ISSN 1831-9424

European Commission

ETF Working together Learning for life
European Training Foundation

“Scaffold”, a deck of cards to design competence-oriented learning experiences.

A practical guide for educators.

Bacigalupo, M.
Bekh, O.
Binasco, A.
Israel, H.
Weikert García, L.

2024

EUR 31863 EN

This publication is a report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It has been produced in collaboration between the JRC and the European Training Foundation (ETF), with complementary contributions from both institutions and input from external experts. It aims is to support educators in designing learning activities aimed at developing learning outcomes for key European competences using Scaffold deck of cards, a joint product of the ETF and the JRC. The contents of this publication do not necessarily reflect the position or opinion of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication. For information on the methodology and quality underlying the data used in this publication for which the source is neither Eurostat nor other Commission services, users should contact the referenced source. The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

EU Science Hub
https://joint-research-centre.ec.europa.eu

European Training Foundation
https://www.etf.europa.eu/

JRC136622

EUR 31863 EN

PDF ISBN 978-92-68-12922-7 ISSN 1831-9424 doi:10.2760/057661 KJ-NA-31-863-EN-N

Luxembourg: Publications Office of the European Union, 2024

How to cite this report: European Commission, Joint Research Centre, Bacigalupo, M., Binasco, A., Bekh, O., Israel, H. and Weikert García, L., *"Scaffold", a deck of cards to design competence-oriented learning experiences*, Publications Office of the European Union, Luxembourg, 2024, https://data.europa.eu/doi/10.2760/057661, JRC136622.

Contents

Abstract **3**

Acknowledgements **4**

Executive summary **6**

1 Introduction **8**

2 How is Scaffold structured? **9**

2.1 Composition of the deck of cards 9

2.2 Structure cards and library cards 10

2.3 This guide 10

2.4 How to start 11

3 Principles **21**

3.1 Engage learners in real-life learning experiences 21

3.2 Use reflection to enhance learners' understanding of how they learn and how they can control how they learn 22

3.3 Place the learner at the centre 23

3.4 Shift the focus from teaching a subject to facilitating learning 23

3.5 Open the classroom to the community and engage others in the learning process 24

3.6 Embed triggers for emotional learning 25

3.7 Assess progress through multiple methods and make it visible 25

4 Teaching Methods Cards **27**

4.1 Project-based learning (PBL) 27

4.1.1 Project-based learning ideas 31

4.1.1.1 Sustainable development goals (SDGs) *31*

4.1.1.2 Exhibition *33*

4.2 Learner-led learning (LED) 35

4.2.1 Learner-led learning ideas 37

4.2.1.1 Individual learning Plans *37*

4.2.1.2 Ikigai *38*

4.3 Value creation pedagogy (VCP) 41

4.3.1 Value creation pedagogy ideas 43

4.3.1.1 Creating value for animals *43*

4.3.1.2 Creating a video tutorial on a topic of this year programme ... *44*
4.4 Cooperative learning (CL) ... 46
4.4.1 Cooperative learning ideas ... 48
4.4.1.1 Group note taking ... *48*
4.4.1.2 World Café ... *48*
4.5 Seriously playful learning (SPL) ... 50
4.5.1 Seriously playful learning ideas ... 52
4.5.1.1 Simple gamification techniques ... *52*
4.5.1.2 Making failing fun ... *54*
4.6 Laboratory learning (LL) ... 55
4.6.1 Laboratory learning ideas ... 58
4.6.1.1 Imagine If (). ... *58*
4.6.1.2 Science simulations ... *59*
4.7 Service learning (SL) ... 61
4.7.1 Service-learning ideas ... 63
4.7.1.1 Let's not eat the planet ... *63*
4.7.1.2 Digital Competence for the elderly ... *64*
5 Assessment Methods Cards ... 67
5.1 Peer feedback ... 67
5.2 Self-reflection ... 70
5.3 Generating assessment evidence ... 73
5.4 Authentic assessment ... 78
5.5 Automated assessment ... 80
5.6 Observation ... 83
5.7 Questions for learning ... 85
6 Conclusions ... 87
7 References ... 88
List of figures ... 90
List of tables ... 91

Abstract

This guide has been prepared to accompany practitioners who will be starting to use the Scaffold deck of cards for designing learning experiences aiming at the development of key competences of young and adult learners while applying the “integrated learning outcomes” approach.

The idea behind Scaffold is to provide educators with a deck of cards that they can use to design teaching, learning and assessment activities. The cards represent competences, instructional design principles, assessment methods, and prompts for educational activities. The concept of Scaffold is presented as a portable, user-friendly tool that helps educators combine competences in meaningful ways.

The tool is designed to stimulate creativity and awareness in the instructional design process, providing a blueprint for educators to incorporate key competences into their teaching practice. It addresses the challenges identified by the Council Recommendation on key competences for lifelong learning (2018/C 189/01), including the variety of learning approaches, support for teachers, and assessment and validation of competence development.

While the “Scaffold” cards are a self-contained, intuitive, ready-to-use tool, that comes with a small booklet for guiding the new users in their first steps in using the card deck to the design of curricula and learning activities - as short as one lesson and as long as the whole course – this guide allows education and training practitioners and researchers to dig deeper into the main principles of learning design aiming at the development of learning outcomes for key European competences. This guide focuses specifically on the teaching and learning methods best suited to support the development of such learning outcomes in a cross-disciplinary, cross-curricular and integrated way.

Acknowledgements

This practical guide for educators on how to use key competence cards to design learning experiences aims to support educators in using the Scaffold deck of cards - a tool for educators developed jointly by the European Training Foundation (ETF) and the Joint Research Centre (JRC) of the European Commission.

Scaffold could not have come to life without the contributions of key competence practitioners in Europe and beyond who have shared with the JRC, the ETF and the wider community their joy and pain points in using the European Competence Frameworks.

We are particularly grateful to the educators who gave their time and energy to help us both in designing this map and in testing its early version: Miguel Ángel Espinar Cerrejón, Paz Fernandez de Vera, Kornélia Lohyňová, Elena Luppi, Elin McCallum, Oksana Pasichnyk, Aurora Ricci, Roman Shyyan and Enzo Zecchi..

The expert work on the Scaffold Card Deck was led by Margherita Bacigalupo (JRC) and Olena Bekh (ETF), in collaboration with Andrea Binasco (Sefirot), and made possible by the ETF production team of Ermina Martini, Joanna Anstey and Galyna Terzi. We are also very grateful to the ETF managers who supported the development and launch of the Scaffold deck: Georgios Zisimos, Manuela Prina and Sofia Sakali, as well as colleagues who peer reviewed the cards: Julian Stanley and Jolien van Uden.

We would like to thank the authors of the European Key Competence Frameworks in alphabetical order: Guia Bianchi, Marcelino Cabrera, Stefanie Carretero, Anusca Ferrari, Vladimir Garkov, Panagiotis Kampylis, Stefano Kluzer, Yves Punie, Ulrike Pisiotis, Arianna Sala and Riina Vuorikari. Scaffold is based entirely on their ground-breaking work.

While the Scaffold deck of cards has been produced as part of the institutional work programmes of the ETF and the JRC, this guide represents the collective research of a group of experts with deep knowledge of key competences development as well as instructional and assessment design, and could be used as an additional resource for educators, policy makers and education specialists looking for ways to improve teaching and learning practices in the development of key competences learning outcomes for young and adult learners.

Authors

Margherita BACIGALUPO

is Deputy Head of the Innovation Policies and Economic Impact Unit at the European Commission Joint Research Centre. In her previous role as Scientific officer in the Human Capital and Employment Unit, she led JRC work on the Entrepreneurship Competence Framework.

Driven by her vision to turn the competence frameworks into easy-to-use tools to plan learning interventions, she has mobilised the resources to make Scaffold happen.

Olena BEKH

leads the ETF's "Creating New Learning" (CNL) expert team working to make innovation a strong driver of teaching and learning modernisation in the EU's partner countries. Following many years of research, teaching, publishing books, designing curricula, developing education policies and tools, she currently works as a Senior Specialist in Human Capital Development at the European Training

Foundation with expertise in education innovation, key competence, human capital development policies, education systems and standards, curricula, teacher training, entrepreneurial learning, etc. “Creating New learning” initiative was the ETF’s “home” of Scaffold development.

Andrea BINASCO

is a teacher and one of the two founders of Sefirot Independent Publisher. He valued the idea of creating easy to use competence frameworks and he used his expertise in designing analogue creative tools to help develop Scaffold.

Hazel ISRAEL

has been working with diverse competence frameworks with groups of all ages in wide-ranging contexts for 30 years. Her perspectives derive from roles as practitioner, teacher trainer, researcher, examiner, qualification developer, quality assurer and instructional designer. Her professional priority is to support development and delivery of purposeful and meaningful learning experiences, which are relevant to the needs, interests, experiences and aspirations of each and every learner. She sees Scaffold as structured and practical support for teachers to design engaging, inclusive, creative and collaborative learning experiences.

Lilian WEIKERT GARCÍA

is an external collaborator at the JRC who has participated in the development of support materials for some of the JRC competence frameworks. As practitioner in training of key competences and transversal skills in espacio RES and laPlasita, she understands the need to make the frameworks more accessible to educators and users, and to develop learning activities that mix competences from the different frameworks. With Scaffold she has spotted the opportunity to leverage her experience as adult trainer and to create value for others.

Executive summary

This practical guide for educators accompanies Scaffold, a deck of cards created to help educators design learning activities that integrate multiple key competences and foster their development for learners.

Scaffold contains a booklet to give its users the information they need to use the deck for educational purposes. This practical guide is meant to provide provides educators with supplementary information for planning successful learning interventions to that which can be found in the deck of cards and accompanying booklet. It offers more details, suggest examples, and offer tips, empowering educators to gain more confidence and fluency in using Scaffold.

It starts by explaining *how to use Scaffold*. It then provides a series of *principles* that will guide educators in designing, implementing, and appraising, competence-oriented learning experiences that allow learners to stage and grow their key competences. Finally, the guide provides extra information to make the most of Scaffold in each educator's practice, by offering step-by-step guidance and examples on how to use different *teaching* and *assessment* methods to orient educational activities towards competence development.

What Scaffold is

Scaffold is a deck of cards created to help educators design learning activities that integrate multiple key competences and foster their development for learners.

It has been produced jointly by the European Training Foundation (ETF) in the framework of its Creating New Learning (CNL) initiative, and the Joint Research Centre of the European Commission (JRC), in the context of its work on key competences with Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL).

It is a tool to be used before entering the classroom, which contains a guide on how to articulate and deliver lessons and teaching, learning and assessment activities.

It is based on the European Competence frameworks developed by the JRC on personal, social and learning to learn competences (LifeComp), for digital competence (DigComp), for entrepreneurship competence (EntreComp) and sustainability competence (GreenComp) as well as on the ETF Reference model for Educators' Activities and Development in the 21st-century (Ready) and is designed to be used for any subject, at any level of the education system.

Who it is for

Scaffold is a tool designed for educators in formal and non-formal learning sectors, who want to design learning activities that promote digital, entrepreneurial, personal, social and learning to learn competences, and competences for sustainability.

Why it was developed

Key competence frameworks are reference documents for actors in the field of lifelong learning. Their purpose is to clarify what each given competence entails, and they adopt different strategies to do so. DigComp relies on examples of knowledge, skills and attitudes (that is on informing the provision of training), EntreComp hinges upon a progression model and learning outcome statements (that is facilitating the development and assessment of the competence) whereas

LifeComp and GreenComp adopt a descriptive approach (that is focusing on clarifying key terms and definitions associated to personal, social, learning to learn and sustainability competences).

Scaffold was developed as a way to demonstrate how the various competence frameworks can be used in flexible combinations, something which is not available from each individual frameworks. Scaffold shows how key competences can be combined by educators in meaningful teaching, learning and assessment contexts.

1 Introduction

Competence-oriented education focuses on learning outcomes, shifting the focus from what is taught to what is learnt, from the transmission of knowledge to the design of learning experiences that foster the development of knowledge, skills and attitudes, that allow learners to create new maps, to find new ways of framing challenges, and to craft novel solutions to wicked problems.

The creation of maps, the framing of complex problems, and the co-creation of innovative ways to dance along today's challenges, require an experimental pedagogical model.

Competence frameworks supply robust reference material to design learning interventions that allow learners to develop the desired array of competences. However at the level of educational practice, educators still have several decisions to make. These involve defining:

- How the learning experience they are setting up will combine the competences they, and learners, want to develop.
- What specific learning outcomes the learners will be expected to achieve.
- What pedagogies will best support the development of the desired set of competences, in parallel with the domain specific knowledge, skills and attitudes.
- What assessment methods will best suit the learning experience and the appraisal of the different competences throughout the learning journey.

Competence frameworks do not dictate how these decisions shall be made; they leave educators plenty of space for customisation. Scaffold provides help to fills this space; it is a tool that helps educators design competence-oriented learning experiences, for learners to develop knowledge, skills and attitudes, through active engagement with real life problems. Importantly, Scaffold supports the creative and flexible use of competence frameworks, and, by allowing the integration of the competences, invites educators to re-draw constellations to their purposes, and those of creating meaningful journeys for and with their learners.

2 How is Scaffold structured?

Scaffold is a deck of cards for educators in formal and non-formal learning sectors, who want to design teaching, learning and assessment activities that promote digital, entrepreneurial, personal, social, and learning to learn competences, and competences for sustainability. It helps educators design learning activities that integrate several key competences and foster their development for learners.

Its aim is to make key competence frameworks simple and usable for teachers and educators, combining meaningful learning activities for their learners, with essential knowledge of what each competence entails, structured with instructional and assessment design prompts.

It is a tool to be used before entering the classroom, but it also contains a guide on how to articulate and deliver lessons and learning activities.

It is based on the European Competence frameworks for personal, social and learning to learn competences ([1]), for digital competence ([2]), for entrepreneurship competence ([3]) and sustainability competence ([4]) and is designed to be used for any subject, at any level of the education system. Scaffold links all competence frameworks with one another, and with seven transversal competences that cut across all frameworks. Educators using it will have a clear picture of the educational activity they are planning; they will be given the bricks of the learning activity; and will be able to build learning experiences creatively, according to their goals and their learners' needs.

Being a deck of cards, Scaffold is portable and easy to use in collaboration. It has a fluid structure to encourage creativity and can be scaled according to user needs.

2.1 Composition of the deck of cards

Scaffold is a deck of 102 cards, divided into 5 groups. Each group guides you, the educator(s), in designing a learning activity, providing a method and step-by-step guide to selecting from a library of elements at different steps of the planning process. In Scaffold there are:

1. **Setting cards** that help you define the learning environment and collect all the relevant information before starting the planning: How much time can the activity last? Who will be the learners? What are the goals of the activity? And so on.
2. **Planning cards** to guide you in the design of the educational activity. These cards are numbered and are to be laid down in a set order. They indicate the action needed to build the activity, from choosing competences to drafting a timeline of the lesson, always keeping in mind the setting.

([1]) https://joint-research-centre.ec.europa.eu/lifecomp_en

([2]) https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework_en

([3]) https://joint-research-centre.ec.europa.eu/entrecomp-entrepreneurship-competence-framework_en

([4]) https://joint-research-centre.ec.europa.eu/greencomp-european-sustainability-competence-framework_en

3. **Competence cards** representing the competences in four frameworks (DigComp, LifeComp, EntreComp and GreenComp). Each card is cross-referenced to other competences in the deck and has a visual link to the Transversal competence it relates to. In this way, you will be able to pick the competences you wish to focus on in a given lesson or setting, and to find new and original connections between them. Transversal Competence cards represent the competences that cut across the four frameworks and they help navigate and harmonise the competences of the frameworks.
4. **Teaching Method cards** are a library of possible pedagogical approaches to be used in the educational intervention. They prompt and promote selection of appropriate teaching methods with practical guidance on how to put the method into action.
5. **Assessment Methods cards** are a library of possible assessment methods that can be used for diagnostic, formative or summative assessment, at the beginning of, during or after the activity.

The Scaffold box contains a booklet, designed to be a quick reference guide, on how to use the deck. In that booklet you will find the essential information you needed to start designing learning activities – from planning to assessment.

2.2 Structure cards and library cards

As you flip through the cards, you will see that some cards have a horizontal layout and some have a vertical layout. The horizontal cards are used to plan the lesson: the setting cards first define the big picture of the activity, and then the planning cards build a structure to help you plan the activity.

The vertical cards can be thought of as libraries from which to choose the competences to be developed or the teaching and assessment methods to be used in the learning activity. Not all of them will be used, but they are there as a set of tools to be selected and used as needed for planning purposes.

Scaffold contains a lot of cards and - at first - this may seem overwhelming. It is important to remember that users are free to choose what they need and more complexity and different elements can be added as users become more confident in using the deck. Scaffold is designed to encourage learning by doing, so familiarity will increase with use.

2.3 This guide

The guide you are reading is designed to provide you with additional information on planning successful learning interventions to that found in the booklet that accompanies the deck of cards. This guide begins by explaining how to use Scaffold. It then provides a set of principles to help you design, deliver and evaluate competence-based learning experiences that enable learners to develop their key competences step by step. Finally, the guide complements the Teaching and Assessment Methods cards by providing additional information that you can use to make the most of Scaffold in your pedagogical practice. You do not need to read or study this guide to use Scaffold. The deck is designed to give you the information you need to use it. This guide expands on the basic information provided in the booklet to give you more detail, examples and tips to help you become more confident and fluent in using Scaffold.

2.4 How to start

Scaffold can be used by educators to design both short lessons and longer educational activities. It can be used by you alone or in groups. Gather your colleagues! Find a wall, a desk or any other available surface! Grab some sticky notes, putty or tape and a pen! Now you are ready to build your lesson visually!

Below you find a sequence nine step, which we suggest to make the most of the Scaffold deck of cards. They are not prescriptive and can be used flexibly to adapt to you needs, approach, working style and familiarity with competence-oriented learning.

Table 1. Getting started with Scaffold.

Step number	Activity
Step 1	Define the setting with the Setting cards
Step 2	Lay down the Planning cards
Step 3	Chose the Competence cards
Step 4	Appraise the starting level through one of the assessment method
Step 5	Select the teaching method
Step 6	Establish the desired output
Step 7	Pick the assessment method
Step 8	Gather the necessary resources
Step 9	Draft the lesson plan

Source: own elaboration

Step 1: Define the setting with the Setting cards

To begin, start by browsing the setting cards and make notes. The Setting cards are laid out horizontally and are grey and white. There are eight setting cards and a cover card. They are used to decide essential information about the learning environment and the setting of the activity. They can be used in any order and can be placed on a flat surface or on a wall using putty or tape and sticky notes. As in brainstorming, make notes around each card to define the preliminary information needed to plan the activity.

Once you have used them, you will have a clear picture of the setting and you will be able to move on, having taken everything into account (for example, the number and type of competences to be developed may vary according to the duration of the activity, the space in which the activity takes place).

Many different elements need to be taken into account when planning a lesson. It is important to study the target audience, to use appropriate language, to know where the lesson will take place and how much time you have. Follow the setting cards and you'll be sure to have all the information you need to start planning the activity.

Each setting card has a title and a question or description to stimulate reflection on the given aspect of the learning environment. Answer the question on the card by writing notes on post-its or paper and placing them next to the card. In this way, you'll be able to use them as a reference, both for yourself and for the people working with you.

The **duration** card**:** How long will the activity last? This card reminds you to determine the duration of the learning activity and to take it into account when planning the lessons. It is very important to know how much time we have available and to consider how many lessons/hours we want or can

devote to a learning activity. Write around this card the expected time span, be it 2 hours or 4 weeks!

The **aim** card: What is the aim of the activity? This card refers to the final, general aim or goal of the activity. It does not have to be related to the competences or the curriculum, but rather to the general objective you are pursuing (and possibly together with your colleagues). For example, it might be 'to prepare learners for work experience', or 'to engage learners and facilitate classroom management', or multiple objectives.

The **topic card** relates to the discipline or subject area you teach. It encourages you to think about the key links with the curriculum, even if the activity is part of an 'integrated learning outcomes' approach. What are the main topics of the lesson? While the main learning objective may be the development of competences, the lesson will often cover different subject areas and topics. Use this card to record the content of the educational activity as it is described in the curriculum you are required to follow. For example, if you are a history teacher, the topic might be "Napoleon". You could work with the computer science teacher to develop students' digital programming skills by creating a battle simulator. However, from your point of view, one of the topics you could list under this card would still be "Napoleon's campaigns".

