finally, to connect all the above-mentioned elements of gamification framework, one needs to design and deploy the suitable and relevant tools and mechanics. Within the G.R.E.E.N. project they included: **engaging storyline, progression levels, bonus missions with special skills badges (made physically for the players to actually wear them), experience points, leaderboard shown on the project website, sharing of players' achievement on the project pages in social networks, and G.R.E.E.N. Agent status and rewards.**
Step 5: Game implementation and performance evaluation	Among the **300 targeted young people 104 (34.7%) of them became actively engaged in the learning experience within the G.R.E.E.N. project** thus benefitting from all trainings and workshops and developing their knowledge in environment protection. Among these **104 youths 70 (67.3%) accomplished all game missions and obtained the G.R.E.E.N. agent status and rewards**, indicating that they are prepared for efficient environmental leadership and management. During and after the project **7 teams of the newly trained G.R.E.E.N. Agents were able to successfully organize their own environmental projects and initiatives** focused on raising awareness about waste pollution and training peers in efficient waste management in their educational institutions
Step 6: Monitoring	G.R.E.E.N. project monitored the game progression developed a progression loop in order to: a) **attracting new players** to the gamification process and featured initial points and free on-boarding trainings given to the players, engagement of current players with their peers in off-line missions, and word-of-mouth marketing; b) **active engagement of current players and included the categorization of game missions** into different levels with increasing difficulty, bonus missions giving special awards and statuses, and the ultimate goal of reaching the G.R.E.E.N. Agent status and receiving the award of all-expenses-covered excursion and summer school on green entrepreneurship in Moldova.

Main gamification tools for G.R.E.E.N. project: on-line gamification platform, social media.

Some learning outcomes:

- The learner will be able to make an efficient environmental leadership and management to face the environmental problems that affect the city of Moldova.
- The learner will be able to establish their own environmental and entrepreneurial initiatives in the country in order to solve the current environmental problems.
- The learner will be able to help others to increase their motivation and engagement in environmental management.

2. **Case study: Creation of a mobile application linked to sports and gamification. University of Sevilla and University of Valencia - Spain.**

This project was an educational initiative on entrepreneurship and innovation in sport. It was organized for the Universities of Sevilla and Valencia in Spain, in order to encourage entrepreneurship and creativity through the exchange of information between students and teachers of different degrees and universities.

The gamification process and elements applied in this project are described below:

Step 1. Define a clear objectives and goals	**The objectives** and **goals** of this project have been the following: a) **promote the entrepreneurial spirit** and creativity through the exchange of information between students and teachers of different degrees and universities. b) **Strengthen contact networks** with students and teachers of different degrees and from other universities. c) Know the possibilities offered by **gamification in sport**. d) Learn to **implement a business and marketing plan** in a sports organization and e) Know how to **start up and commercialize a mobile application.** At the end of the project, each group of students **must submit a proposal for a mobile application** where, by means of gamification, **physical activity is encouraged.**
Step 2: Target group and user types	Students of two University Degrees: physical activity and sports sciences Degree and Business Administration and Management Degree. Creation of groups of 4 to 5 students. (User types are not specified in this project).
Step 3: Context analysis	The teachers explained the project, the contents, the objectives and what the implication of each one of those involved. Each group conducted a **research of sports organizations** related to the **marketing of sports services or products through App**. The objective of this phase is to **know the reality in the sports sector according to the APP that are commercialized**, and **find ideas for the proposal** of each group since the mobile application that they must propose must be creative and innovative.
Step 4. Gamification design	Each group of students presented a **proposal for a mobile application where, through gamification, physical activity is encouraged**. The platform for the creation of the mobile application is http://www.mobincube.com. The business and marketing plan of the proposal are submitted in summary format. The group of teachers also created a **fan page (page on social networks designed to share information on a topic, service or business)**, to share ideas of entrepreneurship in sports, courses, conferences, and so that be a platform for the participants interaction. Developing a **fan page** of the project will allow the **continuous exchange of information between all the members of the project and easy access to comments, doubts and experiences of the participants**. At the same time, it will provide teachers and students with a platform to disseminate materials or documents related to its objectives.
Step 5: Game implementation and performance evaluation	In addition to the **creation of the mobile application**, **eleven theoretical-practical workshops of two hours each were carried out** so that the students could have a closer vision and of different teachers, about entrepreneurship, mobile applications and sports. Each training was recorded and posted on the **project's fan page** as well as the questions presented in each training. All the workshops were taught by the teachers involved in the project, except for two that were done by an external professional. At the end, the groups **created a business idea through an APP, linked to gamification and sports. As well as, the idea and business plan for the implementation**. A **contest of business ideas was held**. The court was constituted by the teachers who were part of the project and an external professional. **The best idea was awarded and the prize was the option of entering a sport-based technology company.**
	During the project and at the end of it, **all objectives were evaluated to verify that they were met.** The instruments and the measure of implementation for the evaluation of results were: a) Instrument of intentions to undertake proposed by

