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Progress by innovation

SUSTAINABLE DEVELOPMENT GOALS

Learning Module: Green and Entrepreneurial Learning

LEARNING MODULE FOR TVET TEACHERS AND TRAINERS

lkdf Learning and Knowledge Development Facility

National Center for Development of Innovation and Entrepreneurial Learning

FH JOANNEUM University of Applied Sciences

UNEVOC unesco International Centre for Technical and Vocational Education and Training

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UNITED NATIONS
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Learning module:

Green and Entrepreneurial Learning

LEARNING MODULE FOR
TVET TEACHERS AND TRAINERS

Vienna, Austria
March 2023

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

CONTENT

Green and Entrepreneurial Knowledge and Understanding

“Everyone has the right to education”

(Article 26 of the 1948 Universal Declaration of Human Rights)

I.1 IMPORTANCE OF EDUCATION

Education for all

"Everyone has the right to education"

(stated in Article 26 of the 1948 Universal Declaration of Human Rights)[1].

Education is the basic building block of every society. It is the single best investment countries can make to build prosperous, healthy and equitable societies. Education is the basis for improving the life of every person. It is probably the most important tool for changing one's life, determines the quality of each person's life and is a lifelong process.

Education improves a person's knowledge, skills, competencies and attitudes. Education directly affects people's chances of employment, because it is much more likely that a well-educated individual, a person with more diverse competencies and skills, will more easily get a suitable job.

Almost every government, worldwide, consider its national educational system as the crucial cornerstone that grasps whole nation together and leads the country towards sustainable development and growth. Since 1948 and the Universal Declaration of Human Rights, education became main pillar of equality and socio-economic development "Everyone has the right to education."

Furthermore, "It is the single best investment countries can make to build prosperous, healthy and equitable societies." Therefore, the education is at the heart of both personal and community developments.

1) Reference: United Nations, "Education For All," [Online]. Available: https://www.un.org/en/academic-impact/education-all

I.2 KNOWING THE ESSENCE OF ENTREPRENEURIAL AND GREEN RELATED EDUCATION

Why is everyone talking about it?

Rapid and deep-seated changes in terms of:

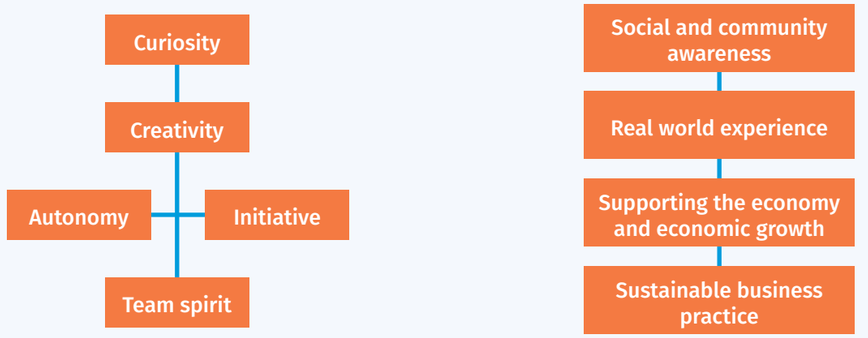
- social;
- technological; and
- environmental changes.

That brings the need to reflect upon **the purposes and content** of education.

Over recent decades, rapid and deep-seated social, technological and environmental changes have prompted policy-makers and educators to reflect upon the purposes and content of education, as part of the need to adapt and keep pace with such changes. There is a growing consensus that this goes beyond transmitting knowledge, towards preparing students for life: towards fulfilling their potential both as active citizens and within the world of work.

Among the recent shifts in the educational sector in the last 10-15 years, beside digitalization, the focus is on development of entrepreneurial thinking among youth and preparation for green transition.

FIGURE 1: Knowing the essence of entrepreneurial and green related education[2]



2) Reference: A. Penaluna, K. Penaluna, E. McCallum, C. Brentnall, C. Jones, S. Brown, R. Polenakovikj, D. Sutevski, I. Stankovska, L. Polenakovikj, B. Jovanovski and T. Velkovski, "How to teach entrepreneurship? WHAT, WHY, WHEN and WHO," National Centre for Development of Innovation and Entrepreneurial Learning, Skopje, 2015. [Online]. Available: http://ncdiel.mk/wp-content/uploads/2016/05/How-to-teach-entrepreneurship-MKENG-web.pdf

With the recommendations of the Oslo Agenda for Entrepreneurship Education in Europe, since 2006 there is general consensus to embed elements of entrepreneurial behaviour in schools and higher education that are already prevalent in primary school. It is widely accepted that experiential learning or 'learning by doing' with practical projects and activities and integrating real world experience of entrepreneurship is more effective than traditional methods, such as lectures, for developing entrepreneurship skills and attitudes.