Figure 1. Setting cards

Source: Scaffold deck of cards booklet

The **target audience** card is used to define who will take part in the learning activity. Who are the learners? How many learners will be in the class? Around this card, outline the number of learners, their backgrounds, experiences and any relevant information that can help to tailor the activity to the target group.

The **needs card** focuses on the specific needs of the learners. What needs will be addressed? Are they general or specific needs? Whereas the Aims card focused on the teacher, here you consider

the specific needs or preferred learning approaches of individual learners or the class as a whole. For example, they may respond better to a visual approach, require thorough preparation or need extra time to achieve the objectives.

The **resources** card: What resources/equipment/people are needed for the intervention? This card can be used to note the equipment, software, hardware, materials or teaching aids that will be available or needed. If external resources are needed or available for the activity, make a note of them for instance on a sticky note that you place next to the resource card. You can also indicate who is responsible for obtaining them. This method can also be used to list human resources: Will you need support from other teachers or a teaching assistant? Will you need to involve someone from the community in the teaching? If so, make a note of this on the sticky note.

The **space** card refers to the physical setting of the activity. Where will the lessons take place? It is important to know this information before planning and to define any space requirements for optimal results. The activity may also take place online or in a blended environment. In such cases, consider the platform to be used and any adaptations to the teaching approach needed in the online or blended context, as well as the opportunities the online environment can offer.

The **real-world links** card**:** What real life issues will be addressed? Are there general or specific real-world links? This card helps to make links between the activity and the community, society and the real world. This could include links to other subjects or teachers, as well as links to the external context. Connecting lessons to reality is often overlooked, but is crucial for meaningful learning activities.

Step 2: Lay down the Planning cards

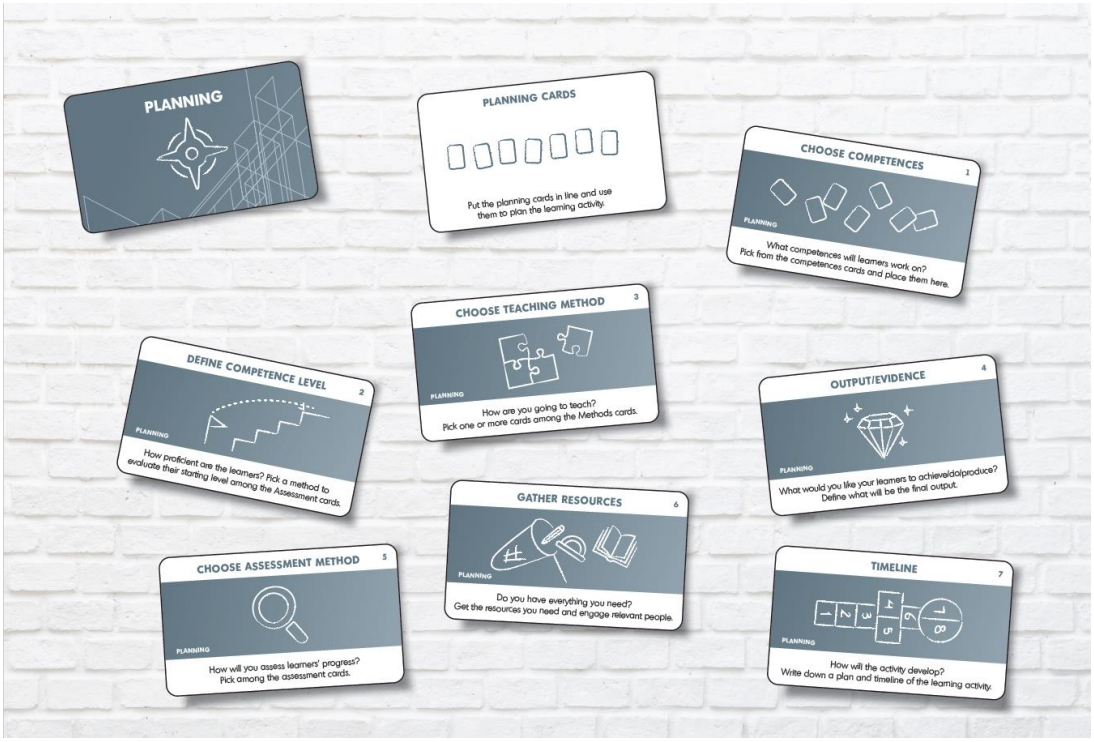
After using the setting cards, the next step is to use the planning cards. The planning cards are a canvas to guide the teacher in designing the activity. The cards are numbered and are used from one to seven. Each card asks for an action: it could be to decide how to teach, to implement the timeline of the learning intervention, or to choose one of the Competences, Methods or Assessments cards.

Place them on a surface, such as a table, or hang them on the wall in their numerical order to get the big picture of the process and to share it with others if you are working with other(s).. Each type of card is like a box that needs to be filled in: you need to make notes underneath it, or fill it in with the library cards in the Scaffold deck.

NOTE

The suggested process aims to be both comprehensive and generic. It can be a valuable resource for trainers, inexperienced teachers and experienced teachers wishing to reflect on their practice. **However, it is important to note that this is a flexible template that can be adapted.** Teachers may choose to skip certain cards, especially if they already have a reliable process to which they are accustomed. The order of the cards can also be changed. We have consulted with many teachers and tested the cards extensively with different teams and some teachers have different planning approaches. In addition, certain situations may require a method- or output-driven approach. Someone may therefore prefer to start with the teaching method, the desired output or any other step. As the main aim of Scaffold is to support the introduction of key competences in the classroom, we decided to start with the step of choosing the competence, emphasising the importance of this action in the teaching process

Figure 2. The Planning Cards



Source: Scaffold deck of cards booklet

There are seven Planning cards and one Cover card. Like the Setting cards, they have a horizontal layout and are grey and white. Each card has a number, a title and a short description. The purpose of these cards is to give the teacher a process to follow when preparing a lesson. They are a safe blueprint to avoid losing focus or forgetting something important. The planning phase is a series of actions, from the teacher's point of view, in which they consider what the setting is and act accordingly.

Arrange the planning cards and start planning your lesson. Make notes under each card or include library cards beyond the Planning card. These will be the next steps in using Scaffold.

Step 3: Chose the Competence cards

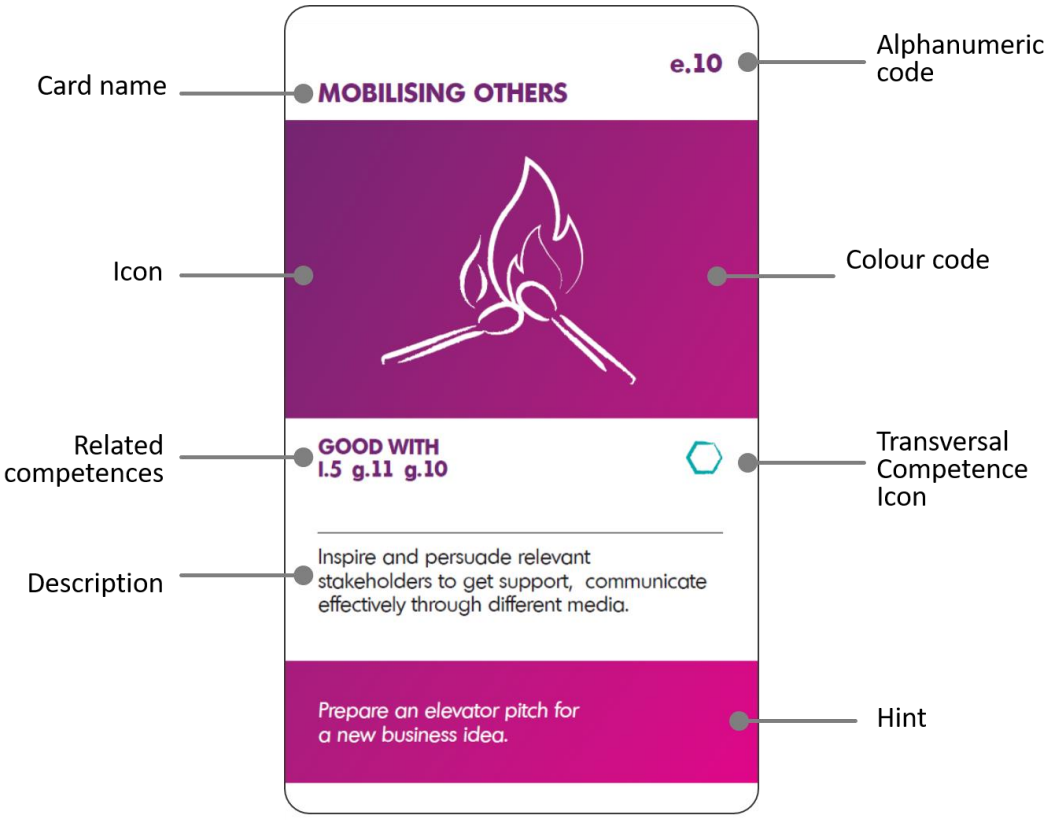
The first Planning card focuses on selecting the competences to be taught. Gather the Competence cards from the deck and choose the ones you intend to develop through the learning activity. These Competence cards represent a library of key competences derived from frameworks such as DigComp, LifeComp, EntreComp, and GreenComp. The deck consists of 57 competence cards in total: 21 for DigComp, 15 for EntreComp, 9 for LifeComp, and 12 for GreenComp. Additionally, there are four cover cards, one for each competence category. These cards share a similar graphic design and structure.

Use the Competence cards as a resource for choosing the competences you will teach, and place the selected cards beneath the "**Choose competence**" card (#1) within the Planning sub-set. The structure of the Competences cards includes the following elements:

Colour Code: The competence cards are colour-coded for easy visual recognition. Digital competence cards are orange, entrepreneurship competence cards are purple, personal, social, and learning to learn cards are lime-yellow, sustainability competence cards are green, and transversal

competence cards are aqua-blue. This colour code helps to distinguish between the different types of competence cards at a glance.

Figure 3. Elements of a competence card.



Source: Scaffold deck of cards

Alphanumeric Code: Each card is assigned an alphanumeric code that indicates its affiliation with the EU competence frameworks and specifies the corresponding section within the framework. This code facilitates easy referencing. For instance, d.1 represents the first competence in DigComp, e.15 signifies the fifteenth competence in EntreComp, and so forth. This system ensures convenient and efficient identification of the competences within the frameworks.

Card name: Each card is labelled with a card name that corresponds to the title of the competence. In most instances, this title aligns with the name of the competence as it appears in the respective EU competence framework. However, there are a few exceptions where certain cards required amendments to their competence names. These modifications were made to ensure that the deck keeps its practical and operational focus, moving away from overly academic terminology.

Description: The description of each competence card encompasses a rephrased version of the original description found within the relevant EU competence framework. This rephrasing ensures that the description remains aligned with the framework while providing a clearer and more accessible understanding of the competence.

Hint: Every competence card offers a practical suggestion for the teacher on how to foster the development of that particular competence. The intention is to provide a useful starting point, allowing the teacher to engage with the selected competence card effectively. These suggestions are designed to be as practical as possible. They are formulated as exercises or requests that can

aid the learner in their progress (e.g., “Explore your digital profile to safeguard your privacy and reputation”). By following these hints, teachers can facilitate meaningful learning experiences related to the specific competence.

Good with: While it is possible to develop each competence alongside others, certain competences naturally complement each other. On each card, you will find a “Good with” section that suggests other competences that are highly compatible for simultaneous development. These recommended competences are identified by their alphanumeric code (as explained earlier). This guidance aims to assist teachers in selecting and combining competences that synergistically support comprehensive learning experiences.

Figure 4. Making notes around the competences cards.

Source: European Training Foundation

Transversal competence icon: Each card features a small icon indicating the transversal competences that are developed through that specific competence. This icon corresponds to one or more Transversal competence cards (explained below) and signifies the transversal competence that will be enhanced by the respective competence card. Furthermore, this icon enables the alignment and mapping of competence cards from different EU competence frameworks based on the transversal competences they develop. For example, the “Growth mindset” (l.7 competence) and the “Spotting opportunities” (E.1 competence) both contribute to the development of the “Critical thinking” transversal competence. Hence, the icon serves as a valuable tool in identifying a group of

competences from diverse EU competence frameworks that collectively foster the growth of the same transversal competences. This alignment facilitates the integration of Scaffold cards into the local curriculum.

There are seven Transversal Competence cards: critical thinking, problem solving, teamwork, communication and negotiation skills, analytical skills, creativity, and intercultural skills. These cards serve as reminders, unifying features, and an index for the other competence cards. Each Transversal Competence card includes a title, a prominent icon that appears on the other competence cards, and a brief description of the competence it represents. Together, these Transversal Competence cards provide an overarching framework that highlights the key skills and abilities necessary for comprehensive development across various competences

Table 2. Transversal Competence Icons

	Critical thinking		Analytical skills
	Problem solving		Creativity
	Team work		Intercultural skills
	Communication and negotiation skills		

Source: Scaffold deck of cards booklet

How to choose the competences?

TRANSVERSAL CRITERION:

To develop a transversal competence without a specific competence in mind, look for the cards with the corresponding transversal competence symbol. For example, if you want to develop intercultural skills, select the cards with the “intercultural skill” icon. This approach allows you to gather a subset of cards from different EU competence frameworks that all focus on the same transversal competence. Then, you can choose the desired number of competences from the pre-selected cards, making the selection process more manageable.

COMPETENCE-DRIVEN CRITERION:

If you have identified a particular learner’s need or if the learners want to work on specific competences, simply pick those competences from the deck. Start by considering the framework to which the needed competence belongs. If multiple competences are to be developed, refer to the “Good with” section on each card to identify complementary competences. Continue this process until you have the desired number of competences to be developed.

RANDOM CRITERION:

For a more creative approach, randomly select one or more Competence cards and devise a lesson plan to develop the resulting competences within the given setting. This method encourages you to adapt the topic, setting, method, and other elements based on the chosen competences, fostering original and stimulating activities with innovative combinations of competences.

Place the selected competences under the “Choose competences” card to define and keep them in mind. You can choose as many competences as needed, but we recommend starting with at least three competences from the frameworks.

Step 4: Appraise the starting level through one of the assessment method

Under the “**Define competence level**” card (#2), you will assess the proficiency level of learners in the selected competences. This diagnostic phase helps determine the learners’ starting point in their competence development at the beginning of the activity. Consider the possibility of diverse levels among learners to design an educational activity that accommodates, supports, and challenges each individual appropriately. Assessments, such as entry tests or interviews, can be used to identify these levels. Defining the proficiency level of learners in the chosen competences is crucial.

To define the starting level of a learner or all learners, use the “Define competence level” card. You can select an Assessment Methods card (p. 67) to choose the assessment method for the entry test or the diagnostic assessment at the beginning of the activity.

There are seven Assessment Methods cards, along with a cover card. These cards, characterised by a dark blue background and a vertical layout, provide a library of possible assessment methods. The assessment method plays a significant role in the success of the educational activity as it helps determine learners’ starting points, track their progress, evaluate goal achievement, and assess the effectiveness of the chosen teaching method. These cards serve as a starting point for you to decide how the assessment process will be conducted. Assessments can be done at the beginning, during, or after the activity, and the methods can be diagnostic, formative, or summative.

Please note that this list is not exhaustive; it serves as a starting point for selecting an assessment method for your educational activity. It represents the work of expert teachers and scholars who have categorized and defined the main assessment approaches for competence-oriented, experiential learning activities.

Each Assessment Method card includes a title, a description, and a hint. The title represents the name of the assessment method, including the full name, if an abbreviation is commonly used, to avoid confusion across different countries. The description provides a brief yet comprehensive definition of the method, highlighting its key aspects. It is important to note that the description is not exhaustive, and further research from additional sources is recommended to explore more ways of using the method. The hint offers a three-point suggestion to educators on implementing the assessment during the educational activity. Place the Assessment Method cards below the “Define competence level” card or make a note of your selected assessment method.

Step 5: Select the teaching method

Under the “**Choose teaching method**” card (#3), define the teaching method you intend to use. It is important to decide on the teaching method before planning the activity, and some teachers may find it practical to select it even before having chosen the topic or the competences to be taught. Select your preferred method from the Teaching Method cards. There are seven Teaching Method cards plus one cover card. They have a vertical layout and a light blue background. They present the most common experiential learning teaching methods and approaches that can be used during a lesson or a series of lessons. The list is not complete, and it is meant to be a starting point for you to choose the method you would like to use for the educational activity. Some of the definitions are quite broad and may encompass different teaching strategies, since only the main traits of the approaches are considered. The teaching methods included in the deck have been selected by expert teachers and scholars with the aim to group and define the main ways educators could

approach competence-oriented, experiential learning. Each card has a title, a description of the method and a hint to help you understand the activity and put it into practice. The title is the name of the teaching method. In case the teaching method is known by an abbreviation, the card presents the full name, to prevent confusion. The description is a broad but short definition of the method, and it is used to better identify the technique and to underline its most important aspects. It is made of one or two sentences under the Title. The description is not meant to be complete, and we suggest researching the method from various additional sources before using it. The hint is a practical suggestion to help you put the method into action. You can put the chosen Teaching Method card under the Choose teaching method card, in line with the Competence cards selected before. In case you prefer a different method, i.e., the method developed over time, or the one that is not included in the Teaching Method cards, you can write it on a post-it and put under the Choose teaching method card, in line with the selected competences. More than one method may be chosen and combined for longer activities.

Step 6: Establish the desired output

During the planning phase of the educational activity, it is essential to define the tasks and expectations for the learners both throughout the activity and at its conclusion. Under the "**Output**/**evidence**" (#4) card, describe what you will be asking the learners to do or produce. Clearly define the desired final product or expected result, as well as any specific requirements or tasks to be completed during and/or at the end of the activity. The output serves as tangible evidence of the learners' engagement and serves as a basis for evaluation or assessment to gauge the quality, progress, and competency achieved.

By articulating the desired output, you provide a clear framework for learners to understand what is expected of them and establish the criteria against which their work will be evaluated. This not only guides their efforts but also allows for meaningful assessment of their performance and growth. Consider including specific details, instructions, or guidelines related to the output or evidence you are seeking from the learners. This may include written work, presentations, prototypes, group projects, or any other form of demonstration or expression that showcases their learning and application of the acquired competences. Remember, the defined output or evidence will play a vital role in assessing the effectiveness of the educational activity and the attainment of desired learning outcomes.

Step 7: Pick the assessment method

When planning the educational activity, selecting an appropriate assessment method is crucial. It is important to avoid the common mistake of overlooking assessment until the end of the activity. Assessing only at the end may result in evaluating aspects unrelated to what learners were specifically asked to demonstrate throughout their educational journey. Under the "**Choose assessment method**" card (#5), define the assessment approach to be used. Just as you selected an assessment method to evaluate the learners' starting level, you can choose from the Assessment card library mentioned earlier. You have the option to continue with the same assessment used at the beginning or opt for a different one. Place the selected assessment card under the "Choose assessment" card, aligning it with the Competence cards and the previously chosen Teaching Method card.

If the desired assessment method is not available on the provided cards, you can simply write it on a post-it note and position it beneath the "Choose the assessment method" card, in line with the selected competences. Remember, setting the assessment method is vital to ensure that the

evaluation process aligns with the learning objectives and desired outcomes of the educational activity.

Step 8: Gather the necessary resources

The next step is to gather resources for the activity. This practical step serves as a reminder to think carefully what is needed for the activity and whether anyone else should be involved. It is important for trainers to anticipate what they will need and get it before the activity begins, to avoid starting an incomplete learning experience. Resources can encompass a wide range of items, from simple printed materials to sophisticated digital tools. Additionally, you may choose to involve colleagues or external individuals to enhance the activity. Under the "**Gather resources**" card (#6), list all the resources needed for the activity and tick them off as you acquire them, keeping an updated checklist throughout the process.