Step 6: Monitoring	Jaén and Liñán (2013) at the beginning and end of the project for the analysis of the promotion of entrepreneurship. b) Teachers and students were asked through a specific Google Forms questionnaire, to indicate how many new people have been known. c) Through a **survey** created with **Google Forms**, students were asked to indicate examples of entrepreneurship opportunities that they could do through gamification. d) The concepts related to the business plan and the business plan were evaluated in a theoretical manner through a test type, using the Virtual Platform of the University of Seville. e) Using Google Form questionnaire, students were asked for which are the ways to market a mobile application in sports. And a final evaluation of the project, explaining what have been its difficulties, strengths and future proposals for project implementation. **An academic and economic report was also elaborated and a book was published.**

Main gamification tools for this project: mobile application (App), social media (Fan page), and surveys through Google Forms.

Some learning outcomes:

- The learner will be able to implement a business and marketing plan in a sports organization through develop of a mobile application.
- The learner will be able to propose an innovate idea, trough gamification, to improve physical activity.

Foundation level

Competence	Level of proficiency - Foundation	
	Discover (level 1)	**Explore (level 2)**
Spotting opportunities	I can find opportunities to help others.	I can recognize opportunities to create value in my community and surroundings.
	I can find different examples of challenges that need solutions.	I can recognize challenges in my community and surroundings that I can contribute to solving.
	I can find examples of groups who have benefited from a solution to a given problem.	I can identify needs in my community and surroundings that have not been met.
	I can tell the difference between different areas where value can be created (for example, at home, in the community, in the environment, or in the economy or society).	I can recognize the different roles the public, private and third sectors play in my region or country.
Creativity	I can show that I am curious about new things.	I can explore new ways to make use of existing resources.
	I can develop ideas that solve problems that are relevant to me and my surroundings.	Alone and as part of a team, I can develop ideas that create value for others.
	I can approach open-ended problems (problems that can have many solutions) with curiosity.	I can explore open-ended problems in many ways so as to generate multiple solutions.
	I can assemble objects that create value for me and others.	I can improve existing products, services and processes so that they better meet my needs or those of my peers and the community.
	I can find examples of innovative products, services and solutions.	I can describe how some innovations have transformed society.
Vision	I can imagine a desirable future.	I can develop simple future scenarios where value is created for my community and surroundings.
Valuing ideas	I can find examples of ideas that have value for myself and others.	I can show how different groups, such as firms and institutions, create value in my community and surroundings.
	I can clarify that other people's ideas can be used and acted on, while respecting their rights.	I can explain that ideas can be shared and circulated for the benefit of every-one or can be protected by certain rights, for example, copy-rights or patents.
Ethical & sustainable thinking	I can recognize behaviors that show integrity, honesty, responsibility, courage and commitment.	I can describe in my own words the importance of integrity and ethical values.
	I can list examples of environmentally friendly behaviour that benefits a community.	I can recognize examples of environmentally friendly behaviour by companies that creates value for society as a whole.
	I can find and list examples of changes caused by human action in social, cultural, environmental or economic contexts.	I can tell the difference between the impact of a value-creating activity on the target community and the broader impact on society.