I.3 WHAT ARE THE SKILLS THAT OUR YOUNG PEOPLE NEED FOR THIS FUTURE?

This is where the interest in entrepreneurial competences lies, as the knowledge, skills and attitudes (or 'mindset') that young people need to thrive in our increasingly complex and uncertain world. In 2020, the World Economic Forum looked at how the skills needed for employment are changing. This is highlighting the rising importance of those skills which the video bellow calls 'innately human' within the world of work. It is clear that this progression in the skills needed for employment includes skills that are not yet widely recognised nor an explicit part of our education systems.

FIGURE 2: Top ten skills

TOP 10 SKILLS IN 2025	TOP 10 SKILLS IN 2020
1 Analytical thinking and innovation	1 Complex problem-solving
2 Active learning and learning strategies	2 Critical thinking
3 Complex problem-solving	3 Creativity
4 Critical thinking and analysis	4 People management
5 Creativity, originality and initiative	5 Coordination with others
6 Leadership and social influence	6 Emotional intelligence
7 Technology use, monitoring and control	7 Judgement and decision making
8 Technology design and programming	8 Service orientation
9 Resilience, stress tolerance and flexibility	9 Negotiation
10 Reasoning, problem-solving and ideation	10 Cognitive flexibility

Watch video: *Skills Development Scotland - The Future of Work*

I.4 WHAT DOES IT MEAN FOR EDUCATION AND TRAINING?

It is within our collective human DNA to try and add value to our lives by **exploring, showing curiosity, asking questions, solving problems** - the kind of skills and dispositions associated with **being entrepreneurial.**

"Entrepreneurship is when you act upon opportunities and ideas and transform them into value for others. The value that is created can be financial, cultural or social".[3]

Boyan Slat was 16 years old in 2012 when he came across plastic pollution on his holiday in Greece. Now, he leads a non-profit Ocean Cleanup developing advanced technologies to rid the world's oceans of plastic. Young people can creatively tackle various issues, from climate change to cultural heritage preservation. They are the citizens and leaders who have ideas to create the future. The creation of value for others is recognized in the process through which all the competences are used to go from creative idea to entrepreneurial action. This value can be of the types ñisted below.

Financial value

Creating financial revenue through services or produces for the market, e.g. fundraising, a social enterprise, a mini-company or practice firm, a real student start-up business or a business run by the school or college.

Cultural value

Ideas which enrich people's cultural experiences such as music, art, heritage e.g. restoring an old building, holding a film festival, a street art exhibition, language learning, celebrating local heritage or arranging a new dance competition

Social value

Ideas which enhance society and social conditions, such as tackling environment issues, reducing loneliness, supporting employment, tackling racism, health campaigns, setting up community sports clubs or providing something that people lack e.g. a regular supply of clean water. Activities such as student councils or parliaments also create social value.

3) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu

Many countries worldwide are encouraging the education and training sector to take action to contribute to the green transition and to strengthen the sustainability competences of all learners.

Green and entrepreneurial education is one opportunity to foster creativity to have an idea, to take an initiative to put that idea into action and to create a value.

Why is green education important?

The move to a climate-neutral world will have significant social, economic and employment impacts.

A socially just transformation needs people to have the knowledge, skills and attitudes to shape and cope with profound change. Education and training systems and institutions can act as catalysts and support a shift to a more sustainable society.

Green education teaches that sustainable methods of production and having a connection and understanding of the environment is essential to cope with the ecological demands of our time.

TOOLBOX TASK
DA VINCI SCRIBBLES

Sit down at pad with a soft pencil in your hand. Close your eyes and start to scribble. Not the scratchy scribble of a child - imagine that you are an artist, sketching in an outline of something. Only don't direct the pencil, just let it flow across the page. When you feel you've scribbled enough, open your eyes. Look at the image you have generated.

- *What does it make you think of?*
- *What does it remind you of?*
- *How might you use it in your problem?*
- *What characteristics of it are appropriate to a solution?*
- *What sort of new product does it imply (or could you use to deal with it).*

Be imaginative - let your mind wander over just what this scribble might be[4].