Step 9: Draft the lesson plan

Now that everything is in place, it's time to prepare your lesson/activity plan. Place under the "**Timeline**" card (#7) the list of activities that will need to be followed. In this way, you will have a vertical schedule of activities for your class. Here, you will mark all the relevant phases of the activity and plan a precise schedule with descriptions of the actions to be completed throughout the anticipated duration of the activity (refer to your notes under the **duration** card from the Setting deck).

3 Principles

In this section, we describe seven inspirational principles that aim to guide you in embedding key competences into your practice with the support of Scaffold. They are there to help you i) develop the right mindset for designing experiential learning opportunities that allow learners to stage and grow their key competences and ii) take into account the main elements that make an experience relevant for competence development.

Table 3. Scaffold inspirational principles

Engage learners in real-life learning experiences
Use reflection to enhance learners' understanding of how they learn and how they can control how they learn
Place the learner at the centre
Shift the focus from teaching a subject to facilitating learning
Open the classroom to the community and engage others in the learning process
Embed triggers for emotional learning
Assess progress through multiple methods and make it visible

Source: own elaboration

Each principle is accompanied by a series of tips that provide extra guidance. What is more, each principles invites you to try out a teaching method and combine it with an assessment method. Principles are of course transversal, but in this guide, we use every opportunity to invite the readership to explore the entire deck of cards as well as to discover additional resources that can help them grow as competence-oriented educators.

3.1 Engage learners in real-life learning experiences

Scaffold is all about planning education and training interventions that enable learning through experience. This requires you to create the context for learning by doing, which is setting the conditions for learners to develop relevant knowledge, skills and attitudes in interaction with reality.

Your role as an educator is to create a frame for action, to establish the right climate for experimentation, to promote flexible adaptation, and to create opportunities to fail, reflect and grow.

Tips

1. Create a plan for action, considering what matters to your learners.
2. Establish the right climate for experimentation and flexible adaptation.
3. Create opportunities to fail, reflect and recover.
4. Practise and learn in a real world setting with real-world purposes.
5. Ensure numerous iterations to guarantee learning through experience.
6. Test ideas and progressively refine assumptions based on what works and what does not.

When using Scaffold to plan your intervention, be it a class, a module, or an entire programme, it is important to consider what matters to your learners, what they care about, what their needs are, how their previous experience can be leveraged though the learning activity you are setting up. In addition, it is important to make the experience authentic and relevant to learners' real life (e.g., by asking

learners to present their findings in a blog post, podcast or video addressed to real-world audiences, rather than in an essay to be graded by the teacher).

Try out project-based learning, combine it with authentic assessment

3.2 Use reflection to enhance learners' understanding of how they learn and how they can control how they learn

Learning through experience requires reflecting on the experience. Reflection over the experience, allows extracting general principles from each situation to apply them to new situations. Reflection promotes meta-cognition, which is the ability to understand one's own thought processes, including one's learning processes. It leads to increased awareness of one's strengths and weaknesses as learners, team members, creative thinkers, resilient agents, etc. helps in self-directed learning.

Tips:

1. Build in regular opportunities for reflection.
2. Promote use of reflection to refine assumptions and improve ideas at each step of a learning process.
3. Support use of reflection to extract general principles from each learning situation to apply to new situations, becoming the basis for further learning.

As an educator you can put emphasis on reflection, by embedding iterative cycles of discovery, ideation, and testing in the process, but also by asking learners (individually or in groups) to reflect upon their learning experience. They can do it in writing, e.g., through a reflective journal or orally, answering questions (e.g., what worked well, what did not), or discussing in pairs or groups (how they felt, what they would do next time).

When planning your learning intervention, think about how to engage learners in reflecting on their own learning. You can involve them in defining their starting point by asking them what they already know, what they do not know, what they want to master and what they would need to achieve their learning goals. You can also invite them to participate in developing the assessment criteria to increase their sense of accountability for the learning process. It is also especially important to think about the feedback that you are going to provide along the whole learning experience. Assessment methods cards can help you in this task.

Try out cooperative learning, combine it with peer feedback

3.3 Place the learner at the centre

Placing the learner at the centre of the planning, design and implementation of learning interventions is key to enable them to take an active role in their learning. It implies giving up control and giving learners autonomy to promote their independence and to motivate them to take ownership of their own learning. This in turn sets the foundation for a self-directed learning approach for life.

Tips:

1. Allow learners to make decisions about what to learn and how to learn it
2. Involve learners in all aspects of managing the learning, including planning, resourcing, evaluation, recognition, etc…
3. Foster meaningful learning
4. Facilitate peer and team learning
5. Develop personalised learning experiences

As a learning facilitator, your role is to cater for individual learners' needs and interests and to stimulate their autonomy by, for instance, allowing them to choose the challenge they want to address, to pick their group mates, to select the methods to collect data or to generate ideas, to take an active role in assessing their own progress.

When planning your intervention, make sure you take the time to think how you can personalise the learning experience for your audience, where you can give autonomy to the learners, and how you can engage them in shaping their learning experience.

Try out learner-led learning, combine it with self-reflection

3.4 Shift the focus from teaching a subject to facilitating learning

A mentor is an experienced other who is there to provide guidance and support to an individual, or a team, in a number of situations. Mentoring thus requires transferring the focus from the subject matter content, to the needs, desires, and difficulties of the learner.

Tips:

1. Reduce learner dependency on you as an educator.
2. Prompt learners to draw upon their previous experience and assume new roles as they face new situations.
3. Develop learner self-efficacy and capacity to cope with uncertain, ambiguous, and complex situations so that they can self-direct their learning.

As a learning facilitator, you need to go beyond arranging activities for your learners to acquire all the content prescribed in a curriculum or a syllabus. You are called upon to create opportunities for learners to independently develop their own learning, to reduce their dependency on you as an educator, to draw upon their previous experience to progressively become self-directed learners. It is part of the role of mentor to support learners by considering their needs and starting points.

In learner-led activities, by acting as a mentor rather than an instructor, you contribute to the development of their self-efficacy, which in turn nurtures their capacity to cope with uncertain, ambiguous, and complex situations and self-direct their learning while creating value.

When planning your learning activities, you can think about how giving autonomy to learners requires you to change your role from providing answers, to providing guidance on how to make decisions, or to face up to challenges and temporary setbacks. Instead of the 'sage on the stage' you will be the 'guide on the side'. Ask yourself how you can communicate passion for learning to inspire, motivate, and raise aspirations of learners.

Try out laboratory learning, combine it with questions for learning.

3.5 Open the classroom to the community and engage others in the learning process

Competence oriented and experience-based learning do not happen in a void. They are rooted in real-world problems and are embedded in the social contexts of a specific community, such as learner's peers group, their own family or their neighbourhood. Opening the classroom to the community is a way to make learning relevant for others beyond the learners themselves, and those who mark their exams, and is a way for learners to experience that what they already know can be used to face up to new situations. In addition, real experiences entail ambiguity, difficulties and temporary setbacks, which help learners understand that, to cope with reality, they need to handle uncertainty, and that failure is part of authentic learning, which in turn can be used to strengthen their motivation and perseverance.

Tips:

1. Cultivate relationships with local businesses, non-governmental organisations or community associations as a source of real-life challenges, experiences and examples.
2. Build and map local stakeholders to act as mentors.
3. Interact closely with those expected to benefit from an idea to develop competence as a social process embedded in a specific community.
4. Ensure that the opening the classroom to the real world remains a safe learning experience
5. Create cooperative learning groups with clear goals, roles, and responsibilities leveraging common interest
6. Engage in a learning community with your peers, planning joint activities, asking and providing feedback, to learn with each other.

What is more, people very rarely work in isolation. Working with others requires the capacity to acknowledge and respect others; to develop empathy and emotional intelligence, so as to tune in with others; to listen actively, and incorporate other people's input; to team up with others around a common goal; to work in teams effectively; as well as the capacity to expand one's network to increase impact.

Your job as an educator is to open the classroom to the community, incorporating real world challenges into the learning process, and fostering collaboration to make learning relevant.

When planning your learning intervention, consider your learners as a community, where the learning is definitively a shared goal. You are part of that community too and you can partner with your learner to create collaborative learning environments. Plan for learners to work together on assignments, to share knowledge, ideas, resources and experiences that can be helpful, or inspire others. Prompt learners to seek feedback from peers, recognise team contributions to common objectives, and jointly develop plans for improvements. Think about how you can set the conditions for your learning community to interact with others outside the classroom. Ask yourself if you can invite the local administration, local businesses, non-governmental organisations, community

associations or specific groups of citizens (e.g., residents of a neighbourhood that is being affected in some way, e.g. by tourism, urban or rural decay).) to provide a real-life challenge or brief. When learners choose a problem to address, based on their own curiosity, drive, and passion - make sure you guide them to engage with others, to adopt a new perspective, and to frame the problem in a novel way. Learners can engage beneficiaries, users, and customers to provide feedback on ideas, or to become co-designers along the entire process.

Tips:

1. Identify the emotions present in learning processes
2. Anticipate and plan to manage emotions in tasks containing ill-defined problems, unexpected flows of events and time constraints.
3. Leverage the emotional dimension of learning to promote motivation and resilience.

learners

Remember you are also part of the educators' community within the larger community: how can collaboration with colleagues enhance your learners' experience or help you further develop your capabilities as a learning facilitator? How can you collaborate with external stakeholders to make learning more authentic for your learners?

Try out value creation pedagogy, combine it with authentic assessment

3.6 Embed triggers for emotional learning

Emotions are always present in learning processes, especially in those designed to require learners to collaborate, to face ill-defined problems, unexpected flows of events, under time constraints. Emotions happening throughout the learning experience can be leveraged to develop learners' self-awareness and self-regulation, while making learning more meaningful and memorable.

As an educator, you are invited to plan opportunities for learners to learn from events and processes that bear an emotional weight, that they care about, and expose them to coping with ambiguity, uncertainty and risk. This can be done by setting challenging tasks; having learners leave the training room; going out and interacting with their intended user groups, beneficiaries or customers; with supporters or possible detractors of their ideas, injecting uncertainty along the process; having learners work in teams; or exerting time pressure, for instance, by moving deadlines forward.

When designing and implementing your intervention, be conscious about the importance of building a safe space for learning, where learners can trust not to be judged, or shamed, for their setbacks or failures, and where their emotional wellbeing is cared for and nurtured.

Try out seriously playful learning, combine it with self-reflection.

3.7 Assess progress through multiple methods and make it visible

Learning experiences differ, mediated by learner' own interests, aspirations, emotions and previous competence level. Also, learning is situated in a social context, where interactions with others shape the learning process. Learning is not on/off, rather it is a process that takes time and is made by endless steps, and happens no matter the starting point. Assessing experiential learning and

competence-oriented learning is not an easy job as there are no standardised tests to facilitate the ranking of a learner's performance.

When learning is driven by learners' curiosity, rather than trying to establish fixed criteria to measure achievement, you, as a facilitator, can focus on observing how learners face the challenges of the learning process and help them reflect on their performance.

When planning your learning intervention, consider what possibility you have to make learning progression visible to the learners. Use progression tables when available ([5]), ([6]). Consider what type of feedback can best sustain learners' motivation and perseverance, self-awareness and self-efficacy. Reflective learning builds on the individual or collective reflection of the learners and aims to foster self-directed learning and a growth mind-set. Peer assessment involves learners assessing one another and contributes to their capacity to take on board valuable criticism from others, as well as to provide constructive feedback to others. External assessment is a very valuable asset to show learners how their learning matters to others (e.g., possible beneficiaries, prospective employers, grant awarding bodies….).

Try out service learning and combine it with generate assessment evidence, observation, and self-reflection.

([5]) Vuorikari, R., Kluzer, S., & Punie, Y. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens-With new examples of knowledge, skills and attitudes* (Vol. UR 31006 EN). Luxembourg: Publications Office of the European Union.

([6]) Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016). *EntreComp: The Entrepreneurship Competence Framework*. Luxembourg: Publication Office of the European Union.

4 Teaching Methods Cards

Scaffold proposes seven teaching methods, or pedagogical approaches, that aim to guide teachers and trainers to cultivate key competences through experiential learning. They all aim to foster learning through experience, by offering learners something to act upon, such as a problem or a challenge. These methods rely on questioning and inquiry, promoting critical thinking, collaboration and a growth mindset.

Table 4. Scaffold teaching methods cards

Project-based learning
Learner-led learning
Value creation pedagogy
Cooperative learning
Seriously playful learning
Laboratory learning
Service learning

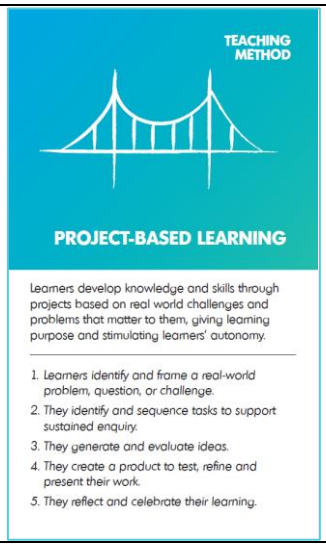
Source: own elaboration

The list of methods is not exhaustive, but offers the readership a range of alternative approaches to explore, combine and experiment with. All methods allow the realisation of the principles indicated in Chapter 3 through experiential learning activities. These teaching methods can be combined with assessment methods suggested in the next session and can be tweaked to adapt to different learning settings and contexts.
If you use a different experiential learning approach, such as design thinking ([7]), or problem-based learning ([8]), or you have developed your own approach, you can, by all means, keep using it.
Consider Scaffold for what it is, a flexible tool to help you orient your educational practice towards key competences, not a manual on how to teach key competences. Scaffold can help you to build your practice one new set of competences or method at a time.

Type	Teaching Method
Title	**4.1 Project-based learning (PBL)**

([7]) https://page.ideo.com/design-thinking-edu-toolkit

([8]) https://www.maastrichtuniversity.nl/education/why-um/problem-based-learning

	
Description	Learners develop knowledge and skills through projects based on real world challenges and problems that matter to them, giving learning purpose and stimulating learners' autonomy.
Hint	Learners **identify** and **frame** a real-world problem, question, or challenge. They identify and sequence tasks to support sustained **enquiry**. They **generate** and **evaluate** ideas. They create a **product** to test, refine and present their work. 5. They **reflect** and **celebrate** their learning.

Into Action

In project-based learning (PBL), learning is framed as a project to address a challenge or tackle a problem, something that is authentic, happens in a real-world context and matters to your learners ([9]).

1. Identify and frame a real-world problem, question, or challenge

The identification of the challenge to address is thus the first step of a PBL.

There are many ways to identify a challenge. You can give one to your learners (for instance proposing to work on the Sustainable Development Goals), or you can ask someone else (for instance a local NGO, the municipality, or a local business) to propose a challenge for them, or give learners the autonomy to choose something that matters to them.

Challenges can be clear and well defined, or less so, and the way to address them can be well defined, or not, up to and including wicked problems, for which there are no definitive solutions. The less problems are defined at the outset, the more active learners will need to be in shaping the problem (see learner-led learning, p. 35). No matter the degree of autonomy you have planned for your learners, it is essential that, in this first phase, you give them the time to understand the challenge they want to address, or the problem they are going to tackle, and frame it in a way that opens the solution space.

([9]) https://www.pblworks.org/what-is-pbl

One way to go about it is to ask your learners to answer the following questions in writing:

— What is the problem you are trying to solve? Keep it simple and broad enough to allow discovery of original ways to frame it and create value, yet still narrow enough that it is actually manageable.

— What is your vision, the ultimate impact you want to achieve? Be honest about what you expect to achieve in the time frame of the project.

— What are the main constraints you face? Time is one of them, list all the other constraints you may face along the project.

See also:

EntreComp Playbook: F5 (p.44) L6 (p.60) L7 (p.61)

LifeComp Into Action: Accountable Talk (p. 64)

Teacher booster video with Eva Stojanovska, North Macedonia

2. Identify and sequence tasks to support sustained enquiry.

Once your learners have identified a challenge, they need to define how to approach it. This enquiry phase is meant to set the foundations of the project learners will develop. By gathering information, posing questions, combining approaches to shape and address the problem iteratively throughout, learrners achieve an authentic understanding of the challenge to be addressed.

The enquiry phase is often referred to as a discovery phase to emphasise how it allows learners to broaden their understanding of the problem to address by expanding their perspective.

Working in small groups (3-5 people) is a valuable strategy to face this step. Make sure that groups are diverse so that multiple perspective are taken on board in this phase. Help learners develop the capacity to work in teams, by asking them to define each member's roles, negotiating rules of conduct and valuing the diversity of contributions to negotiate and agree consensus.

Once groups are formed, ask learners to go back to the challenge they have identified and collect all their thoughts about it; what they know already, what they need to discover, who are the people that are most affected by the challenge and would benefit from it being addressed, and how they can help in framing the challenge?

Next, invite learners to formulate an enquiry strategy: how they are going to fill the knowledge gaps they have identified, how they will uncover additional areas, where research should be performed to frame the challenge? Help them list different potential sources of information (the internet, key information repositories, insightful TED talks, experts, end users, the documentation they have produced on the topic….). Ask them to develop a plan, covering how they are going to reach out to informants and what are the questions they are going to ask.

Invite them to get inspired and expand their understanding of the topic by using metaphors, or by reasoning on paradoxes and extremes.

See also:

EntreComp Playbook: L1 (p.55) L2 (p.56) L3 (p.57) L4 (p.58), L14 (p.69), L15 (p.70), L17 (p.72), L21 (p.76)

LifeComp Into Action: Create an agreement on the rules for the (online) learning spaces (p. 74)

Teacher booster video with Kornélia Lohyňová, Slovakia

3. Generate and evaluate ideas.

Once learners have analysed and interpreted the information they have collected, they can embark on the creative phase of idea generation. Through brainstorming and other creative techniques, they can come up with multiple ideas to address the challenge that they have framed in the previous phase.

Help learners generate ideas by allowing time, and preparing a space, for creativity. Help them understand that idea generation is a semi-structured process, where rules have to be followed and ideas have to be harvested systematically, for instance using physical or virtual sticky notes.

Prompt learners to clusters the ideas generated, selecting the most promising ones through voting and discussion, and finally, to refine the selected idea to ensure that it addresses the challenge as it has been framed through inquiry.

See also:

EntreComp Playbook: L10 (p.64), L11 (p.66), L12 (p.67), L16 (p.71)

LifeComp Into Action: Novel ideas (p. 56)

Teacher booster video with Eva Stojanovska, North Macedonia

4. Create a product to test, refine and present the work.

Ideas need to be tested. To be tested they need to be turned into prototypes that allow testers to simulate their features and stimulate reflection on their value. Prototypes can be continuously evaluated within the team, throughout development and with external testers. Prototypes allow for a reality check on the idea selected for the project. They allow for additional enquiry cycle, which in turn deepen learner's understanding of how the challenge they are addressing can be approached. Depending on the time and resources available, learners can be asked to run multiple prototyping and testing sessions, to allow for progressive refinement of the idea.

Turning an idea into a tangible output does not only allow for testing it, but in PBL it is also an opportunity to demonstrate learning progress: a project artefact can be presented to an external audience. It can be documented and shared via social media, with a video or on the school website, which in turn make the learning authentic for learners.

Your role is to orient the learners in selecting an idea that can be turned into action by keeping in mind the learning objectives you have set for your activity, and the competences you want the learners to develop through this assignment.

See also:

EntreComp Playbook L26 (p.81) L27 (p.82) L28 (p.83) L29 (p.84),

LifeComp Into Action: Create an agreement on the rules for the (online) learning spaces (p. 74)

Teacher booster video with Kornélia Lohyňová, Slovakia

5. Reflect and celebrate learning.

Reflection is necessary to achieve meaningful learning, allowing learners to develop their self-awareness, grow their self-efficacy and cultivate their metacognition. It is essential to help them strengthen their capacity to extract general principles from the learning process and apply them to new contexts, thus, to nurture their capacity to self-direct their learning.

Project-based learning puts a lot of emphasis on self-directed learning, based on learners' reflections on the process, the obstacles encountered, and the strategies they have devised to overcome them.

By shifting your focus from the subject you teach, to your role as a learning facilitator, you can appreciate the importance of your power to prompt reflection. You can trigger self-reflection, provide constructive feedback, or ask learners to share their appreciation for others' contribution to their learning.