Self-awareness and self-efficacy	I can identify my needs, wants, interests and goals.	I can describe my needs, wants, interests and goals.
	I can identify things I am good at and things I am not good at.	I can identify things I am good at and things I am not good at.
	I believe in my ability to do what I am asked successfully.	I believe in my ability to achieve what I intend to.
	I can list different types of jobs and their key functions.	I can describe which qualities and abilities are needed for different jobs, and which of these qualities and abilities I have.
Motivation and perseverance	I am driven by the possibility to do or contribute to something that is good for me or for others.	I am motivated by the idea of creating value for myself and others.
	I see tasks as challenges to do my best.	I am motivated by challenges.
		I can recognize different ways of motivating myself and others to create value.
	I show passion and willingness to achieve my goals.	I am determined and persevere when trying to achieve my (or my team's) goals.
	I do not give up and I can keep going even when facing difficulties.	I am not afraid of working hard to achieve my goals.
Mobilizing resources	I recognize that resources are not unlimited.	I can appreciate the importance of sharing resources with others.
	I value my possessions and use them responsibly.	I can describe how resources last longer through reuse, repair and recycling.
	I can recognize different uses for my time (for example, studying, playing, and resting).	I value my time as a scarce resource.
	I can look for help when I am having difficulty achieving what I have decided to do.	I can identify sources of help for my value-creating activity (for example, teach-ers, peers, mentors).
Financial and economic literacy	I can recall basic terminology and symbols related to money.	I can explain simple economic concepts (for example, supply and demand, market price, trade).
	I can judge what to use my money for.	I can draw up a simple household budget in a responsible manner.
	I can identify the main types of income for families, businesses, non-profit organizations and the state.	I can describe the main role of banks in the economy and society.
	I can outline the purpose of taxation.	I can explain how taxation finances the activities of a country and its part in providing public goods and services.
Mobilizing others	I show enthusiasm for challenges.	I am actively involved in creating value for others.
		I can persuade others by providing a number of arguments.
	I can communicate my ideas clearly to others.	I can communicate my team's ideas to others persuasively by using different methods (for example posters, videos, role-play).
	I can provide examples of inspiring communication campaigns.	I can discuss how different media can be used to reach audiences in different ways.
	I can carry out the tasks I am given responsibly.	I am comfortable in taking responsibility in shared activities.

Taking initiative	I show some independence in carrying out tasks I am given.	I can work independently in simple value-creating activities.
	I can have a go at solving problems that affect my surroundings.	I show initiative in dealing with problems that affect my community.
Planning & management	I can clarify what my goals are in a simple value-creating activity.	I can identify alternative goals to create value in a simple context.
	I can carry out a simple plan for value-creating activities.	I can deal with a range of simple tasks at the same time without feeling uncomfortable.
	I can recall the order of steps that was needed in a simple value-creating activity I took part in.	I can identify the basic steps that are needed in a value-creating activity.
	I can recognize how much progress I have made on a task.	I can monitor whether a task is going to plan.
	I am open to changes.	I can confront and deal with changes in a constructive way.
Coping with uncertainty, ambiguity and risk	I am not afraid of making mistakes while trying new things.	I explore my own ways to achieve things.
	I can identify examples of risks in my surroundings.	I can describe risks related to a simple value-creating activity in which I take part.
Working with others	I can show respect for others, their background and situations.	I am open to the worth that others can bring to value- creating activities.
	I can show empathy towards others.	I can recognize the role of my emotions, attitudes and behaviors in shaping others people's attitudes and behaviors and vice versa.
	I can show empathy towards others.	I can discuss the benefits of listening to other people's ideas for achieving my (or my team's) goals.
	I am open to working alone as well as with others, playing different roles and taking some responsibility.	I am willing to change my way of working in a group.
	I am open to involving others in my value-creating activities.	I can contribute to simple value- creating activities.
	I can explain the meaning and forms of association, co-operation and peer-to-peer support (for example, family and other communities).	I am open to establishing new contacts and cooperation with others (individuals and groups).
Learning through experience	I can find examples of great failures that have created value.	I can provide examples of temporary failures that have led to valuable achievements.
	I can provide examples that show that my abilities and competence have increased with experience.	I can anticipate that my abilities and competence will grow with experience, through both successes and failures.
	I can recognize what I have learnt from taking part in value- creating activities.	I can reflect on my experience in taking part in value-creating activities and learn from it.