Celebrating progress is one way to attach a positive emotion to the reflective practice, and to cultivate learners' growth mind-set. When prompting learners to reflect, focus on celebrating progress rather than the quality of results. In PBL, learning is your goal. Project results are a means to this end and have no value per se.

See also:

EntreComp Playbook: L31 (p.86), L33 (p.88)

LifeComp Into Action: Give one, Get one, Move on (p.58), Reciprocal learning strategy (p. 66)

Teacher booster video with Paz Fernandez De Vera, Spain

4.1.1 Project-based learning ideas

4.1.1.1 Sustainable development goals (SDGs)

Description

The SDGs are 17 goals defined by the United Nations to tackle the world's biggest problems by 2030. Education for Sustainable Development (ESD) is at the heart of one of the targets of the Sustainable Development Goal on education SDG 4.7 and it is considered a driver for the achievements of all 17 SDGs.

Target 4.7 sat the goal that, by 2030 "all learners acquire knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and nonviolence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development."

Benefits

The 17 sustainable development goals provide a context within which learners can develop insights into issues around the world, such as gender inequality and lack of access to clean water. Learners need to understand these issues as a part of cultural norms and differences in an increasingly interconnected and multicultural society. Using the SDGs in learning encourages learners to be active participants in their local and global communities to solve the world's biggest challenges. Learners develop empathy and compassion learning about the poverty, hunger and lack of access to education experienced by their peers across the world.

The SDGs are increasingly used as a shared mission by people all over the world, creating a framework for purpose and action within which to collaborate with others across the world to create greener, more inclusive economies and stronger societies. The SDGs invite innovation and value creation

through international co-operation. Using the SDGs opens the door to practices and actions all over the world and connects learners and educators with people on similar missions.

How

Below are some inspirational triggers to run a PBL steps focusing on SDGs:

1. You can ask your learners to make their school (home, office, community building) more sustainable. You can invite learners to form groups of 3-5 persons.
2. Each group will start with exploring what it means for a school (home, office, community building) to be sustainable and planning a sequence of tasks to keep collecting information over the duration of the project. Give them autonomy to select from a range of tools and strategies they prefer to obtain information and data (e.g., from internet search, via interviews with key stakeholders, though focus groups with relevant actors). Your role is to support them, by offering guidance on how to find and use resources, how to identify success criteria or by scheduling checkpoints and deadlines to pace their progress. Remember that we are becoming more and more used to formulate questions that can be answered by search engines. You need to push your learners to work on formulating the hard questions, the ones that will require thinking to formulate an answer.
3. Learners will generate a variety of ideas that could hit the target to make their school more sustainable. These could range from preparing a pledge for learners, teachers, and the whole school staff, to cut the waste of resources by 20%; to use the school garden to grow food for the community; to campaign for a school bus that would reduce the number of cars driving learners to school; to set up a competition for sustainable school rides (on foot, by bike or in shared vehicles); to advocate for vegan food options in the cafeteria; to lobby for vending machines to be replaced by fresh produce baskets … Generating multiple purposeful ideas is a necessary step to find the most promising idea that could best address the challenge set at the beginning.
4. Project-based learning relies on the embodiment of learning into an artefact that demonstrates learning. Depending on your learners' idea, they could set up the campaign for the pledge and collect signatures from peers, teachers and school staff, or give a pitch to the school managers to propose a route for a school bus that would cut emissions, or create a vegetable yard in the school garden.
5. Using reflection to enhance learners' understanding of how they learn, and how they can control how they learn, is one of the principles set out at the beginning of this handbook (see p. 21), and an essential element of PBL. To promote reflection, you could, for instance, ask learners to discuss in pairs, groups or as a whole community, the following prompts:
    - What were the steps in the process to create this work?
    - What did you learn?
    - What new skills did you develop?
    - What were some challenges?
    - What was your favourite part of this learning experience?
    - What advice would you give to others who want to do this?

If times allows, you could also engage your learners in setting up an exhibition to showcase the project results (see next suggested idea)

More

There are lots and lots of resources available online to support learning using the SDGs. These real world examples can be used for inspiration, potential collaboration, boosting the value and impact of the learning for all. The UNESCO for instance provides clear learning objectives for Education for Sustainable Development Goals (http://unesdoc.unesco.org/images/0024/002474/247444e.pdf), as well as a series of resources for educators: https://en.unesco.org/themes/education/sdgs/material

4.1.1.2 Exhibition

Description

Exhibiting learner work is a public display and/or demonstration, when learners showcase and celebrate their learning and progress, in personal and creative ways, to a real audience. Exhibitions put learners at the centre of the stage, as they describe the process and products of their learning. Like a sports event, or performance, they can bring families and community members together to celebrate the collective work of a class, a team, or a school. With exhibitions, the whole community is taking pride in learners' progress.

Benefits

When learners know that they will be sharing their work with real audiences, they are motivated to produce work of a very high quality. When learners are invited to exhibit what they have learned, they are invited as the expert, having had time to research and prepare. Honour your learners' efforts by allowing them to decide how best to present their learning in personal and creative ways, building confidence and pride.

How

Below are some suggestions on how you could set up an exhibition as part of a PBL activity.

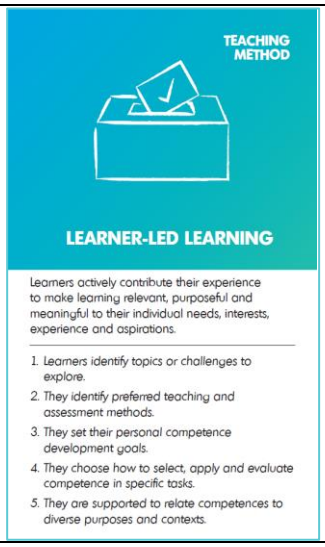
1. Schedule a date, time and space, where you can hold your exhibition.
2. Invite families, learners, colleagues, and community members to visit the exhibition.
3. Support learners to curate multimodal evidence of their learning and identify the resources they will need to display, including final products, findings and conclusions, and artefacts that highlight the learning and development process e.g., decisions and changes that were made along the way.
4. Prepare your learners and help them to focus their exhibits by reflecting on their learning and practise talking through it with a peer.
5. Learners should prepare a checklist counting down to the exhibition event.
6. During the exhibition encourage learners to discuss their learning and displays with audience members. Help visitors by allocating learners as guides, or by issuing a list of suggested questions that visitors may ask the exhibitors.
7. Plan for learners to collect data to evaluate the experience.

8. After the exhibition, ask learners again to reflect upon the experience. Support them to reflect and not just describe, focusing on what they can do now and have learned rather than simply the steps they took. You can use the what?, so what?, now what? as prompts to support critical evaluation.

Tips

Review professional examples of exhibitions. Help learners analyse the modes and techniques used, and how work is presented, in the "real world." Research Q&A sessions in galleries with artists or filmmakers, scientists presenting findings at conferences, writers publishing their work. Each profession offers examples for how to bring meaningful work to an authentic audience.

Have a look at this short video by High Tech High: Why and how of exhibitions to showcase learning

Type	Teaching Method
Title	**4.2 Learner-led learning (LED)**
	
Description	Learners actively contribute their experience to make learning relevant, purposeful and meaningful to their individual needs, interests, experiences, and aspirations.
Hint	1. Learners identify **topics** or **challenges** to explore. 2. They identify preferred teaching and assessment methods. 3. They set their personal competence development goals. 4. They **choose** how to select, apply and evaluate competence in specific tasks. 5. They are supported to relate competences to **diverse purposes** and **contexts**.

Into Action

Learner-led approaches (LED) to learning focus on preparing learners for volatile, uncertain, complex and ambiguous futures, aiming to prepare them to become creative, critical and competent actors, able to adapt to changing conditions at cognitive, behavioural and affective level.

LED is characterized by a teaching approach, which gives learners control, ownership, and accountability over their own education, while the educator acts as facilitator and resource person ([10]).

1. Learners identify topics or challenges to explore.

The first step of LED does not differ much from project-based learning (p. 27), but its primary purpose is to give an active role to learners in making choices in some aspects of the curriculum, so that the learning experience is the most relevant, meaningful and effective for them. So the first task is to plan for learners' autonomy and ask learners to choose an ill-defined problem to work on. The choice of the issue to address is the first space where learner will start developing their competences such as critical thinking, system thinking, spotting opportunities, communication and

([10]) Iversen, A.-M., Pedersen, A. S., Krogh, L., & Jensen, A. A. (2015). Learning, Leading, and Letting Go of Control: Learner-Led Approaches in Education. *SAGE Open*, *5*(4). https://doi.org/10.1177/2158244015608423

collaboration. In this initial step, they will need to argue how their subject matter knowledge and their transversal competences can be used to tackle the problem they have chosen for their enquiry.

See also:

EntreComp Playbook: F5 (p.44) L6 (p.60) L7 (p.61)

LifeComp Into Action: Accountable Talk (p. 64)

Teacher booster video with Eva Stojanovska, North Macedonia

2. Identify preferred teaching and assessment methods.

The second step of LED focuses on the collaborative nature of the relationship between learners and educator(s). It is also based on the assumption that learners are capable of making decisions about how the subject can be best taught, learned and assessed. Also, within the same cohort, some will find it easy while others will be put off by the tasks, and will argue that it is the educator's job to plan how to teach and assess a course, as he/she/they is the expert. Of course, there is room for negotiations. You can facilitate the process, by, for instance, providing an extensive bibliography on the topic, and allowing learners to make a selection, based on their interests, to then present their readings to their peers, allowing them to choose their preferred format (for instance, live presentation, podcast, video, game). You can be more radical and delegate the decision to the learners. Your choice will depend on the context. Keep the life-long learning perspective in mind and reflect how this step will enable your learners, once they are in a professional setting. They will be more prepared to deal with innovations, such as, how Artificial Intelligence can affect their personal, social, learning or work lives In this scenario, they could take a MOOC on the topic; do research on sectorial press; select a few podcasts; invite experts to provide a seminar series; establish a peer-learning network in their sector; or ask their HR department to add a dedicated training in their learning and development portfolio. Taking a LED approach will allow you to prepare your learners to manage their own learning throughout and across their lives.

See also:

Teacher booster video with Shadi Zatara, Palestine

3. Set personal competence development goals.

In LED, learners are in charge of their learning. This means that they have to play an active role in setting their own learning goals, not only in relation to the subject matter of the course or module they are taking, but also in relation to the key competences they will develop.

Help them reflect on their strengths and weaknesses and invite them to identify the areas they want to improve, either to overcome a clear deficiency, or to really excel in a given competence cluster.

See also:

EntreComp Playbook: L32 (p87) which can be expanded to all competence frameworks

LifeComp Into Action: Creating SMART goals (p. 76)

4. Chose how to select, apply and evaluate competence in specific tasks.

Ask your learners to be intentional about what they plan to do to develop the competences they have selected through their learning journey, and to track their progress toward a learning target during the learning experience. Provide numerous opportunities for checkpoints, to help learners self-regulate their learning based on their own formative assessment.

You can ask learners to track their learning in an analogue way, e.g., by keeping a journal, or you can use digital trackers and e-portfolio tools that can help capture and visualise progress and achievements.

5. Relate and apply competences to diverse purposes and contexts.

Empowering learners to self-regulate their learning by defining their learning objectives, developing strategies to meet their learning needs, setting criteria to appraise their progression, and understanding that any challenge is an opportunity to learn, is the aim of LED approaches. LED approaches allow learners to realise that lifelong learning does not mean taking courses at different stages in life, but rather finding a balance between doing things and learning through the process, a balance between learning and generating value for others at work, or in the community.

Professional training courses often end with the question, how would you apply what you have learnt today in your own practice starting tomorrow? Try to engage your learners in transferring the competences they have developed through the journey they have embarked upon under your guidance, to other aspects of their life. One straightforward way to do this is to have them work on a job application where transversal skills are sought, or to write a letter to their future self, reminding them what they have learnt in this journey that they can apply to any other situation and context. Another way is to work with individual learning plans, as explained in the next session.

See also:

Teacher booster video with Mervi Jansson, Finland

4.2.1 Learner-led learning ideas

4.2.1.1 Individual learning Plans

Description

Learners do not develop competences in the same way, from the same starting points, at the same pace. Developing competence is a highly personal endeavour. Individual learners have very different profiles and will be operating at different levels in each competence, reflecting strengths, experiences and learning goals. For this reason, competence development goals will need to be personal, to reflect the next steps needed in each competence, for each learner. An effective individual learning plan (ILP) is at the heart of learning, support, assessment and achievement. It helps the learner to become an active, motivated partner in learning.

The ILP has many functions providing a personalised, flexible route map to guide each learner's journey. It is used as a dynamic working document, owned by the learner, and supported by educators, employers and others. It creates a record of learning goals and progression routes, initial and diagnostic assessment information, learning targets, progress and achievements within different contexts for learning and is a way of making and reinforcing links and connections between topics, subject and personal, learning and thinking skills. The plan can also be used as a communication aid between the learner and others who support the learning process in various contexts and a place to collect evidence of learning.

Benefits

Learners can use ILPs to take ownership of their own learning, recognising the value of prior experiences to make sense of new experiences and understand how they learn. Through consistent

use of an ILP, learners plan to practise skills and gain confidence by applying them in a range of different contexts such as the workplace, at home or in the community, also identifying and understanding barriers to learning, and where they can find support to remove them to measure their own success.

How

In practice, this means learners using their ILP to:

— record what they want to achieve on their learning journey – their goals and progression options;

— negotiate and plan exactly what they are going to do, how and when. The ILP will include:

- learning targets with outcomes and timescales, and details of how success will be determined (success criteria);
- details of the resources, support and guidance the learner will use;
- details of where and how the learning will take place.

— view every assessment as a learning opportunity and to plan for their next steps;

— reflect on:

- what, and how, they learned;
- what went well and why;
- what went less well and why;
- where they could use the skills and approaches again.

The learner's journey is dynamic, not confined to a simple loop. Learners will pass through several cycles of learning and review. Involve learners by encouraging them to ask questions about their learning.

Tips

As you negotiate meaningful ILPs with learners, your role is to:

— create a climate in which learners can negotiate and contribute to their own learning plans.

— use teaching approaches that make learning skills explicit.

— provide constructive feedback and support for learners as they develop reflection skills.

Your role will vary from the 'sage on the stage' to the 'guide on the side' as learners gain skills and become independent.

4.2.1.2 Ikigai

Description

Educators inspire and motivate learners by appealing to their interests, recognising and relating to their experiences, and structuring learning in ways, which meet learners' needs and preferences. Effective educators, facilitators, mentors and coaches build positive and professional relationships with learners, by getting to know them beyond the confines of assessment and classroom. To fully

recognise and develop a learner's potential it is necessary to position learning as a part of lifelong learning, which adds value across all areas of a learner's experience. Ikigai ([11]) is a model, which aims to bring together what learners care about, are good at and can be paid for to help to meet the world's needs – as depicted in **Figure 5**.

Figure 5. The Ikigai model

Source : https://commons.wikimedia.org/wiki/File:Ikigai-FR.svg

Benefits

Learner led learning adopts a holistic view of each learner, drawing on their individual needs, interests, experiences and aspirations, to fully engage the learner with relevant, purposeful learning experiences. The Ikigai frame helps learners to relate their competence to important themes, which can be powerfully motivating. Using this frame to map priorities supports learners to synergise learning, from diverse purposes, in diverse contexts, into something personally relevant, purposeful and meaningful.

How

The Ikigai model shown here can be used to prompt learners to reflect on and clarify their interests, values and priorities, to get to know themselves better and to spot opportunities to live a more meaningful life. You can invite learners to brainstorm on their priorities based on the areas of the Ikigai model. You could

— invite learners to add sticky notes to a large print out or on an online whiteboard or virtual wall.

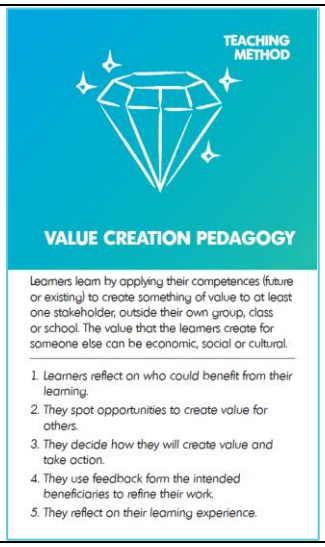
— provide time for learners to review and compare each others' models.

([11]) https://positivepsychology.com/ikigai/

— invite learners to revise their ikigai over time to see if and how ideas and priorities have changed with time.

Tips

You can use the Ikigai model to help learners fill in their Individual Learning Plan, to support them in taking responsibility over their own learning in relations to their aspirations.

Type	Teaching Method
Title	**4.3 Value creation pedagogy (VCP)**
	
Description	Learners learn by applying their competences (future or existing) to create something of value to at least one stakeholder, outside their own group, class or school. The value that the learners create for someone else can be economic, social or cultural.
Hint	1. Learners reflect on who could **benefit** from their **learning**. 2. They **spot opportunities** to create value for others. 3. They decide how they will create value and **take action**. 4. They use **feedback** form the intended beneficiaries to refine their work. 5. They reflect on their learning experience.

Into Action

Value creation pedagogy (VCP) is based on allowing the learner to learn through the creation of value for others outside their own group ([12]). Creating something of value for others is thus the vehicle of the learning goal, and the effort of trying to create something of value is more important than the actual output of such effort. VCP stands on three pillars: i) the engagement of learners with people outside their own learning community (class, school…) to identify those for whom they want to create value, ii) the engagement of these "others" in the learning process through their feedback on the learners' work, and iii) a good balance between value creation and learning, between theory and practice, between action and reflection.

1. Learners reflect on who could benefit from their learning.

One way to initiate a VCP activity is to ask learners to think about who could benefit from their learning, who could find their learning valuable. This question triggers a reflection on the value that learning can have in real life. You should expect learners to have a tough time in identifying the beneficiaries of their learning, beyond themselves, but repeating this question along the learning pathway will allow learners to identify others for whom their knowledge, skills and attitudes may have a value, such as potential employers, future generations, or other learners. This question helps

([12]) https://vcplist.com/2018/10/19/this-is-value-creation-pedagogy/

learners shift their mind-sets from thinking that they are the one who shall extract value from a learning experience, to thinking that their learning can have value for others.

You can follow up by asking your learners to reflect to answer questions like Who am I? What do I care about? What do I know? Whom do I know?

See also:

EntreComp Playbook: L3 (p.57)

2. Learners spot opportunities to create value for others.

Having realised that their learning can yield value for someone else, learners can intentionally explore opportunities to create value for others. Invite them to think about who they could help, how they could help them, how they could reach out to clarify the needs of people they want to help, and then test the ideas they have developed to address such needs. Ask learners to go out and engage with their intended beneficiaries to ensure that they create valuable solutions that meet the intended needs..

See also:

EntreComp Playbook: L6 (p.60) L14 (p.69) L15 (p.70)

Teacher booster video with Paz Fernandez De Vera, Spain

3. Learners decide how they will create value and take action.

VCP relies on balancing analytical and creative processes, very much like project-based learning (p. 27) and learner-led learning (p. 35). For a VCP activity to be effective, you have to plan time for learners to analyse the data they have collected in the field, to generate ideas that could address those needs and to select the most promising ideas to develop during the VCP. You will also have to allow time for the messy business of the practical development of the idea and the set backs and failures this involves.

See also:

EntreComp Playbook: L18 (p.73) L10 (p.64), L11 (p.66), L12 (p.67), L16 (p.71)

Teacher booster video with Eva Stojanovska, North Macedonia

4. Learners use feedback from the intended beneficiaries to refine their work

VCP is grounded in creating value for others, and in opening the learning space (class, training room or any other space where learners convene) to the wider world. Depending on which ideas the learners are pursuing, there are diverse ways to collect feedback: from pitching their ideas to external people, to testing them with their end beneficiaries, as scenarios, or with mock-ups and prototypes, to setting up simulations. Give them autonomy to choose how to engage with end beneficiaries, and allow them to take initiative and responsibility over the process. Your role is to offer instruments and to encourage them to explore the different alternatives laying ahead.