Competence	Level of proficiency - Intermediate level	
	Discover (level 2)	**Explore (level 3)**
Spotting opportunities	I can explain what makes an opportunity to create value.	I can proactively look for opportunities to create value, including out of necessity.
	I can identify opportunities to solve problems in alternative ways.	I can redefine the description of a challenge, so that alternative opportunities address it may become apparent.
	I can explain that different groups may have different needs.	I can establish which user group, and which needs, I want to tackle through creating value.
	I can tell the difference between contexts for creating value (for example, communities and informal networks, existing organizations, the market).	I can identify my personal, social and professional opportunities for creating value, both in existing organizations or by setting up new ventures.
Creativity	I can experiment with my skills and competences in situations that are new to me.	I can actively search for new solutions that meet my needs.
	I can experiment with different techniques to generate alternative solutions to problems, using available resources in an effective way.	I can test the value of my solutions with end users
	I can take part in group dynamics aimed at defining open-ended problems.	I can reshape open-ended problems to fit my skills.
	I can identify the basic functions that a prototype should have to illustrate the value of my idea.	I can assemble, test and progressively refine proto-types that simulate the value I want to create.
	I can tell the difference between types of innovations (for example, process versus product innovation and social innovation, incremental versus disruptive innovation).	I can judge if an idea, product or process is innovative or just new to me.
Vision	I can develop (alone or with others) an inspiring vision for the future that involves others.	I can build future scenarios around my value-creating activity.
	I can explain what a vision is and what purpose it serves	I am aware of what is needed to build a vision.
	My vision for creating value drives me to make the effort to turn ideas into action.	I can decide what type of vision for creating value I would like to contribute to.
Valuing ideas	I can tell the difference between social, cultural and economic value.	I can decide which type of value I want to act on and then choose the most appropriate pathway to do so.
	I can tell the difference between types of licenses that can be used to share ideas and protect rights.	I can choose the most appropriate license for the purpose of sharing and protecting the value created by my ideas.
	I can apply ethical thinking to consumption and production processes.	I am driven by honesty and integrity when taking decisions.