See also:

EntreComp Playbook: L26 (p.81), L27 (p.82), L28 (p.83), L29 (p84)

5. Learners reflect on the learning experience.

VCP arises from reflection on whom the learning has a value for, beyond the learner. At any moment in the VCP activity you are facilitating, you can ask learners to reflect on who would

benefit from what they are doing and learning. In VCP, learning by doing translates into learning by creating value for others, where the important part is the learning. Hence, it is essential that you invite learners to reflect on what they have learnt throughout the VCP experience, about themselves, about interacting with others, working in teams, and turning their knowledge, skills and attitudes into something of value for someone else, themselves and their learning circles.

Be mindful of the importance of emotions that learners experience throughout a VCP initiative. These can be positive (the thrilling joy of creating something that is useful to someone, the excitement of getting out of the classroom to gather information…) or negative (the frustration of having an idea rejected by key stakeholder, the anxiety of a deadline…). No matter whether positive or negative, emotions have the power to reinforce learning. By prompting reflection, starting with their emotions, you can help learners turn their experiences into learning opportunities and trains them to draw lessons from any situation.

See also:

EntreComp Playbook: L31 (p.86), L33 (p.88)

LifeComp Into Action: Give one, Get one, Move on (p.58), Reciprocal learning strategy (p. 66)

Teacher booster video with Paz Fernandez De Vera, Spain

4.3.1 Value creation pedagogy ideas

4.3.1.1 Creating value for animals

Description

The 15th Sustainable Development Goal aims to "protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" and in particular target 15.5 asks to "take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species". As part of a course on life science or biology learner could engage in halting biodiversity loss, by defending the habitat of endangered species. Depending on the resource available, the project can lead to the seeding of several types of flower in the school garden to feed pollinators, to create a campaign to raise awareness in people living in the areas, to 3D print shelters for varied species (e.g., insects, birds, bats).

Benefits

Creating value for animals is a good way to engage learning by debating different types of value creation, and reflecting on what others could benefit from their learning. What's more, working on creating value for animals allows learners to develop their capacity to promote nature and value sustainability.

How

Below are some suggestions on how you could set up a VCP around creating value for animals.

1. Invite learners to think how their learning (e.g., pollination, ecosystems, biodiversity…) could be of value for some species living in their surroundings.
2. Invite learners to explore how they could create value for the species they have identified.
3. Support learners in transforming their ideas into action, by developing a prototype.

4. Invite learners to test their ideas with experts (e.g., biologists, zoologists…) and in the field.
5. Help learners in defining strategies to collect information (e.g., via a pitch, a focus group, a series of interviews or via infrared cameras aiming at observing animal interaction with a prototype).
6. Ask learners again to critically reflect on their actions and experience. Do not ask what they did, but what they would do differently, what they would do as a next step, and what they have learned.

More

This idea is inspired by "Symbiotic Spaces", the project that has won the 2022 "Reconnecting with nature" New European Bauhaus "Rising Star" prize, which is awarded to concepts or ideas submitted by young talents (aged 30 or less). You can find their application here. The New European Bauhaus Prizes finalists list can inspire you with plenty of creative ideas. If you want to engage in co-creating learning actions focusing on environmental value creation, join the Education for Climate Coalition and explore their participatory challenges.

4.3.1.2 Creating a video tutorial on a topic of this year programme

Description

No matter the type of learning intervention you are designing, you can invite your learners to develop a project that would help next year's learners to acquire the knowledge, skills and/or attitude they have developed through their learning experience. Even if your subject is very theoretical, and your learners would find it hard to identify someone who could benefit from their knowledge, you can invite them to pick a topic from this year's programme and create an educational resource to benefit future cohorts of learners.

Benefits

Creating value for the next generation of learners offers the advantage of embedding reflection on learning by default. Your learner will be challenged to reflect on what they learned and how that learning could be shared with other learners. In addition, this kind of project help learners realise that they have the power to pass on what they know, are able to do and the value they can create.

How

Below are some suggestions on how you could set up a VCP on creating value for next generation learners.

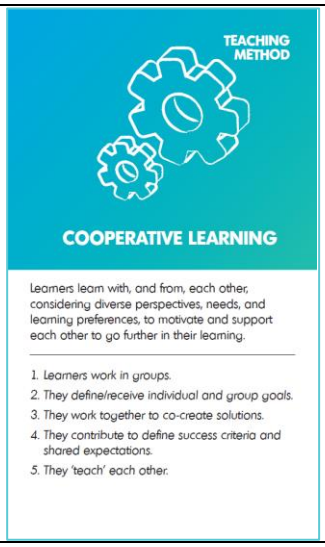
1. Invite learners to form groups (2 to 5 people) and to select a topic from this year's programme that they would like to work on.
2. Invite learners to explore how they could present that content in an engaging way for learners, imagining a remote schooling scenario.
3. Invite learners to engage with peers from other classes, who have not taken your course, and to understand what worked and what did not work in their remote schooling experience, how they manage their self-paced learning, or what the characteristics are of the most engaging learning experience they have had so far….

4. Help learners in defining strategies to collect information (e.g., via an online focus group, an evaluation questionnaire, or a semi-structured interview) and to analyse the information gathered (e.g., identifying patterns in the information they have collected to turn into insights and understanding).
5. Ask learners to work on an idea that would meet their target audience learning needs and develop it into a sharable artefact (a pdf of a comic or of a serious game, a video lecture, a podcast, a value creation challenge….).
6. Invite learners to get back to their peers to collect feedback and refine their ideas.
7. Ask learners again to work in groups and prepare a reflection essay, where they critically reflect on how working to make their learning available to others has actually enriched their learning. Ask them to reflect on working together, on collecting data in the field, on the analysis of information collected, on the idea generation and selection process and on the feedback received by the intended beneficiaries of their value creation effort. You can ask learners to explicitly reflect on the competences you have selected while planning this activity.

More

Martin Lackéus, researcher at Chalmers University of Technology, has published extensively on the topic of value creation pedagogy. His most recent book (2022) ([13]) has not been translated to English yet. However he has made available the introduction and first chapter on value creation pedagogy and chapter on value creation pedagogy for sustainable development (chapter 9) of the book in English for free on his website dedicated to venture creation programmes and value creation pedagogy. You can watch an introductory video on what value creation pedagogy is, why it is a useful teaching method and how it can be embedded in everyday teaching practice.

([13]) Lackeus, M. (2022). Den värdeskapande eleven En handbok för meningsfullt lärande i skolan. Lund: Student Litteratur.

Type	Teaching Method
Title	**4.4 Cooperative learning (CL)**
	
Description	Learners learn with, and from, each other, considering diverse perspectives, needs, and learning preferences, to motivate and support each other to go further in their learning.
Hint	1. Learners work in **groups**. 2. They define/receive individual and group **goals.** 3. They work together to **co-create** solutions. 4. They contribute to define success **criteria** and shared **expectations.** 5. They 'teach' each other.

Into Action

Cooperative Learning (CL) is an instructional method in which learners work in small groups to accomplish a common learning goal with the guidance of the teacher ([14]). In pairs and/or groups, learners experience themselves as a team and are on the same side, working toward the same goal. Learners are given time to think/work alone, and to interact with peers, fostering positive interdependence and individual accountability, improving learners' autonomy and cooperation.

1. Learners work in groups.

An ideal small group size is three to five as fewer than three can lack diversity and divergent thinking, and bigger groups can mean that some members may not participate. When forming groups, it is important to be mindful of how the attitudes and personalities of the different group members may affect the interactions and the results. Grouping learners who tend to be introvert and do not like to take the stage may favour their participation more than if they were grouped with very extrovert, initiative-taking peers. However, favouring groups where learners have different backgrounds and competences can enhance the learning experience, by creating the opportunity for learners to be scaffolds for one another's learning.

([14]) Gillies, R. M. (2016). Cooperative Learning: Review of Research and Practice. *Australian Journal of Teacher Education, 41*(3). https://doi.org/10.14221/ajte.2016v41n3.3

Depending on the overall learning objectives and competences you want learners to develop, you can create groups that foster communication and negotiation competence, groups that are able to mobilise a diverse array of resources to deliver on the task, or groups that will develop creativity to blend the diverse perspectives of their participants. Make sure your strategy is purposeful, shared, clear and agreed.

See also:

EntreComp Playbook: F9 (p49), L1 (p.55), L3 (p57)

Teacher booster video with Paz

2. Learners define/receive individual and group goals.

Establishing group goals frames the purpose and objectives of the activity, and the responsibility of each group member towards the common goal. Setting individual goals acknowledges the diversity of the group members, and challenges everyone to grow in a specific area. Consider how much autonomy would best benefit your learners and how best to balance support and challenge.

See also:

EntreComp Playbook: F1 (p.37), F4 (p.43)

LifeComp Into Action: Hope project. A path through goal setting (p 80)

3. Learners work together to co-create solutions.

Co-operative Learning does not happen because you create a task and ask learners to figure it out together. An educator should prepare tasks and activities that require learner interaction, otherwise learners may just divide the task you assigned them into subtasks, and work on each subtask individually. This would be fine if the task was the purpose, but the purpose here is learning. It is important to design activities that require learners to co-construct knowledge to succeed, like dividing research questions to be addressed individually, but the overall task requires members of a group to pool their information, discuss how to present it, and develop a joint presentation. By preparing tasks that generate a positive interdependence between learners, you create the conditions for all group members to take individual responsibility for the collaborative result.

See also:

Teacher booster video with Kornélia Lohynova, Slovakia

4. Learners contribute to define success criteria and shared expectations.

Developing a memorandum of expectations establishes common ground and a consensus, whereby learners can always keep sight of their shared ambitions. Agreeing on success criteria, roles, flexible norms and expectations (e.g., asking questions, answering questions, observing, collaborating on the set task, note taking, managing time collaboratively), allows learners to know what is expected from them, and what they can expect from others. When expectations are agreed, and roles are clear, individual accountability is easier to exert.

See also:

LifeComp Into Action: Create an agreement on the rules for the (online) learning spaces (p. 74)

5. Learners 'teach' each other.

This last step levers the notion that teaching is learning. Giving learners an active role in teaching each other reminds them that learning is not only about listening and retaining information, but

requires active engagement. This can help learners to develop the capacity to manage their own learning.

See also:

LifeComp Into Action: Think/Write/Pair/Share (p.60) Reciprocal learning Strategy (p.66), Jigsaw (p. 70), Fishbowl (p.72)

4.4.1 Cooperative learning ideas

4.4.1.1 Group note taking

Description

Note taking is typically an individual activity. Teachers often remind their learners to take notes when they lecture because note taking helps listeners to stay focused, reducing the cognitive load on their working memory, and allowing them to capture the key messages that will ease their study of the topic. What's more, note taking is a skill that many people will transfer from the learning setting into the work setting. However, there are many people who are not good at taking notes, and struggle trying to structure the information they capture while taking notes.

Benefits

Group note taking invites collaboration to develop and share the notes that each group member takes. It helps learners to compare and contrast their understanding of a topic and their ways of working with those of others, enriching the note taking experience with extra value. Group note-taking can trigger a critical discussion among learners, who - in revising their respective contributions - have to select which information to keep, which to discard and what are the key edits to make, so that the group notes become easy to use when studying for a test or an exam.

How

Below are a few suggestions for a flipped classroom approach, where learners prepare some work before coming to class.

1. Divide learners into groups of 4-5 each and assign roles to each group member.
2. Present the material they have to prepare before coming to class (reading lists, videos, podcasts…).
3. Use synchronous time (in class or online) for learners to discuss their analysis and come up with a joint report.
4. Set a session for each group to present their report, focusing on highlighting commonalities and differences.

Tips

You can add a dimension of value creation (see Value creation pedagogy p. 41) by inviting learners to prepare notes for peers who have not been able to attend the class, or to prepare a learner handbook for the online version of the course, or to jointly edit a Wikipedia entry on the topic at hand.

4.4.1.2 World Café

Description

The World Café is a simple and flexible technique to facilitate dialogue in a large group ([15]). It provides a structured format to keep the conversational process going. It is characterised by an informal setting, where small groups gather around a small table, like in a café, and they start a conversation on the topic/question that has been defined for that table.

It is a valuable strategy to have everybody participating in a joint discussion, and can be used for collaborative exploration of a topic for learning, as well as for professional purposes.

Benefits

This method fosters a relaxing and informal environment that develops collaborative dialogue around questions that matter, in order to generate innovative ideas.

How

1. Prepare the space so that small groups (four or five people) can come together around the tables you have prepared and discuss the topic that has been defined for the table they sit at. Prepare the questions and topic that learners will debate at each table.
2. Explain the rules of the World Café.
3. Set the time for the first round of discussion (e.g., 20 minutes). At the end of the allocated time, each member of the group moves to a different table. It is preferable that they do not move all together to the next table but rather that they split. You can decide if one member of each table will not move to act as the host of the table, who welcomes the newcomers, and briefs them on what has been discussed in the preceding round.
4. At the end of the time allocated, e.g., after three rounds, invite learners to report on their tables' findings, and to share their highlights of the process, and how discussing with peers has shaped their understanding of the topic.
5. Ask each table host to summarise the key messages on a flip chart that can be displayed somewhere, to remain available to learners.

Tips

You can easily run a World Café online, or in hybrid settings. Ensure you can create breakout rooms for your learners to join, and that you provide each breakout room with a virtual board, where each group can capture take away messages from the discussion.

([15]) https://theworldcafe.com/key-concepts-resources/world-cafe-method/

Type	Teaching Method
Title	**4.5 Seriously playful learning (SPL)**
	
Description	Learners are encouraged to take a creative, explorative, active, and immersive attitude to learning, to stimulate intrinsic motivations and a flow state for learning.
Hint	1. Learners are supported to learn from **failure** in a **safe space**. 2. They engage in **playful activities** designed for learning. 3. They understand the **learning purpose** of the activity. 4. They are **emotionally** engaged in learning. 5. They **envision** sustainable futures and **frame** problems in a novel way**.**

Into Action

Seriously Playful Learning (SPL) refers to the application of play elements in the design of learning activities ([16]). If play is the primary formative element in human culture following Huizinga ([17]), play can further be exploited to improve the learning experience, once the misconceptions of frivolity have been questioned and overcome. Elements of play can be applied as energisers, and engagement and learning activities can be designed following the structure of a game.

Although playful learning is often associated with engaging children in activities that are both fun and educational, playful experimentation suits adult learning too. By questioning every part of the process, and by considering why things happen the way they do, we will realise that sometimes there are good reasons for formality, but that in other cases, it is simply unquestioned custom. In particular, Seriously Playful Learning aims at nurturing creativity, i.e., the capacity to frame problems in novel ways. Thus, opportunities are spotted that may have been otherwise invisible, while the capacity to value all ideas and make the most of them is developed. It also supports learners' resourcefulness, while allowing them to learn from experience, thus nurturing their

([16]) https://pz.harvard.edu/sites/default/files/PoP%20Playbook.pdf

([17]) Huizinga, J. (1955, originally published in 1938). *Homo Ludens*: A Study of the Play Element in Culture. Beacon Press, Boston.

autonomy as learners. Further, it embraces failure as part of the process of experimenting and practising, focusing on learning from experience, and from discovering what does not work. Through trial and error, learners develop perseverance and resilience to setbacks, while learning that, by experimenting, they develop better solutions. SPL is a perfect methodology to teach and learn not only key competences but also transversal skills like creativity, negotiation and communication skills. Playful learning activities can be designed on an individual basis or as teamwork.

1. Learners are supported to learn from failure in a safe space.

To create a safe space is essential to allow playful learning. Learners must feel safe and know the rules that must be followed in the activity. Playful methodologies stimulate curiosity and innovation in learning. Play itself is a place where learners learn about the world, and about themselves, in an exploratory and experimental way. When playing, learners learn to tolerate uncertainty, and welcome diversity. In order to do so, they need to feel safe. Failure and setbacks are understood as low stakes, enjoyable parts of the learning process, and as opportunities to improve and innovate. Learners must access space and materials freely.

See also:

Entrecomp Playbook: Novelty (p.15), Effectuation (p.24), palyful experimentation (p.32), F4 (p.43), F9 (p.49)

LifeComp Into Action: Trust (p.10),

2. Learners engage in playful activities designed for learning.

Play is an explicit engagement element. Introducing playful elements in learning is known to boost learners' engagement and motivation. When playing, the motivation of the learners increases and is maintained over time. To ensure this, the learning activity must be well designed and flexible at the same time, to adapt the process to the development and engagement of the participants. Play is a good context to work with different target groups, of different ages, with different interests. Introducing gamification boosts motivation to learn by activating both intrinsic and extrinsic factors. Game-based elements in learning can include progress bars, points, leaderboards and badges (extrinsic motivators), but can also include more complex elements, such as narrative, mystery, and elements of chance and risk.

See also:

EntreComp Playbook: L1 (p55), L2 (p.56)

3. Learners understand the learning purpose of the activity.

To maintain motivation, it is essential that the learning purpose of the activity is clearly understood by the learners, and that they feel it as meaningful. In this sense, learners can decide how to participate, and understand the relationship of the playful activity with the learning outcome. To apply game elements and principles in the teaching method is not just for fun, but also a means to achieve educational purposes.

See also:

LifeComp Into Action: Create an agreement on the rules for the (online) learning spaces (p.74) Reciprocal learning Strategy (p.66), Jigsaw (p. 70), Fishbowl (p.72)

4. Learners are emotionally engaged in learning.

Learning is more than a cognitive process that can be accessed through direct instruction, and emotions play a particularly important role in this process. Learners should be supported to feel the

central purpose of the activity, so that they are emotionally engaged in the process. Themes or topics, and methods of the game, should be related to the learners' contexts, interests and needs. A variety of learning opportunities, many of which match what is contained in the prescribed curriculum, can then be built around these topics of interest. Educators have to take this into account and allow the customisation of some parts of the learning activity to adapt it to the learners' needs. Educators act as facilitators to provide support, resources and knowledge, when it is needed. Even within the constraints of prescribed curricula, educators can find ways to integrate content in a play-based way.

See also:

LifeComp Into Action: Wellbeing (p.23), Create an agreement on the rules for the (online) learning spaces (p.74)

5. Learners envision sustainable futures and frame problems in a novel way.

Playing is a natural way to imagine future scenarios that can be more or less likely. This quality, and the safe space necessary to play, allows learners to envision other possible futures, and to be able to design and develop answers to the big questions of the future. Improve the learners' predisposition to innovation by envisioning future scenarios to train learners' capacity to develop answers by applying problem solving, critical and creative thinking. In the game, different perspectives and interests can interact in a harmonious way.

See also:

GreenComp: Problem framing (p.21), Envisioning futures (p. 23),

4.5.1 Seriously playful learning ideas

4.5.1.1 Simple gamification techniques

Description

Gamification can be used to make learning more engaging by punctuating learning activities with frequent energisers. It requires creating opportunities to shake up thinking approaches with 'fun breaks, in which learners change focus, shift perspective, and move around. During extended periods of learning, or longer online sessions, attention and engagement can be boosted with short energisers. You can try and integrate some of the following to energise your practice and revitalise your learners' engagement and attention. Gamification does not have to be complex, technical or time consuming, and it does not only apply to younger learners ([18]).

Benefits

Gamification can be a powerful tool to integrate narrative, experience, emotion, progress and motivation in the training process, achieving lasting learning over time. In the same way that learners need comfort breaks to attend to physical comfort, learners benefit from taking learning breaks, which pause, shift and change thinking and collaboration in some way, to refresh and reset attention and engagement.

([18]) https://www.dns-tvind.dk/gamification-and-adult-education/

How

Boost progression and build competence:

— **Learning 'chunks':** Deliver content in small chunks.

— **Rewards:** Give learners a sense of mastery and competence through points or badges after completing or understanding the 'chunk' of content.

— **Star ratings:** Use a star rating system to give feedback as to how well learners have understood the content.

— **Collecting resources:** Provide interesting facts or concepts that learners can 'collect' to win points or recognition.

— **Leaderboards:** Create a daily leaderboard challenge to maximize the number of winners over time, therefore improving the sense of achievement for the overall learner group.

— **Learning levels:** Progress the content from easy to most difficult, keeping learners on the 'edge of competence'.

— **Tailored assistance:** Give hints or clues exactly when the learner needs them: e.g., give a prompt after 3 incorrect attempts at a question.

— **Gradually remove the support**: Remove prompts as the learner progresses through the course.

Boost engagement:

— **Provide choice:** Allow learners to make decisions that have an impact, e.g., provide a choice of case study, or whether to complete a 10-point or 20-point question.