Ethical & sustainable thinking	I can identify practices that are not sustainable and their implications for the environment.	I can produce a clear problem statement when faced with practices that are not sustainable.
	I can identify the impact that taking up opportunities will have on me and my team, on the target group and on the surrounding community.	I can identify stakeholders who are affected by the change brought about by my (or my team's) value-creating activity, including stakeholders who cannot speak up (for example, future generation, climate or nature).
		I can tell the difference between accounting for use of re-sources and accounting for r the impact of my value-creating activity on stakeholders and the environment.
Self-aware-ness and self-efficacy	I can commit to fulfilling my needs, wants, interests and goals.	I can reflect on my individual and group needs, wants, interests and aspirations in relation to opportunities and future prospects.
	I can judge my strengths and weaknesses and those of others in relation to opportunities for creating value.	I am driven by the desire to use my strengths and abilities to make the most of opportunities to create value.
	I can judge the control I have over my achievements (compared with any control from outside influences).	I believe I can influence people and situations for the better.
	I can describe my skills and competences relating to career options, including self-employment.	I can use my skills and competences to change my career path, as a result of new opportunities or from necessity.
Motivation and perseverance	I can anticipate the feeling of achieving my goals and this motivates me.	I can regulate my own behaviour to stay driven and achieve the benefits of turning ideas into action.
	I can set challenges to motivate myself.	I am willing to put effort in and use resources to overcome challenges and achieve my (or my team's) goals.
	I can reflect on the social incentives associated with having a sense of initiative and creating value for myself and others.	I can tell the difference between personal and external factors that motivate me or others when creating value.
	I can over-come simple adverse circumstances.	I can judge when it is not worth continuing with an idea.
	I can delay achieving my goals in order to gain greater value, thanks to prolonged effort.	I can maintain effort and interest, despite setbacks.
Mobilizing resources	I can experiment with different combinations of resources to turn my ideas into action.	I can get and manage the necessary resources to turn my idea into action.
	I can discuss the principles of circular economy and resource efficiency.	I use re-sources responsibly and efficiently (for example, energy, materials in the supply chain or manufacturing process, public spaces).
	I can discuss the need for investing time in different value-creating activities.	I can use my time effectively to achieve my goals.
	I can describe the concepts of division of labour and job specialization.	I can find and list public and private services to support my value-creating activity (for example, incubator, social enterprise advisors, start-up angels, chamber of commerce).

Financial and economic literacy	I can use the concept of opportunity costs and comparative advantage to explain why exchanges happen between individuals, regions and nations.	I can read income statements and balance sheets.
	I can draw up a budget for a value- creating activity.	I can judge the cash-flow needs of a value-creating activity.
	I can explain that value-creating activities can take different forms (a business, a social enter-prise, a non-profit organization and so on) and can have different structures of ownership (individual company, limited company, co-operative and so on).	I can identify public and private sources of funding for my value-creating activity (for example, prizes, crowd-funding, and shares).
	I can estimate the main accountancy and tax obligations I need to fulfil to meet the tax requirements for my activities.	
Mobilizing others	I do not get discouraged by difficulties.	I can lead by example.
	I can persuade others by providing evidence for my arguments.	I can persuade others by appealing to their emotions.
	I can communicate imaginative design solutions.	I can communicate the value of my (or my team's) idea to stakeholders from different backgrounds effectively.
	I can use various methods, including social media, to communicate value-creating ideas effectively.	I can use media appropriately, showing that I am aware of my audience and purpose.
Taking initiative	I can take individual and group responsibility to carry out simple tasks in value-creating activities.	I can take individual and group responsibility in value-creating activities.
	I can initiate simple value-creating activities.	I am driven by the possibility of being able to initiate value-creating activities independently.
	I actively face challenges, solve problems and seize opportunities to create value.	
Planning & management	I can describe my goals for the future in line with my strengths, ambitions, interests and achievements.	I can set short-term goals that I can act on.
	I can create an action plan which identifies the necessary steps to achieve my goals.	I can allow for the possibility of changes to my plans.
	I can develop a business model for my idea.	I can define the key elements that make up the business model necessary to deliver the value I have identified.
	I can priorities the basic steps in a value-creating activity.	I can set my own priorities and act on them.
	I can identify different types of data that are necessary for monitoring the progress of a simple value-creating activity.	I can set basic milestones and observation indicators to monitor the progress of my value-creating activity.
Coping with uncertainty, ambiguity and risk	I can change my plans based on the needs of my team.	I can adapt my plans to achieve my goals in light of changes that are outside my control.
	I can discuss the role that information plays in reducing uncertainty, ambiguity and risk.	I can actively look for, compare and contrast different sources of information that help me reduce ambiguity, uncertainty, and risks in making decisions.