— **Encourage curiosity:** Start the module with a question instead of a long list of learning objectives.

— **Create mystery:** Give learners incomplete information or a mystery to solve and provide instructions on how to find the missing pieces.

Build connection to boost collaboration:

— **Rewards:** Allow learners to celebrate their success with others through rewards, leader boards and badges.

— **Social connection:** Allow learners to share these rewards through social media channels.

— **Competition and cooperation:** Set up groups or teams to compete against each other in a quiz challenge. Promote cooperation within the team and competition between the teams.

— **Narrative:** Create characters, avatars and scenarios that learners can identify with

Pace learning to develop habits of mind:

— **Timed release:** Keep modules short and release them over time, not all at once. If your content is presented as a game (e.g., a mystery the learner has to solve), then space out the clues over time to increase engagement.

— **Check in quiz:** Ask learners to complete a quiz challenge immediately after working through a piece of content.

— **Daily prompts:** Use mobile notifications to prompt learners to complete a mini-module every 24 hours or at regular intervals.

Energise:

— **Stand up if/have you ever…?** Educator presents a series of yes or no questions to which learners respond with an identified action such as hands up, stand up, wave

— **Pencil pitch** Educator issues a selection of weird and wonderful objects (relevant to the learning or not) allocating on each to learners who have 60 seconds to sell the object or idea to the rest of the group, highlighting its features and benefits.

— **Giff challenge** Educator posts a phrase or statement, and learners have 5 minutes to post a gif on a shared online whiteboard which represents the statement eg “good teaching looks like this” or “how to cope with pressure”

4.5.1.2 Making failing fun

Description

Failure is a positive action in creativity. Any practice, competence or behaviour, e.g., athletic, artistic, social – involves repeatedly failing until the goal is achieved, as a part of the journey to mastery. Educators can use challenge to engage learners to develop competence through practice, where they fail and try again.

Benefits

The sense of practice overcoming challenge is a part of a growth mindset and builds resilience and perseverance. If learning feels just hard enough, then it leads to greater levels of reward and feelings of accomplishment.

How

— Create opportunities to celebrate and learn from failure, e.g., “my favourite fail”, “high five the fails”, “failure Friday”, “my favourite mistake”

— Train learners to fail forward with questions like, “what did I learn?” what will I do differently?” “what will I do next?”

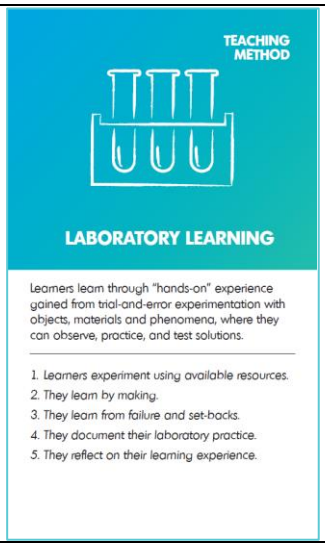
Tips

The key is to frame failure positively and, instead of learners feeling disappointed, demotivated and frustrated by failure, they are supported to view failure through the lens of excitement, curiosity and optimism.

— Increase opportunities for rehearsal and repeated practice.

— Create a safe space where learners can fail comfortably, think, look around, process, and reflect.

— Focus on growth mindset.

Type	Teaching Method
Title	**4.6 Laboratory learning (LL)**
	
Description	Learners learn through "hands-on" experience gained from trial-and-error experimentation with objects, materials and phenomena, where they can observe, practice, and test solutions.
Hint	1. Learners **experiment** using available resources. 2. They learn by **making**. 3. They learn from **failures** and **setbacks**. 4. They **document** their laboratory practice. 5. They **reflect** on their learning experience.

Into Action

Laboratory Learning (LL) takes place in a space where learners can observe, practice, and experiment with objects, materials, phenomena, and ideas, either individually, or in groups ([19]). It leverages first-hand experience, where learners can observe, practise, test solutions and answer "what if?" questions by trial and error. LL is experiential, offering learners the chance to develop practical competence in the field they are specialising in, by observation, by conducting experiments, or by training skills hands-on. Failure is emphasised as an important and valuable opportunity for learning.

In LL, space is not necessarily physical, but can be virtual, such as in the case of a computer-simulated laboratory.

Historically, LL has been used to help learners reinforce theoretical concepts, by demonstrating theory with practice, and acquiring practical experience in the field of vocational specialisation. Nowadays, LL is used, not only for practising theoretical concepts and training technical skills, but also to provide opportunities for experiential learning, whereby learners can develop a wider array of transversal competences, such as problem solving, creativity, critical thinking and collaboration.

([19]) https://link.springer.com/referenceworkentry/10.1007/978-1-4419-1428-6_966

No matter the kind of activities to be run, LL requires a laboratory with some facilities and resources to set up learning activities, be these test tubes or 3D printers. Depending on the facilities, the activities may vary considerably. For instance, the activities you would set up in an experimental physics laboratory are quite different from the ones provided in a kitchen laboratory. A good example of this is the concept of a Fab lab, a digital fabrication laboratory ([20]), which in turn is an instance of maker spaces ([21]). Fab labs originate in the early work on Seymour Papert's on 'learning-by-making' at the Massachusetts Institute of Technology (MIT) MediaLab in the early Sixties, followed by the work by Neil Gershenfeld at the Center for Bits and Atoms, always hosted at the MIT ([22]). They provide a setting for exploring authentic, real-world problems and allowing learners to focus on solving them. They support a variety of pedagogical approaches, such as project-based learning (p. 27), learner led learning (p. 35) cooperative learning (see p. 46), value creation pedagogy (p. 41) and service learning (p. 61).

1. Learners experiment using available resources.

Exploring through tinkering is a very common practice in Fab labs. Tinkering fosters autonomous, curiosity-driven, and self-regulated learning, and it can lead to incidental learning. However, Fab labs can be tweaked to intentionally ([23]) promote learning. If this is your goal, your most important task is to carefully plan what will be the activities and tasks learners will be asked to conduct, so that the intended learning outcomes are achieved, and concepts and competences developed. Even if the learning process remains driven by open-ended discovery and learners' curiosity, you are responsible for steering it towards the intended learning outcomes, by leveraging the context and selecting the most suitable arrangements, in order to highlight links between the activity and the significance of the learning goals. Consider that *creativity* is always a core learning outcome ([24]) in a Fab lab activity, and it is important that the tasks you design for learners remain open ended to allow them to creatively address them.

Whichever tools, prompts and opportunities you plan to provide through LL, it is important that you prepare opportunities for learners to practise the skills required during the Lab work, e.g., questioning, note taking, observation, online research, data analysis, what to do when things go wrong. Do not forget to provide instruction in the proper use and handling of the available material and non-material resources, from how to use 3D printers, on how to handle Intellectual Property or managing personal data respecting GDPR.

2. Learners learn by making.

Making is at the heart of learning in learning lab settings, and it is rooted in constructionism, which, in Papert's own words, means, "Giving children good things to do so that they can learn by doing

---

([20]) A Fab lab is a space to play, create, tinker, invent and learn by using digital fabrication tools. Fab labs are community resources offering open access for individuals and programmes. The are part of an international network and beyond access to the lab space and the available hardware and software they offer operational, educational, technical, financial, and logistical assistance. See https://www.fablabs.io/

([21]) Vuorikari, R., Ferrari, A., Punie, Y., (2019). M*akerspaces for Education and Training – Exploring future implications for Europe*, Luxembourg: Publications Office of the European Union.

([22]) Gershenfeld, N. (2005). F*ab: The Coming Revolution on Your Desktop - From Personal Computers to Personal Fabrication*. New York, NY, USA: Basic Books.

([23]) https://fablearn.org/principles/

([24]) Morado, M.F., Melo, A.E. and Jarman, A. (2021), Learning by making: A framework to revisit practices in a constructionist learning environment. *Br J Educ Technol*, 52: 1093-1115. https://doi.org/10.1111/bjet.13083

much better than they could before" ([25]). Allowing learners to make things helps them to feel that they can build and shape the world, enhancing their self-efficacy.

Make sure you invite learners to explore and create something with the available resources. The more responsibility learners have for designing and managing this process, the more effective and successful the learning will be.

There is no one-size-fits- all template for setting up LL in a maker space. To deepen the learning outcomes selected, the learning process needs to be steered in ways, which promote the demonstration of desired learning. While *creativity* is intrinsic to learning by making, consider that educators can design activities that promote problem framing by having learners rethink, refocus, or re-define a problem, opportunity, or procedure, or help them develop the capacity to *mobilize resources*, by being proactive and creative about finding information, advice and instruction. If *collaboration* is a competence area you want learners to progress, design activities that promote doing things together at any stage of the process.

See also:

Teacher booster video with Paz Fernandez De Vera, Spain

3. Learners learn from failures and setbacks.

Labs are the place where hypotheses get tested. Using labs can show empirically what is learnt theoretically, helping learners to anchor theory with practice. LL can also be leveraged to support learners to learn about what it means to test hypothesis in research. Sometimes the hypothesis is not supported, and often times technical failures, or ambiguous experimental results, do not allow learners to reach conclusions on the validity of the hypothesis. Talk openly about failure, and emphasise that it is inherently linked to a research and experimentation process. By doing so you will help learners develop their critical *thinking*, their *motivation and perseverance*, their *growth mindset*, as well as the capacity to turn failure into a *learning experience.*

4. Learners document their laboratory practice.

Maintaining records of experimental observations is as important as conducting an experiment. In a lab, documenting processes and results serves many purposes, ranging from providing all necessary information for experiments to be run by others under the same conditions, to keeping evidence in case of disputes around the reported results, streamlining procedures into routines, and having guidance for new entrants in the lab.

In Lab Learning, documenting the processes performed addresses the purposes above and provides a good anchor for reflection on learning. To serve the purpose of competence based learning, educators ask learners to systematically document not only steps and results but also descriptions of the qualities of the process they followed, and the emotions they experienced along the way. Frustration? Fear of failure? Excitement? Pride? Learning to recognise emotions is a very transferrable asset also helping learner to acknowledge that, when facing creative projects or trying to solve wicked problems, there are stages in the process that are characterised by feeling lost, or fearful about not being up to the challenge. This awareness, tied with the reflection on the feeling

([25]) http://www.papert.org/articles/const_inst/const_inst1.html

of excitement and satisfaction that comes when things shape up, helps learners to trust the process they have experimented with in the lab, and to be able to apply it to other situations. What is more, documenting learning makes progress visible and provides learners with a sense of ownership on the progress made, reinforcing learners' *growth mindsets.*

5. Learners reflect on their learning experience.

Laboratory learning experience is more likely to yield learning results when learners are given the opportunity to discuss the activities they have completed in the laboratories and what the value of these is for their futures. Prompting learners to reflect on what they have learnt fosters their capacity to manage their own learning.

See also:

EntreComp Playbook: L30 (p.85), L31 (p.86), L33 (p.88)

LifeComp Into Action: Give one, Get one, Move on (p.58), Reciprocal learning strategy (p. 66)

4.6.1 Laboratory learning ideas

4.6.1.1 Imagine If ([26]).

Description

Pick an object and ask learners to consider its parts, purposes, and the people who interact with it. Then ask them to imagine:

— In what ways could it be made to be more **effective**?

— In what ways could it be made to be more **efficient**?

— In what ways could it be made to be more **ethical**?

— In what ways could it be made to be more **beautiful**?

Benefits

This activity encourages *creativity*. Asking learners to think of new possibilities for an object or system, encourages convergent thinking and cultivates divergent thinking. Asking learners to decide upon an effective approach to build, tinker, re/design, or hack an object, or a system, fosters collaboration and convergent thinking. This activity calls learners to improve what is around them, showing them how the capacity to *spot opportunities* can be cultivated by focusing on how things can be improved.

How

In a Fab lab setting, you could consider framing the activity so that learners can turn their ideas into action, for instance redesigning their lab chairs:

1. Divide learners into groups of 4-5 each.

([26]) Adapted from http://www.agencybydesign.org/thinking-routines-tools-practices

2. Ask learners to identify ways to improve the chairs of the Fab lab.
3. Ask them to visualise their idea in a 3D model, or to create a mock-up for testing it.
4. Ask them to document their work and the results of the test.
5. Set a session for each group to present their re-design proposal, focusing on how they would improve it after testing, and allow space for feedback exchange.

More

If you are interested in the *learning by making* approach, you can find useful resources online. Check for instance Maker Ed ([27]) or Fablearn ([28]) and follow Makerspaces.com on Twitter for a rolling list of resources ([29]). If you think the subject that you teach is not suited for LL, have a look at this list of activities organised by disciplines ([30]). If you have an interest in the use of Fab labs in vocational education, you may find inspiration in the EU funded Digital Fablab project ([31]) that focuses on footwear manufacturing skills. If you are looking for ideas for embedding LL at Higher Education level, the Academy of (almost) anything ([32]). Lastly, for a reflection of the very notion of making, check out the concept of "Critical Making" ([33]).

4.6.1.2 Science simulations.

Description

For many generations of learner, science laboratories have been the place for hands-on learning. Laboratory experience is essential in technical and scientific education, but physical laboratories are costly to maintain. Technology today allows the laboratory experience to be simulated via computer software, offering learners the chance to implement their own experiments in a virtual environment, with the flexibility to perform laboratory experiments at home or in class ([34]).

Benefits

This in turn allows them to

— Explore concepts and theories in a digital environment.

— Learn how to perform virtual laboratory experiments.

— Use and interpret laboratory data.

— Apply scientific knowledge and use advanced lab equipment to solve real-world challenges.

([27]) https://makered.org

([28]) https://fablearn.org/

([29]) https://twitter.com/Makerspaces_com?s=20&t=bSHof2llcdeJyqf9jyet0Q

([30]) https://blogs.lawrence.edu/makerspace/assignments/

([31]) https://www.digitalfablab.eu/#project

([32]) http://academany.org/

([33]) http://opendesignnow.org/index.php/article/critical-making-matt-ratto/

([34]) Lynch, T., & Ghergulescu, I. (2017). Review of virtual labs as the emerging technologies for teaching stem subjects. Presented at the International Technology, Education and Development Conference, Valencia, Spain, (pp. 6082–6091). https://doi.org/10.21125/inted.2017.1422

How

To make the most of a simulated science lab, it is important to guide learners to focus on science, rather than the simulation. In following the steps presented in the table above, make sure you promote active inquiry, and encourage learners to develop hypotheses; design experiments; make predictions; collect and record data; make observations; operate virtual equipment; but also relate observations to plausible explanations; present findings effectively and ensure the quality of an experimental design. By doing so, you will support learners to develop the capacity to design and conduct scientific investigations.

Tip

If you are interested in using simulated environments for laboratory learning, you can find a wealth of useful, open education resources online. A good directory is maintained by the Arthur Lakea Library of the Colorado School of Mines" ([35]).

([35]) https://libguides.mines.edu/oer/simulationslabs

Type	Teaching Method
Title	**4.7 Service learning (SL)**
	 Learners turn ideas into action to meet real-world needs in their local community. 1. Learners engage with their communities and identify needs. 2. They explore how to create value for the community. 3. They take action to create value for the community. 4. They reflect on feedback from beneficiaries. 5. They demonstrate learning and celebrate progress.
Description	Learners turn ideas into action to meet real-world needs in their local community.
Hint	1. Learners **engage** with their communities and identify needs. 2. They **explore** how to create value for the community. 3. They **take action** to create value for the community. 4. They **reflect on feedback** from beneficiaries. 5. They demonstrate learning and celebrate progress.

Into Action

Service learning (SL) is a teaching method that integrates course content with relevant community services ([36]). It combines learning objectives with social value creation, providing learners with opportunities to engage in community service, and structured ways to reflect on such experience, to achieve the intended learning outcomes. SL differs from volunteerism in that learning is its main motive.

SL is close to Value Creation Pedagogy (p. 41) as it focusses on i) the usefulness of learning and the value that learning can create for others in the community, ii) learning through experience and iii) leveraging emotions to make learning engaging and meaningful.

SL can take different forms, such as direct, indirect, research based or advocacy-based service learning. Direct SL involves learner engagement with the direct beneficiaries, e.g., helping elderly people in learning to use smart phones. In Indirect SL learners provide support to entities that deliver the services to the local community, e.g., creating a communication campaign for the local health centre on the benefit of a plant-based diet. Research-based SL involves learners in providing new knowledge to entities that work with the community (e.g., compiling a report on food shopping habits in the grocery stores in the area covered by the local community centres). Advocacy-based

([36]) https://www.suffolk.edu/student-life/student-involvement/community-public-service/service-learning/what-is-service-learning

SL engages learners in informing, campaigning, or educating others on topics of public concern, e.g., what are the most effective actions people can take to improve their carbon footprint).

1. Learners engage with their communities and identify needs.

SL starts with learners connecting with the local community and committing to help. Depending on the intended learning outcomes, the focus of the community service will change, spanning from health and wellbeing, the environment, the commons, inclusion and community building, or culture.

There is no limit to the briefing you can prepare for you learners; the important thing is to create opportunities for learners to go out into the community and uncover needs they can help to meet. You can brief them and assign them a task, or you can liaise with local non-profit organisations to have them provide a brief asking for learners' support. If your learners are autonomous, (or they are remote), you can invite them to choose the focus of their community work.

No matter the initial focus area or form of service learners will undertake, and who has selected it, the first things learners will do is engage with the community to identify and understand their needs in their specific context. Your role is to support them in choosing appropriate enquiry methods (e.g., observation, interviews, focus groups).

See also:

EntreComp Playbook: F5 (p.44) L6 (p.60) L7 (p.61)

LifeComp Into Action: Accountable Talk (p. 64)

Teacher booster video with Eva Stojanovska, North Macedonia

2. Learners explore how to create value for the community.

Once learners have identified an issue that they can help tackle to the benefit of their community, they explore diverse ways to make change and improvement happen. They can partner with local actors such as the municipality, a local non-profit organisation, or the community centre, to better frame the issue to tackle, before deciding which way to go. It is essential that the idea they decide to develop is both meaningful to them, and valuable to someone other than themselves and their learning companions. By making sure that learners find purpose in their community service, you secure their motivation.

See also:

EntreComp Playbook: L6 (p.60) L14 (p.69) L15 (p.70)

Teacher booster video with Paz Fernandez De Vera, Spain

3. Learners take action to create value for the community.

Taking action is the service delivery part of the SL experience and very much depends on the form of SL. In direct SL, taking action means interacting with the target group within the community, whereas in advocacy SL, taking action equals designing and producing the planned campaign. For action to be relevant for learning, it is important to ensure that learners can use and train the competences you have planned for them to develop.

See also:

EntreComp Playbook: L18 (p.73) L10 (p.64), L11 (p.66), L12 (p.67), L16 (p.71)

4. Learners identify competences developed through reflection, feedback from beneficiaries and evaluation of learning experiences.

Reflection is a key step in learning through experience; in this case, through engaging in community service. It serves to process the experience and the emotions that have surfaced along it, as well as to understand how knowledge, skills and attitudes have shaped, and have been shaped by, the experience.

Reflection can start from a factual description of the experience, who was involved, what the need was, what activities were set in place, and what the outcomes were. However, it is essential that reflection is not limited to a recollection of the events that shaped the SL experience. Emotions can be put under the spotlight and, at each of the phases of the SL experience, learners can be asked to reflect on their feelings. Similarly, reflection should be guided to take stock of the SL experience, to think about what worked and what did not work, what the learners would do differently in the future, what part of the experience could be applied to other situations they might face, and what lessons were learnt that might prove useful in an analogous situation in the future.

See also:

EntreComp Playbook: L31 (p.86), L33 (p.88)

LifeComp Into Action: Give one, Get one, Move on (p.58), Reciprocal learning strategy (p. 66)

Teacher booster video with Paz Fernandez De Vera, Spain

5. Learners demonstrate learning and celebrate progress.

To strengthen the learning aspect of SL, you can task learners with crystalising their learning in some sort of tangible output that can be shared, so that learning becomes visible, and progress can be celebrated. Celebrating progress is way to attach a positive emotion to the reflective practice, and to cultivate learners' growth mindsets.

There are multiple ways to demonstrate and celebrate learning. Learners can set up an exhibition, write a blogpost, deliver a public speech, or address the authorities with a letter to the local newspaper.

4.7.1 Service-learning ideas

4.7.1.1 Let's not eat the planet.

Description

This activity provides a setting for learners to increase their awareness of current environmental problems, learn about sustainable nutrition, and form an understanding of how environmental problems are linked to our nutrition choices, by means of creating a communication campaign targeting families with children in the local community.

The activity is characterised by three blocks: the first addressing the environmental footprint of food production and consumption systems; the second addressing elements of healthy and sustainable nutrition for adults and children; the third relating to community engagement and communication. Each block can take a different weight according to the intended learning outcomes: an agro-chemistry programme will put more emphasis on the role of fertilisers in exceeding the planetary boundaries for nutrient flows; a nutrition programme in the Faculty of Medicine would concentrate on the benefits of a sustainable diet for health and on developing guidelines for ensuring all the micro-and macro nutrients for children and adults; while an advertising training course would focus on how to mobilise community members to act and change their grocery shopping and eating habits.

Benefits

By linking learning with real-world beneficiaries, SL increases learners' motivation and perseverance, leading to higher retention, course completion and aspirations ([37]). Engaging with the community also enhances learners' civic and environmental responsibility, as well as their critical thinking, communication, and collaboration competences. This activity is designed to enhance learners' system thinking and capacity to mobilise others towards individual initiative.

How

This activity should be tailored to its intended target learners. For example, consider starting with learners watching a video on sustainable nutrition, for instance, the ones produced by the United Nation Environmental Programme ([38]), or the Food and Agriculture Organization, choosing from the agro-ecology for sustainable food systems playlist ([39]). Educators could use a flipped classroom approach ([40]) and ask learners to work in groups to carry out some research into the impact of food systems on air and soil pollution, deforestation, biodiversity loss, plastic pollution and climate change, and then share their findings.

You could prompt learners to reflect on sustainable food choices and what would reduce the environmental impact of a family diet, addressing the same aspects previously analysed on air and soil pollution, deforestation, biodiversity loss, plastic pollution, and climate change.

You could ask learners how the food pyramid could be modified to promote healthy and sustainable food choices.

You could finally ask learners to engage with the community to understand how they could promote the new pyramid, e.g., by engaging with the local health centres, the local schools or parents' associations. Ask them to develop a communication campaign to mobilise families with children to adopt healthy and sustainable food habits.

Tip

You can find inspiration for activities related to food and sustainability on the European Food Information Council (EUFIC) website ([41]) and in the course on Nutrition for Health and Sustainability ([42]) developed by the EIT Food ([43]).

4.7.1.2 Digital Competence for the elderly

Description

([37]) Darby, A., Longmire-Avital, B., Chenault, J., & Haglund, M. (2013). Students' motivation in academic service-learning over the course of the semester. College Student Journal, 47(1), 185-191.

([38]) See for instance https://youtu.be/VcL3BQeteCc

([39]) https://youtube.com/playlist?list=PLzp5NgJ2-dK4OW2Lt_BbtKpCrXHEyCfuA

([40]) https://en.wikipedia.org/wiki/Flipped_classroom

([41]) https://www.eufic.org/en/

([42]) https://www.futurelearn.com/courses/nutrition-for-health

([43]) see in particular: https://www.eitfood.eu/education/consumers

SL is intended to meet identified community needs. Thus, in collaboration with the local community centre, the library, or any association that brings elderly citizens together, ask your learners to identify older community members' digital skills needs, and then engage them in offering tuition or support to this community to promote their digital inclusion.

SL is also intended to meet one or more course objectives, hence the SL experiences shall relate to the content of the course you are providing. Depending on what the digital competences are that you are planning to work on, this activity makes them relevant for the local community. By asking your learners to transfer what they learn in your course to the elderly attending the community centre, local library, or any other space where learners can have access to, shows for whom what they are learning has an immediate value.

Benefits

By opening the classroom to the community, this SL activity helps learners see the value of their learning for others, which in turn increases their engagement with course content. By opening up to the community, learners develop social awareness and civic responsibility, while training their digital competences.

How

This activity could develop as follows:

1. Ask your learners to identify older community members' digital skills needs and then engage them in offering tuition or support to this community.
2. Once the needs have been identified, make sure you prepare your learners for interacting with elderly people: start by designing some ice breaker activities that allow learners, and the elderly, to get acquainted.
3. Facilitate action by creating a dedicated time in the weekly schedule for learners to commit to visit and spend a little time with the elderly to teach them how to use their tablet, computer, or smartphone. Make sure that there is mapping between what your learners are supposed to learn during your course and the SL experience, and the activities they run with the elderly people they serve. Encourage them to slowly address one need at a time, such as making a video call or securing the mobile phone with a password.
4. You can ask learners to keep a diary of their experience, to reflect on what worked well and what did not work, how they overcame obstacles over time and what they would do differently next time. Make sure that you plan for shared reflection where things like ageism and other negative stereotypes can be addressed.
5. To celebrate the experience, you could ask learners to create a video or podcast collecting testimonials both among the elderly community and the learners, which will help demonstrate learning.

Tip

Register to the Education for Climate Coalition ([44]) and discover its challenges. Many of them can be turned into SL activities.

([44]) https://education-for-climate.ec.europa.eu/community/all-challenges

5 Assessment Methods Cards

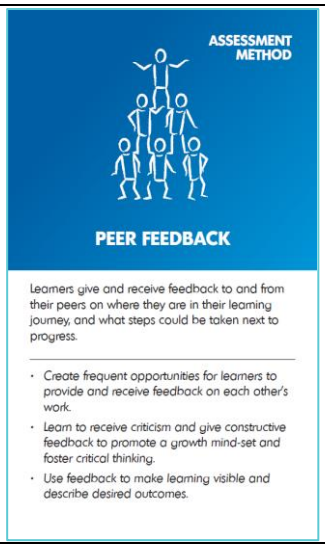
Scaffold proposes seven assessment methods that can be used in combination with the seven teaching methods to assess competence development and learner progress.

Table 5. Scaffold assessment methods cards

Peer feedback
Self-reflection
Generating assessment evidence
Authentic assessment
Observation
Questions for learning

Source: own elaboration

The list of methods is not exhaustive, but offers the readership a range of alternative approaches to explore, combine and experiment with. All methods allow the embodiment of the principles indicated in Chapter 3, to appraise learners' starting levels, as well as their progress. These assessment methods can be combined with every teaching method suggested in the previous section, and can be tweaked to adapt to different learning settings and context.
The assessment methods cards are intended as sources of inspiration and can either be used as they are, adapted, or combined with existing methods.

Type	Assessment Method
Title	**5.1 Peer feedback**
	
Description	Learners give and receive feedback to, and from, their peers on where they are in their learning, and what next steps could be taken to further progress.
Hint	• Create frequent opportunities for learners to provide and receive feedback on each other's work • Learn to receive criticism and give constructive feedback to promote a growth mind-set and foster critical thinking • Use feedback to make learning visible and describe desired outcomes

Into Action

Peer assessment or peer feedback refers to "a reciprocal process whereby learners' produce feedback reviews on the work of peers, and receive feedback from peers on their own work" ([45]). Peer assessment can be formative or summative, quantitative (providing grades) or qualitative (providing extended verbal feedback), and a variety of products can be peer-assessed, such as written assignments, presentations, portfolios, oral statements, scientific problems etc. ([46]).

Peer feedback involves creating the opportunity for learners to learn from each other, by discussing performance and success criteria. It is a collaborative learning process, where internalisation and transfer of learning is facilitated. It can be used in combination with any teaching methods, and is especially good with Cooperative Learning (p. 46). Peer feedback involves the development of communication and negotiation skills. Learn to give and receive criticism constructively, with the intention of improving the results and the learning process.

Create frequent opportunities for learners to provide and receive feedback on each other's work

Use feedback positively, constructively, and continuously, so that it becomes a natural and comfortable dimension of the learning experience. Peer assessment has three key components. First, to define assessment criteria in relation to the work to be assessed; second, to identify one's strengths and weaknesses; and third, to suggest areas for future learning ([47]). Create frequent opportunities for learners to provide and receive feedback, since the process of peer feedback needs to be trained and practised. Through peer feedback, learners learn to develop objective and critical thinking, that they can apply later to assess their own work.

Use feedback to promote a growth mind-set and foster critical thinking

Support learners to identify ways in which activities, experiences and performance can be improved, and in which learning can be applied in different future scenarios. Encourage learners to practise justifying their decision making and provide them with constructive criticism from their peers. Practise supporting formative feedback with specific examples, and several types of evidence, so that learners feel confident and in a safe space to give and receive feedback from their peers. This criticism must be positive, clear, respectful and constructive. Peer feedback will promote the shift from fixed mindset to growth mindset. When peer feedback is timely, learners receive feedback from their peers that they can use immediately. This way they feel encouraged to move forward with what they are working on, and to improve their performance. It adds use-value to the learning process.

Create opportunities to highlight and celebrate the characteristics of a growth mindset, which:

1. Believes intelligence and talents can be developed.

([45]) Nicol, D., Thomson, A., & Breslin, C. (2014). Rethinking feedback practices in higher education: a peer review perspective. *Assessment & Evaluation in Higher Education*, *39*(1), 102-122, p. 102.

([46]) Kapsalis, G., Ferrari, A., Punie, Y, Conrads, J., Collado, A., Hotulainen, R., Rämä, I., Nyman, L., Oinas, S., & Ilsley, P., Evidence of innovative assessment: Literature review & case studies, EUR 29882 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-12116-9, doi:10.2760/552774, JRC118113.

([47]) Sluijsmans*, D. M., Brand-Gruwel, S., van Merriënboer, J. J., & Martens, R. L. (2004). Training teachers in peer-assessment skills: Effects on performance and perceptions. *Innovations in Education and Teaching International*, *41*(1), 59-78.

2. Believes effort is the path to mastery.
3. Believes mistakes are an essential part of learning.
4. Views failure as an opportunity to learn.
5. Believes failures are just temporary setbacks.
6. Embraces challenges.
7. Welcomes feedback from others in order to learn.
8. Believes feedback is a guide to further improvement.
9. Views feedback as a source of information.
10. Views other's success as a source of inspiration and information.

Focus on feedback that is identifying strengths, before highlighting weaknesses, to give learners the incentive to continue the road to acquiring expertise.

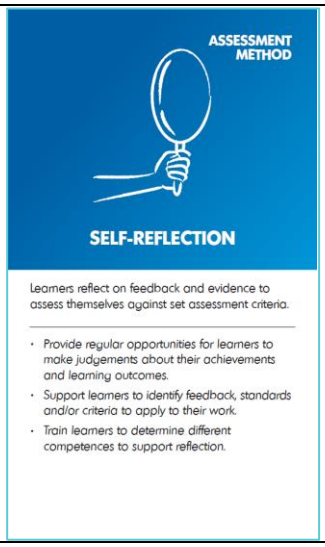
Use feedback to make learning visible and describe desired outcomes

Look to include use of a range of feedback methods, such as scores, progress points, badges, verbal feedback, annotated notes on work, interviews, discussions, rankings, to encourage learners to view their work in diverse ways. Feedback leads to better performance if you explain to the learner why they are receiving feedback, and very specifically that receiving critical feedback indicates a belief that the learner can take the next steps towards high academic standards.

Evaluate progress from different perspectives and compare with lower and higher levels of competence.

Rubrics are useful tools to make learning visible and describe desired outcomes in a structured way within the classroom. But it is best not to attach a mark to the feedback. With a mark the learner is less inclined to look any further to reflect on what went well and still needs to be further developed.

Feedback is particularly effective when it is followed up regularly and structurally.

Type	Assessment Method
Title	**5.2 Self-reflection**
	
Description	Learners reflect on feedback and evidence to assess themselves against set assessment criteria.
Hint	• Provide regular opportunities for learners to make judgements about their achievements and learning outcomes. • Support learners to identify feedback, standards and/or criteria to apply to their work. • Train learners to evidence competence in different modes to support reflection.

Into Action

Self-reflection is essential for anyone to think about their own thinking, which in turn is a cornerstone in developing the capacity to manage one's learning ([48]). Self-reflection also helps learners to develop their self-awareness, self-efficacy, motivation and perseverance ([49]), in that it allows them to identify:

— What they are good at,

— What they would need to improve,

— What they would like to master,

— What they would need to do to progress.

Self-reflection activities should be embedded systematically throughout the learning activities. For example, you can introduce a new topic by asking learners to rate their existing knowledge of the topic first. This can take the form of a small test. At the end of the class, you can ask learners to go through the test again and encourage them to analyse the difference between what they thought they knew and what they really know.

([48]) Sala, A., Punie, Y., Garkov, V. and Cabrera Giraldez, M., (2020) *LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence*. Luxembourg: Publications Office of the European Union.

([49]) Bacigalupo M, Kampylis P, Punie Y and Van Den Brande L., (2016) *EntreComp: The Entrepreneurship Competence Framework.* Luxembourg: Publications Office of the European Union.

These self-prediction activities are important for developing self-knowledge because learners can clearly see whether they are overestimating, or underestimating, what they know. This recognition activates metacognition.

Self-assessment identifies areas that require improvement and empowers learners to be more effective learners.

Provide regular opportunities for learners to make judgements about their achievements and learning outcomes

Providing opportunities for learners to reflect on their learning is a form of formative assessment, which trains the learners to detect indicators of learning during the process, and to re-adjust their learning strategies in progress, rather than waiting for summative appraisal of the learning outcome. To empower learners to continuously appraise their learning and think critically, you can provide them with rubrics to clarify what they are expected to learn, and how they are expected to demonstrate their learning.

Support learners to identify feedback, standards and/or criteria to apply to their work

Success criteria makes learning visible to the learners and empowers them to gauge their progress and adjust their strategies to achieve their learning goals.

Success criteria can be linked to a product, or process, and may describe performance and ways of working, as well as quality and outputs. If a learning activity is more open ended, or exploratory, success criteria can be developed as a part of reflection, in terms of lessons learned from an activity or experience. Success criteria can also be developed following analysis of a range of examples of outcomes and outputs.

Involving learners in the development of such criteria is a valuable strategy to encourage their understanding of expectations, to strengthen their accountability, and enhance their ownership of the intended outcomes.

Train learners to evidence competence in different modes to support reflection

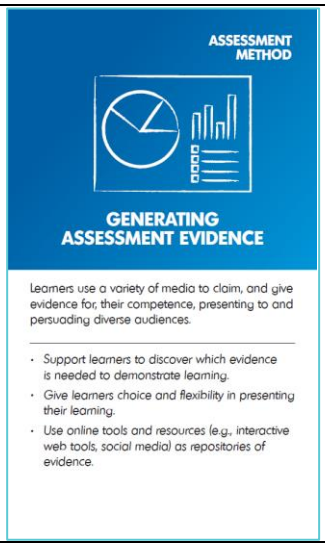
Let learners choose the format of their assignments among a list of options, such as

- Visual: Chart, drawing, timeline, diagram, infographic, map, comic, poster...
- Construction: Model, sculpture, diorama, miniature, museum exhibit...
- Oral: Podcast episode, panel discussion, lecture, theatre play, press conference, talk show, monologue...
- Multimedia: Song, illustrated book, newspaper, video, slide for a presentation, video poetry, photo Essay, board game, videogame, webpage...
- Written: Report, article, persuasive essay, letter, children's story, poem, eulogy, diary...

Using multiple formats to demonstrate learning helps both learners and their educators build a richer picture of learner's knowledge, skills, and attitudes.

Digital portfolios can be created using a variety of tools. One example is journeyfolio ([50]),, which can also be used as a CV. Using a simple presentation format, learners can collect, collate and present diverse evidence of competence, practised and gained through wide-ranging experiences, helping them to develop a sense of purpose for their learning. A journeyfolio is an opportunity for learners to be creative, and make decisions about how best to evidence, and share, their progress and potential. At the same time, it is a tool to help learners to reflect on their learning, understanding how cognition happens and their knowledge states to develop a sense of progress and growth mindset.

([50]) https://gamestorming.com/journeyfolio/

Type	Assessment Method
Title	**5.3 Generating assessment evidence**
	
Description	Learners use a variety of media to claim, and give evidence for, their competence, presenting to and persuading diverse audiences.
Hint	• Support learners to figure out which evidence is needed to demonstrate learning. • Give learners the choice and flexibility in presenting their learning. • Use online tools and resources (e.g., interactive web tools, social media) as repositories of evidence

Into Action

Generating assessment evidence is necessary to support the ongoing achievement of learning. Learners need to demonstrate their learning in some way for it to be useful in the future and to be able to continue building on it ([51]).

A critical aspect of the evaluation process is collecting an appropriate amount, and type, of evidence, to demonstrate the purpose of the assessment, in this case, that the individual is competent. Depending on what we want to assess, and the evidence we want to collect, we can evaluate in one way or another. In a language class, a live conversation can generate evidence of fluency when speaking, but not the level of spelling correction. As always, when it comes to evaluating and measuring, we must be sure that the measurement / evaluation instruments that we apply will capture only what we want to measure. Additionally, the evidence required should be directly related to the requirement of the competence standard being assessed. It is important to assess the learner's agency in creating the evidence, using assessment as learning to further develop competence through active learner participation throughout the process.

Support learners figure out which evidence is needed to demonstrate learning.

Support learners to identify, select and use diverse evidence to articulate and demonstrate their competence development. A portfolio (often electronic) is a collection of products generated by the

([51]) Yambi, T. (2018). Assessment and evaluation in education. *University Federal do Rio de Janeiro, Brazil*.

learner that demonstrates the mastery of specific competences or attainment of learning outcomes and is an effective way to support learners in organising evidence of their learning. The educator should help learners to structure their portfolios with questions to prompt planning, and pose the same questions in the past tense to prompt reflection. A reflection paper, or voice note, should be included in the portfolio, providing rationale for the selection of specific evidence to prove specific learning goals or competences.

These are some questions learners can use to structure their portfolio

1. What do/did I want to learn/need to learn?

— What is/was important or necessary

— a specific problem to be solved

— a challenge that must be faced

— information that will construct something of value to me/others

— What is/was interesting or relevant

— a hobby or skill

— personal knowledge development

— learning for a job or a career

2. Why is/was this important?

— What has motivated me to seek this knowledge?

— What circumstances have led me to want to learn this?

— Why is this meaningful to me or to others?

— What would happen if I don't find out what I need to?

— How will this knowledge change things?

3. How do/did I intend to use this knowledge?

— personal development

— problem-solving

— general interest

— developing other learning challenges

— responding to a question(s)

4. What do/did I know and what do/did I need to find out?

— Current knowledge

— exploration of assumptions

— personal experience

— knowledge gained from others

— Missing knowledge

— who, what, where, when, why, how

— the history of the problem or challenge

— what others have missed in the past

5. What are/were my capabilities/limitations?

— What do I know or what can I do now that will help me?

— What can't I do? Can I learn how to do it? (Considering time frame, budget, etc…)

6. Where can/did I find out what I need/ed to know?

— Traditional sources

— books

— articles

— film

— art and design

— conversation/collaboration

— courses

— hands-on workshops

— seminars

— mentoring/practicums

— Online sources

— websites

— blogs

— wikis

— videos

— podcasts

— online learning/MOOCs

7. Who can/did I ask for help?

— Family, friends, and teachers

— Other professionals and experienced enthusiasts

— Those who have failed to solve the problem and gained insights from that

8. How will/did I apply and share my knowledge?

— Production and Delivery

— developing and giving a presentation

— writing/publishing a book

— building and publishing a website or wiki

— starting a blog

— filming and hosting a video tutorial

— recording and hosting a podcast

9. How will/did I know my learning was successful?

— What were the results of my efforts?

— How did I succeed or fall short of accomplishing my goal?

— What went well, and what didn't?

— How can I improve my efforts, processes, and outcomes in the future?

— Where/when/how else can I use what I've learned?