	I can tell the difference between acceptable and unacceptable risks.	I can weigh up the risks and benefits of self-employment with alternative career options, and make choices that reflect my preferences.
	I can critically evaluate the risks associated with an idea that creates value, taking into account a variety of factors.	I can critically evaluate the risks related to the formal set-up of a value-creating venture in the area in which I work.
Working with others	I can combine different contributions to create value.	I can value diversity as a possible source of ideas and opportunities.
	I can express my (or my team's) value-creating ideas assertively.	I can face and solve conflicts.
	I can listen to other people's ideas for creating value without showing prejudice.	I can listen to my end users.
	I can work with a range of individuals and teams.	I share the ownership of value-creating activities with the members of my team
	I can contribute to group decision- making constructively.	I can create a team of people who can work together in a value-creating activity.
	I can use the relationships I have to get the support I need to turn ideas into action, including emotional support.	I can establish new relation-ships to get the support I need to turn ideas into action, including emotional support (for example, joining a mentor network).
Learning through experience	I can reflect on failures (mine and other people's), identify their causes and learn from them.	I can judge if and how I have achieved my goals, so that I can evaluate my performance and learn from it.
	I can reflect on the relevance of my learning pathways for my future opportunities and choices.	I am always looking for opportunities to improve my strengths and reduce or compensate for my weaknesses.
	I can reflect on my interaction with others (including peers and mentors) and learn from it.	I can filter the feedback provided by others and keep the good from it.

Advanced level

	Level of proficiency - Advanced level	
Competence	Discover (level 5)	Explore (level 6)
Spotting opportunities	I can describe different analytical approaches to identify entre-preneurial opportunities.	I can use my knowledge and understanding of the context to make opportunities to create value.
	I can take apart established practices and challenge mainstream thought to create opportunities and look at challenges in different ways.	I can judge the right time to take an opportunity to create value.
	I can carry out a needs analysis involving relevant stake-holders.	I can identify challenges related to the contrasting needs and interests of different stakeholders.
	I can identify the boundaries of the system that are relevant to my (or my team's) value-creating activity.	I can analyze an existing value- creation activity by looking at it as a whole and identifying opportunities to develop it further.

Creativity	I can actively search for new solutions that improve the value-creating process.	I can combine my understanding of different contexts to transfer knowledge, ideas and solutions across different areas.
	I can describe different techniques to test innovative ideas with end users.	I can set up processes to involve stake-holders in finding, developing and testing ideas.
	I can describe and explain different approaches to shaping open-ended problems and different problem-solving strategies.	I can help others create value by encouraging experimentation and using creative techniques to approach problems and generate solutions.
	I can create (alone or with others) products or services that solve my problems and my needs.	I can develop and deliver value in stages, launching with the core features of my (or my team's) idea and progressively adding more.
	I can describe how innovations diffuse in society, culture and the market.	I can describe different levels of innovation (for example, incremental, breakthrough or transformation-al) and their role in value-creating activities.
Vision	I can use my understanding of the context to identify different strategic visions for creating value.	I can discuss my (or my team's) strategic vision for creating value.
	I can explain the role of a vision statement for strategic planning.	I can prepare a vision statement for my (or my team's) value-creating activity that guides internal decision-making throughout the whole process of creating value.
	I can identify the changes needed to achieve my vision.	I can promote initiatives for change and transformation that contribute to my vision.
Valuing ideas	I recognize the many forms of value that could be created through entrepreneurship, such as social, cultural or economic value.	I can break down a value chain into its different parts and identify how value is added in each part.
	I can tell the difference between trademarks, registered design rights, patents, geo-graphical indications, trade secrets, confidentiality agreements and copyright licenses, including open, public-domain licenses such as creative com-mons.	When creating ideas with others, I can outline a dissemination and exploitation agreement that benefits all partners involved.
Ethical & sustainable thinking	I can argue that ideas for creating value should be supported by ethics and values relating to gender, equality, fairness, social justice and environmental sustainability.	I can take responsibility for promoting ethical behaviour in my area of influence, (for example, by promoting gender balance highlighting inequalities and any lack of integrity).
	I can discuss the impact an organization has on the environment (and vice versa).	I can discuss the relationship between society and technical developments, relating to their implications for the environment.
	I can analyze the implications of my value-creating activity within the boundaries of the system I am working in.	I can define the purpose of the impact assessment, impact monitoring, and evaluation of impact.
	I can tell the difference between inputs, output, out-comes and impact.	I can discuss a range of accountability methods for both functional and strategic accountability.
	I can translate my needs, wants, interests and aspirations into goals that help me reach them.	I can help others to reflect on their needs, wants, interests and aspirations and how they can turn these into goals.