10. Where/when/how else can/did I use what I've learned?

— Parts of learning (or the whole) can potentially be applied to other future problems of a similar nature

— We can find other ways to share our learning (e.g., teaching it to others

— Knowledge retention and reuse can effectively exercise overall positive cognitive development

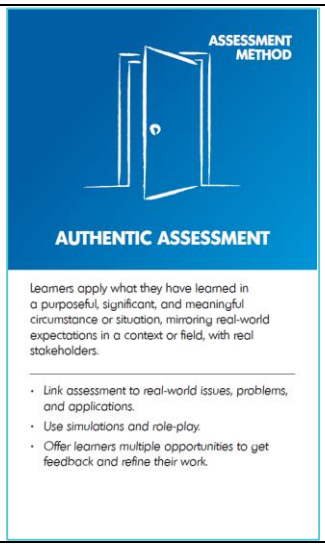
Employing these self-directed learning questions can lead to valuable experiences for the development of any independent learner. Expand on them and revise them, using different combinations of the questions as appropriate.

Give learners the choice and flexibility in presenting their learning.

Encourage learners to choose from, and combine, different types of evidence, to demonstrate different competence or learning outcomes, and their confidence and mastery in the use of different tools and methods (see Assessment Method Self-reflection). Offering flexibility in presenting their learning is very inclusive and will give learners confidence and the opportunity to learn from their peers, so that they can also learn how to apply other tools and methods, and express themselves in gradually better and more diverse ways. Give learners the choice and flexibility in how best to present their learning (text, speech, drawing, illustration,...) Use real life examples of multimodality, as encountered in life and communication in a digital media-rich world (text, speech, drawing, illustration, comics, storyboards, design, film, music or video).

Use online tools and resources (e.g., interactive web tools, social media) as repositories of evidence

Process and product portfolios, in contrast to traditional assessment approaches like examinations, can accommodate and represent a set of complex tasks, including interdisciplinary learning and transversal capabilities, with examples of different types and combinations of learner evidence over time. When the learners make decisions about how best to represent their learning and progress, with different types of evidence, they engage creatively and critically to own and drive their own progress and self-efficacy. collect

Type	Assessment Method
Title	**5.4 Authentic assessment**
	
Description	Learners apply what they have learned in a purposeful, significant, and meaningful circumstance or situation, mirroring real-world expectations in a context or field, with real stakeholders.
Hint	• Link assessment to real-world issues, problems, and applications. • Use simulations and role plays. • Offer learners multiple opportunities to get feedback and refine their work.

Into Action

Authentic assessment is a form of assessment linked to the performance of real-world tasks, and the meaningful display of relevant knowledge, skills, and attitudes. In other words, it assesses the demonstration of competence in real, or realistic, assignments ([52]). A typical example of authentic assessment is the practice exam you needs to pass to obtain a driving licence. The mere knowledge of the driving code, normally assessed through a multiple-choice test, is not sufficient to declare a learner apt to drive. They need to prove their competence by driving.

Link assessment to real-world issues, problems, and applications.

Authentic assignments require learners to analyse the situation and figure out what competences (knowledge, skills, and attitudes) to apply to face each situation. Authentic assessment is intrinsically linked to experiential learning, as it aims to assess learners' proficiency in selecting and applying the competences they have acquired, or are developing in practice.

Use simulations and role plays.

Authentic assignments do not need to put the learner in the real situation, but the situation must be realistic. When training to become a pilot, the learner starts in a flight simulator, not a plane full of

([52]) Darling-Hammond, L., & Snyder, J. (2000). Authentic assessment of teaching in context. *Teaching and teacher education*, *16*(5-6), 523-545.

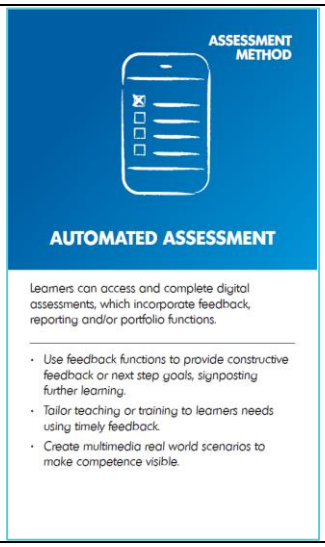
passengers. Similarly, you can use role playing to assess learners' ability, for instance, to analyse information through interviews, or you can use case studies to have learners develop business model canvases for existing ventures.

Offer learners multiple opportunities to get feedback and refine their work.

Authentic assessment can be itereated; hence it is important to create multiple opportunities for learners to stage their abilities, get feedback and work on them to improve performance. If the competence to be developed is the ability to speak in public, it is ideal to have learners pitch their ideas to their peers at the initial stage of their work, present progress midway, and then communicate key results at the end of a project. Ideally the audience could change and involve at the end a wider public, e.g., at an exhibit, in a local Pecha Kucha ([53]) event, etc...

Authentic assessment can be performed by the educators, by an external audience, by peers and combines well with self-reflection.

([53]) https://www.pechakucha.com/

Type	Assessment Method
Title	**5.5 Automated assessment**
	
Description	Learners can access and complete digital assessments, which incorporate feedback, reporting and/or portfolio functions.
Hint	• Use feedback functions to provide constructive feedback or next step goals, signposting further learning. • Tailor teaching or training to learners needs using timely feedback. • Create multimedia real world scenarios to make competence visible.

Into Action

Automated assessment is an assessment that is done using software that assesses several factors and characteristics ([54]). Typically, this software implements an assessment model based on a rubric, containing the characteristics to be analysed.

Automated assessment can promote the autonomy of learners who want to follow their learning path at their own pace. It is an optimal and efficient way to assess learning outcomes, support learners and tailor learning activities to their needs. It makes learners more independent and supports them to self-regulate their learning.

Tailor teaching or training to learners needs using timely feedback.

Digital technologies provide the possibility to generate automated assessment to support you in tailoring your training or teaching to the learners' needs, since timely feedback can be scheduled automatically. Customised learning paths can be designed and organised so that the learner progresses at his/her/their own pace, as directed by the programmed activities.

Use feedback functions to provide constructive feedback or next step goals, signposting further learning.

([54]) Ala-Mutka, K. M. (2005). A survey of automated assessment approaches for programming assignments. *Computer science education*, *15*(2), 83-102.

The kind of feedback provided influences the learning process. To receive timely feedback can increase the learning motivation of learners. Positive feedback leads to emotional space for learning. Learners learn a lot from mistakes, but a safe climate is needed to explore reasons for the mistakes and ways of doing things better. Providing constructive feedback is an essential condition in order to keep learners motivated, and to strive for a learning climate that is safe. Therefore, it is important that the learner always receives, on a two to one basis, a majority of constructive task-oriented feedback, over negative task-feedback. Consistent provision of constructive feedback that identifies strengths before highlighting weaknesses, gives learners the incentive to continue on the road to acquiring expertise.

Create multimedia real world scenarios to make competence visible.

Escape rooms can be used merge gamification with automated assessment ([55]). Digital or physical escape rooms can be designed to teach curricular topics in a more engaging way with pace and variety.

Escape rooms are adventure games where players work together to find clues and solve problems, or puzzles, to escape simulated danger, before time runs out. Escape rooms can be as simple as a series of questions, puzzles or tasks to complete to unlock clues. The content can be contextualised to whatever competences are being developed, or whatever problems are being solved.

Escape rooms are a great way to embed teamwork and problem solving, and demonstrate competences as they are practised in different challenges.

How

1. Create the context or back story. Contextualise the challenge with a relevant and engaging scenario within which to frame the tasks. Encourage your learners to create scenarios to hook, intrigue and inspire each other. Use the scenario to set up the purpose of the task, provide information and motivate learners to engage.
2. Create your clues. Decide how many and what kind of clues you want. Clues can be:
    - Hidden within images
    - Translate this sentence
    - Online jigsaw puzzles
    - Hide a word in a slide where learners move a magnifying glass to see the clue
    - Dingbats
    - Crossword style clues
    - Anagrams

    Click on the link below to more clue creation ideas.

([55]) Makri, A., Vlachopoulos, D., & Martina, R. A. (2021). Digital escape rooms as innovative pedagogical tools in education: A systematic literature review. *Sustainability*, *13*(8), 4587.

https://wakelet.com/wake/8cbb6cc5-6f48-4262-9156-51318250ecf8

3. Create interactive images with roll over hot spot
4. Select from riddles, anagrams, crossword clues, questions, puzzles or jigsaws to create discrete challenges.
5. Sequence the tasks within the scenario or narrative
6. Learners test their rooms with other groups, making competence visible

Tips

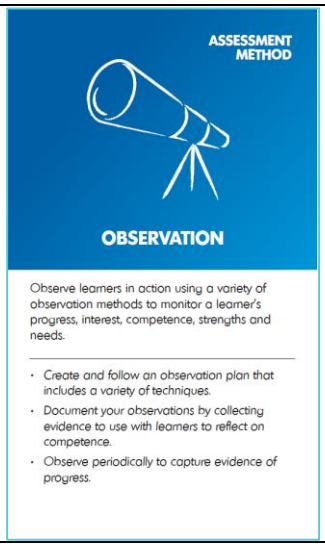
Work with learners to create the escape room themselves.

Brainstorm scenarios that learners would find engaging and meaningful.

Design the escape room using simple digital tools like Jamboard ([56]), Genially ([57]), or any slide presentation software you want to build confidence progressing onto more complex platforms like Minecraft and other 3D software.

([56]) https://jamboard.google.com/

([57]) https://genial.ly/

Type	Assessment Method
Title	**5.6 Observation**
	
Description	Observe learners in action using a variety of observation methods to monitor a learner's progress, interest, competence, strengths and needs.
Hint	• Create and follow an observation plan that includes a variety of techniques. • Document your observations by collecting evidence to use with learners to reflect on competence. • Observe periodically over time to capture evidence of progress.

Into Action

Observation is the action, or process, of observing something, or someone, to gain information. Observation allows learners and teachers to identify the learning needs and interests of themselves and others, as well as progress. Noticing where significant learning is taking place allows skilled practitioners to make judgements about how best to extend and deepen learning. This can be 'in the moment', or at a later point.

Learning and competence development are complex phenomena, which it can be difficult to capture using traditional methods. Thus having structures and formats to support sustained focus and attention to the desired elements can be helpful.

Practitioners should take time to notice the quality of the environment, experiences, and interactions within their setting. The addition of visual and audio media can create a richness and texture unavailable in written text, is a shortcut in demonstrating a competence, and can be self-explanatory and meaningful, as compared to a longwinded and detailed description.

Create and follow an observation plan that includes a variety of techniques.

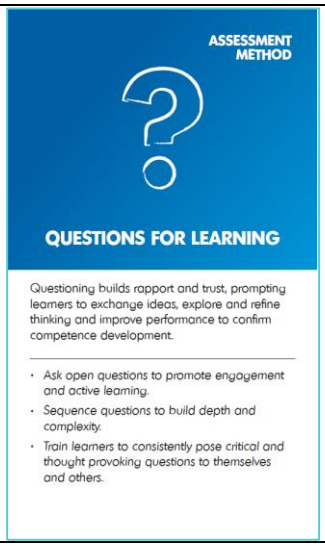
A variety of methods should be used, such as, discussions with the learners, effective questioning, planned and spontaneous observations, professional dialogue and discussions with parents and other stakeholders, to collect evidence. When choosing, pick the data collection methods that best align with your objectives – what are you looking for or looking to find out? - how do the methods you choose generate evidence of what you are looking for?

Document your observations by collecting evidence to use with learners to reflect on competence.

Identify what types of data you want to gather. Record your observations in one column using factual terms, and describing only what you observed, as if you were describing the events to someone who was not there. Focus on interactions and capture quotes, keep track of the artifacts that can be seen in the space and those that are used. Add to a second column your reflections once the observation time is concluded.

Observe periodically over time to capture evidence of progress.

To track progress observations need time. Plan numerous recurrent observation moments and – if possible- engage another observer to make sure your observation is rich in detail and as impartial as possible. One single observer could be biased due to looking for and seeing things that confirm their thoughts (confirmation bias), looking for evidence where they think we will find it (observation bias), initial impression of one person or a group of persons (the halo effect).

Type	Assessment Method
Title	**5.7 Questions for learning**
	
Description	Questioning builds rapport and trust, prompting learners to exchange ideas, explore and refine thinking and improve performance to confirm competence development.
Hint	• Ask open questions to promote engagement and active learning. • Sequence questions to build depth and complexity. • Train learners to continuously ask critical and challenging questions to themselves and others.

Into Action

Questioning is essential to scaffold thinking and learning and to mediate construction of knowledge by learners ([58]). Appropriately challenging, engaging, and effective questions stimulate peer discussion, and encourage learners to explore and refine their understanding of key concepts and competence. Questions help learners to frame and clarify goals, challenges or curiosities, as a call for active exploration and response.

Questioning is a skill that can be taught and learned. Create spaces where learners feel safe to continuously ask critical and challenging questions to themselves, and others, to test ideas, and manage ambiguity and uncertainty.

Quality questioning provides a great source for 3 areas of motivation in the following ways:

AFFILIATION – Establishes a safe environment to encourage speculation, sharing of 'best thinking' and articulation of ideas.

AGENCY – Encourages a sense of self-efficacy as questions that are well-pitched, targeted and directed will elicit thoughtful and accurate responses.

([58]) Salmon, A. K., & Barrera, M. X. (2021). Intentional questioning to promote thinking and learning. *Thinking Skills and Creativity*, *40*, 100822.

AUTONOMY – Different types of questions can be used to encourage decision-making and self-direction by requiring learners to reflect on their own and each others' thinking and responses.

Ask open questions to promote engagement and active learning.

Open-ended questions work best to engage learners in discussion, as they provide the opportunity for debate. Avoid asking leading questions, those that prompt or suggest the answer, and yes/no questions. If a yes/no question is warranted, be ready with a follow-up question to encourage learners to critically evaluate the material and engage in discussion.

Encourage learners to also ask open-ended questions in class discussions, being respectful of peers and remaining open minded. Asking questions throughout the class will not only make it more interactive, but will also help you gauge and improve learning. Give learners time to think and formulate responses to allow for longer, more complex answers.

Sequence questions to build depth and complexity.

During class discussions, instead of starting with a single, complex, multi-level question, use a sequence of questions to build depth and complexity. Essay questions on exams or paper assignments, on the other hand, often provide a suitable opportunity to ask multi-level questions. If your course goals include preparing learners to answer multi-level questions, use questions during class time to model and guide learners through the process.

Design deliberate opportunities to pose specific types of questions and find a sequence that works for you, your learners and the context in which you are teaching. In this way, you will be able to adapt the type of your questions according to the progress being made as-it-happens during the lesson.

You should combine questions that require critical thinking to assess learners' knowledge and comprehension, with questions that require complex processing to assess learners' skills to apply, analyse, synthesize, and evaluate acquired knowledge.

Train learners to continuously ask critical and challenging questions to themselves and others.

To train the questioning of the essential aspects of a topic needs time and confidence from the learners. Create spaces where learners feel safe to propose their own questions. The questions you ask should help learners practise critical thinking skills and growth mindset, as well as communication skills. Asking questions, learners also improve their skill of exploring and envisioning sustainable futures. Give them the needed time to respond, do not interrupt and show interest in all answers. This will boost an atmosphere where all learners feel safe and confident to participate in the discussion. Also, aim to redirect and guide incorrect answers towards a correct one and develop new questions drawn from the previous answers of the learners.

Using different types of questions supports analysis of what happens, when, and what impact this has during learning experiences. You can combine asking questions with peer feedback to develop the growth mindset of your learners.

6 Conclusions

"Scaffold" deck of cards is as an innovative and practical tool for educators to design competence-oriented learning experiences. The deck and this guide represent the collaborative efforts of the Joint Research Centre (JRC) and the European Training Foundation (ETF), to facilitate the take up European key competence frameworks in different educational setting.

The practical guide for educators enriches the Scaffold deck by delving into the underlying principles and methods that facilitate engaging and real-life learning experiences. It underscores the importance of engaging learners, enhancing reflection, centrality of the learner, and the shift from traditional teaching to facilitating learning. The collaborative nature of this guide is reflected in the valuable contributions of educators and experts, whose insights have enriched the both the development of the deck and its testing on the ground.

This guide is more than an instructional manual, with the deck of cards it accompanies it provides a vision for an education system that is adaptive, inclusive, and forward-thinking. The Scaffold deck of cards and this guide are not the end but a beginning—a starting point for educators to inspire, innovate, and integrate key competences into their pedagogical practices.

Educators are encouraged to explore, adapt, and experiment with the Scaffold cards to meet the dynamic needs of their learners. In doing so, they will contribute to learning environments that are not only about knowledge acquisition, but also about developing skills and attitudes that empower learners to navigate and contribute to an ever-changing world.

7 References

The ETF Ready Model: https://openspace.etf.europa.eu/pages/ready-model

Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016). EntreComp: The Entrepreneurship Competence Framework. Luxembourg: Publication Office of the European Union.

Bacigalupo, M., Weikert García, L., Mansoori, Y., O'Keeffe, W., (2020), EntreComp Playbook. Entrepreneurial learning beyond the classroom. Luxembourg: Publications Office of the European Union.

Bianchi, G., Pisiotis, U., Cabrera Giraldez, M. (2022) GreenComp – The European sustainability competence framework. Bacigalupo, M., Punie, Y. (eds) Luxembourg: Publications Office of the European Union.

Gershenfeld, N. (2005). Fab: The Coming Revolution on Your Desktop - From Personal Computers to Personal Fabrication. New York, NY, USA: Basic Books.

Huizinga, J. (1955, originally published in 1938). Homo Ludens: A Study of the Play Element in Culture. Beacon Press, Boston.

Kapsalis, G., Ferrari, A., Punie, Y, Conrads, J., Collado, A., Hotulainen, R., Rämä, I., Nyman, L., Oinas, S., & Ilsley, P., (2019) Evidence of innovative assessment: Literature review & case studies, Luxembourg: Publication Office of the European Union.

Lynch, T., & Ghergulescu, I. (2017). Review of virtual labs as the emerging technologies for teaching stem subjects. Presented at the International Technology, Education and Development Conference, Valencia, Spain, (pp. 6082–6091). https://doi.org/10.21125/inted.2017.1422

Lackeus, M. (2022). Den värdeskapande eleven En handbok för meningsfullt lärande i skolan. Lund: Student Litteratur.

Morado, M.F., Melo, A.E. and Jarman, A. (2021), Learning by making: A framework to revisit practices in a constructionist learning environment. Br J Educ Technol, 52: 1093-1115.

Nicol, D., Thomson, A., & Breslin, C. (2014). Rethinking feedback practices in higher education: a peer review perspective. Assessment & Evaluation in Higher Education, 39(1), 102-122, p. 102.

Sala, A., Punie, Y., Garkov, V. and Cabrera Giraldez, M., (2020) LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence. Luxembourg: Publications Office of the European Union

Sala, A., Herrero Rámila, C., (2022), LifeComp into Action: Teaching life skills in the classroom and beyond, Luxembourg: Publications Office of the European Union.

Salmon, A. K., & Barrera, M. X. (2021). Intentional questioning to promote thinking and learning. *Thinking Skills and Creativity*, *40*, 100822.

Sluijsmans*, D. M., Brand-Gruwel, S., van Merriënboer, J. J., & Martens, R. L. (2004). Training teachers in peer-assessment skills: Effects on performance and perceptions. Innovations in Education and Teaching International, 41(1), 59-78.

Vuorikari, R., Kluzer, S., & Punie, Y. (2022). DigComp 2.2: The Digital Competence Framework for Citizens-With new examples of knowledge, skills and attitudes (Vol. UR 31006 EN). Luxembourg: Publications Office of the European Union.

Vuorikari, R., Ferrari, A., Punie, Y., (2019). Makerspaces for Education and Training – Exploring future implications for Europe, Luxembourg: Publications Office of the European Union.

List of figures

Figure 1. Setting cards 12

Figure 2. The Planning Cards 14

Figure 3. Elements of a competence card. 15

Figure 4. Making notes around the competences cards. 16

Figure 5. The Ikigai model 39

List of tables

Table 1. Getting started with Scaffold..... 11

Table 2. Transversal Competence Icons..... 17

Table 3. Scaffold inspirational principles..... 21

Table 4. Scaffold teaching methods cards..... 27

Table 5. Scaffold assessment methods cards..... 67

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

— by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),

— at the following standard number: +32 22999696,

— via the following form: european-union.europa.eu/contact-eu/write-us_en.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

Science for policy

The Joint Research Centre (JRC) provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society

EU Science Hub
joint-research-centre.ec.europa.eu

Publications Office
of the European Union