Self-aware-ness and self-efficacy	I can team up with others to compensate for our weaknesses and add to our strengths.	I can help others identify their strengths and weaknesses
	I believe in my ability to carry out what I have imagined and planned, despite obstacles, limited re-sources and resistance from others.	I believe in my ability to understand and take the good out of experiences that others may label as failures.
	I can discuss how a realistic understanding and evaluation of my personal attitudes, skills and knowledge can influence my decision-making, relationships with other people and quality of life.	I can choose professional development opportunities with my team and organization based on a clear understanding our strengths and weaknesses.
Motivation and perseverance	I drive my effort by using my desire for achievement and belief in my ability to achieve.	I can coach others to stay motivated, encouraging them to commit to what they want to achieve.
	I can use strategies to stay motivated (for example, set goals, monitor performance and evaluate my progress).	I can use strategies to keep my team motivated and focused on creating value.
	I can persevere in the face of adversities when trying to achieve my goals.	I can devise strategies to overcome standard adverse circumstances.
	I can celebrate short-term achievements, in order to stay motivated.	I can inspire others to work hard on their goals by showing passion and a strong sense of owner-ship.
Mobilizing resources	I can develop a plan for dealing with limited resources when setting up my value-creating activity.	I can get together the necessary resources to develop my value-creating activity.
	I take into account the non-material cost of using resources when taking decisions about my value-creating activities.	I can choose and put in place effective resource-management procedures (for example, life-cycle analysis, solid waste).
	I can manage my time effectively, using techniques and tools that help make me (or my team) productive.	I can help others manage their time effectively
	I can manage my time effectively, using techniques and tools that help make me (or my team) productive.	I can help others manage their time effectively
	I can find digital solutions (for example, free, paid for, or open-source) that can help me manage my value- creating activities efficiently.	I can find support to help me take ad-vantage of an opportunity to create value (for example, advisor or consultancy services, peer or mentor sup-port).
Financial and economic literacy	I can explain the difference between a balance sheet and a profit-and-loss account.	I can build financial indicators (for example, return on investment).
	I can apply the financial planning and forecasting concepts that I need to turn ideas into action (for example, profit or not for profit).	I can judge the cash-flow needs of a complex project.
	I can choose the most appropriate sources of funding to start up or expand a value-creating activity.	I can apply for public or private business support programmes, financing schemes, public subsidies or calls for tender.
	I can estimate how my financial decisions (investments, buying assets, goods and so on) affect my tax.	I can make financial decisions based on current taxation schemes.

Mobilizing others	I can get endorsement from others to support my value-creating activity.	I can inspire others, despite challenging circumstances.
	I can pitch effectively in front of potential investors or donors.	I can overcome resistance from those who will be affected by my (or my (team's) vision, innovative approach, and value-creating activity.
	I can communicate the vision for my (or my team's) venture in a way that inspires and persuades external groups, such as funders, partner organizations, volunteers, new members and affiliate supporters.	I can produce narratives and scenarios that motivate, inspire and direct people.
	I can influence opinions in relation to my value- creating activity, through a planned approach to social media.	I can design effective social- media campaigns to mobilize people in relation to my (or my team's) value-creating activity.
Taking initiative	I can delegate responsibility appropriately.	I can encourage others to take responsibility in value-creating activities.
	I can initiate value-creating activities alone and with others.	I can help others work independently.
	I take action on new ideas and opportunities, which will add value to a new or existing value-creating venture.	I value others taking the initiative in solving problems and creating value.
Planning & management	I can define long-term goals arising from the vision for my (or my team's) value-creating activity.	I can match short-term, mid-term and long-term goals to the vision for my (or my team's) value-creating activity.
	I can summarize the basics of project management.	I can apply the basics of project management in managing a value- creating activity.
	I can develop a business plan based on the model, describing how to achieve the value identified.	I can organize my value-creating activities using planning methods such as business and marketing plans.
	I can define the priorities to meet my (or my team's) vision.	I can stay focused on the priorities set, despite changing circumstances.
	I can describe different methods for performance and impact monitoring.	I can define what data is needed to monitor how effective my value-creating activities are and an appropriate way to collect them.
	I can embrace change that brings new opportunities for value creation	I can anticipate and include change along the value-creating process.
Coping with uncertainty, ambiguity and risk	I can find ways of making decisions when the information is incomplete.	I can pull together different viewpoints to take informed decisions when the degree of uncertainty is high
	I can apply the concept of affordable losses to make decisions when creating value.	I can compare value-creating activities based on a risk assessment.
	I can demonstrate that I can make decisions by weighing up both the risks and the expected benefits of a value-creating activity.	I can outline a risk management plan for guiding my (or my team's) choices while developing my value-creating activity.
		I can support diversity within my team or organization.
	I can compromise where necessary.	I can deal with non-assertive behaviour that hinders my (or my team's) value -creating activities (for

Working with others		example, destructive attitudes, aggressive behaviour and so on).
	I can describe different techniques for managing relationships with end users.	I can put in place strategies to actively listen to my end users and act on their needs.
	I can build a team based on the individual knowledge, skills and attitudes of each member.	I can contribute to creating value by teaming up with distributed communities through digital technologies.
	I can use techniques and tools that help people to work together.	I can give people the help and support they need to perform at their best within a team.
	I can use my network to find the right people to work on my (or my team's) value-creating activity.	I proactively make contact with the right people inside and outside my organization to support my (or my team's) value-creating activity (for example, at conferences or on social media).
Learning through experience	I can reflect on my (or my team's) achievements and temporary failures as things develop so as to learn and improve my ability to create value.	I can help others reflect on their achievements and temporary failures by providing honest and constructive feedback.
	I can find and choose opportunities to over-come my (or my team's) weak-nesses and to develop my (or my team's) strengths.	I can help others develop their strengths and reduce or compensate for their weaknesses.
	I can integrate lifelong learning into my personal development strategy and career progress.	I can help others reflect on their interaction with other people and help them learn from this interaction.

Annex 2. Checklist for apprenticeship programme design

Template for corporate and VET trainers to follow for the apprenticeship programme design				
Step 1. Objectives and goals				
Define the main objectives and goals of you apprenticeship program.				
Step 2. Learning outcomes				
Use the table below to define the main learning outcomes				
Actions	**Performance criteria**	**Knowledge**	**Skills**	**Competences**
Step 3. Identify the apprentices profile and the user types for gamification				
Select the techniques that you will use to determine the apprentices profile and the user types for gamification				
☐ Interviews ☐ Survey ☐ Diaries ☐ Observation ☐ Focus group				

Step 4. Design the App.Mode project			
Context analysis	**Design the PBL scenario**	**Gamification design**	**Assessment criteria and methods**
Define a general narrative or theme and proposed the challenge.	*Design the PBL scenario with an embedded problem.*	*Brainstorming activity, select the appropriate game elements and describe the reward system.*	*Define the assessment criteria and methods to find out if apprentices have achieved the learning outcome.*

Step 5: Game implementation and performance evaluation

Describe the pilot project that will be used for field evaluation of the apprentice's model design. Define how you will develop the performance evaluation (playtesting, interviewing, and observation).

Step 6: Monitoring
Define the monitoring methods (collect data to evaluate the implemented PBL and gamification mechanics, to identify irregularities and to check whether the desired apprentice behavior is achieved - list of a possible improvements)
Trainer/mentor
(Name + substitute)
Support to the learner

Timeframe												
Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Preparation												
Implementation												
Evaluation												

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