4) Reference: A. Penaluna, K. Penaluna, E. McCallum, C. Brentnall, C. Jones, S. Brown, R. Polenakovikj, D. Sutevski, I. Stankovska, L. Polenakovikj, B. Jovanovski and T. Velkovski, "How to teach entrepreneurship? WHAT, WHY, WHEN and WHO," National Centre for Development of Innovation and Entrepreneurial Learning, Skopje, 2015. [Online]. Available: http://ncdiel.mk/wp-content/uploads/2016/05/How-to-teach-entrepreneurship-MKENG-web.pdf

- **Feedback:** Leonardo used this method to come up with new inventions, which considering his track record makes it quite a promising technique. If you have problems seeing anything in your picture, think of modern art - what title might you give your artwork in a gallery? Look for suggestions in the shapes and sub-patterns.
- **Outcome:** This technique is marginally better for coming up with new ideas than solving problems, but it is quite often a source of a solution.
- **Variations:** In a group you could each generate your own picture, or have a single person draw on a flipchart, then all of the group can individually think about what it implies before sharing their thoughts. Other old techniques this is reminiscent of are seeing pictures in cloud formations and in an open fire. Given appropriate surroundings, either of these will make an effective variant.

I.5 FIVE ENERGIZERS FOR ENTREPRENEURIAL AND GREEN RELATED EDUCATION

1. *Creating strong awareness in the whole environment.*
2. *Continuous teacher development.*
3. *Using the state-of-the-art technology in implementing entrepreneurial learning activities.*
4. *Implementation of a systematic approach in development implementing and sharing best practices.*
5. *Building strong international co-operation.*

The listed so-called energizers are essential for implementation and continuous improvement of the entrepreneurial and green learning process[5].

5) Reference: A. Penaluna, K. Penaluna, E. McCallum, C. Brentnall, C. Jones, S. Brown, R. Polenakovikj, D. Sutevski, I. Stankovska, L. Polenakovikj, B. Jovanovski and T. Velkovski, "How to teach entrepreneurship? WHAT, WHY, WHEN and WHO," National Centre for Development of Innovation and Entrepreneurial Learning, Skopje, 2015. [Online]. Available: http://ncdiel.mk/wp-content/uploads/2016/05/How-to-teach-entrepreneurship-MKENG-web.pdf

I.6 VALUING ENTREPRENEURIAL EDUCATION FOR YOUR TEACHING

To show that you value entrepreneurial education, there are **three key principles**[6]:

- **Build knowledge and understanding of entrepreneurial education for your teaching**

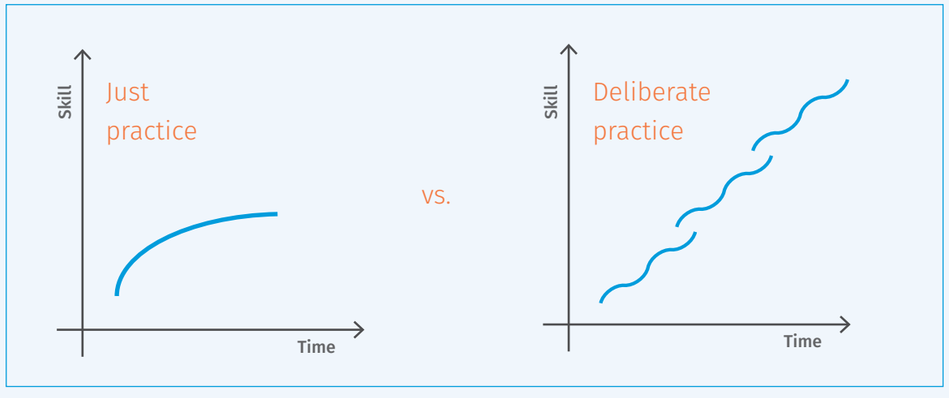
  Through these materials we will provide tasks to expand your knowledge. And these tasks will include suggested readings, discussions, observations and reflections.

- **Role model the entrepreneurial behaviors that you expect from students**

  Simply refining what you say and do can inspire learners to behave in an entrepreneurial way. For example, if teaching history you could use examples of entrepreneurial behavior of people in the past. Or in mathematics teaching you might focus on real-world applications of numeracy skills among market street traders. In other cases, you may need to rethink your approach more radically so that the distinctiveness of entrepreneurship shines through.

- **Use deliberate practice to develop your competences**

  The concept of deliberate practice underpins and is key to your participation in this training programme, asking you to deliberately practice what you learn within the modules in your teaching (inside and beyond the classroom) and with your learners.



Improving performance through practice in a purposeful, focused and systematic way is not a simply repeated practice. Through small steps and by acting on feedback, everyone can improve their erformance in all walks of life, including you as a teacher exploring new ways of facilitating learning and assessment.

6) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

I.7 VALUING GREEN AND ENTREPRENEURIAL EDUCATION FOR ALL

What kind of education do you value or think important?

Green and entrepreneurial education is important because this approach to learning can:

- *help you **build on learners' natural curiosity and creativity**;*
- *help you **engage learners** in challenging, real-world problems;*
- *help you **equip learners** with the knowledge, skills and attitudes;*
- *help you **strengthen ties between schools and the outside world**;*
- *help you support learners to **contribute towards a more inclusive society**.*

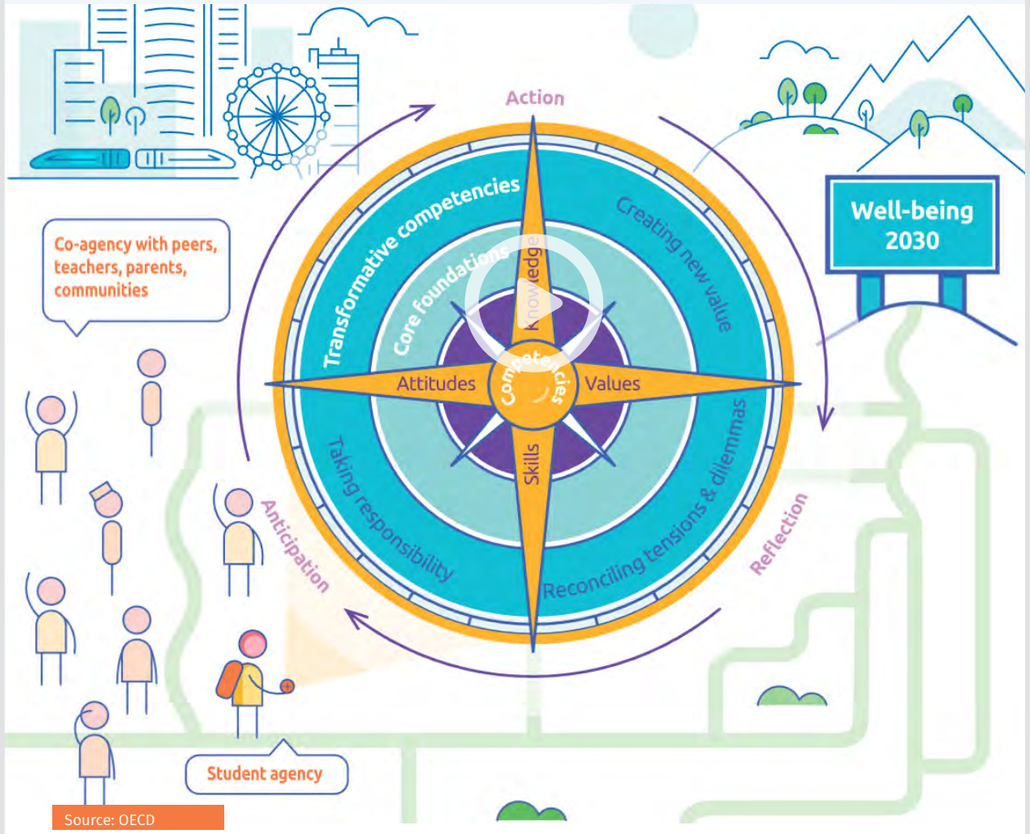
Organisations such as the European Commission and a growing number of governments know that entrepreneurial education is important in a fast-changing world. Additionally, the green and sustainable learning concepts are becoming a necessity to face the environmental challenges.

However, there are challenges to overcome. These include teachers who have a lack of time in the curriculum, inflexible curriculum demands, inadequate knowledge and professional training or limited entrepreneurial contacts with the world outside school. These materials are designed to help you overcome these challenges.

TOOLBOX TASK
WATCH A VIDEO ABOUT THE LEARNING COMPASS 2030

To get a sense of where entrepreneurial learning fits into the bigger educational picture, watch this **brief video on the Learning Compass 2030** produced by the Organization for Economic Cooperation and Development[7].

Watch video: *Learning Compass 2030*



Source: OECD

Then reflect on the following question:

What importance is attached to creating value, which is at the heart of entrepreneurial learning?

7) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

I.8 GUIDING PRINCIPLES OF EFFECTIVE ENTREPRENEURIAL PEDAGOGY

Teaching is the most important school-based factor in improving students' learning

The following guiding principles can help teachers to enhance the opportunity for students to develop entrepreneurial competences through learning experiences both in and beyond the classroom[8].

Facilitates creative thinking throughout the learning process

Facilitating creative thinking throughout the learning process means helping students explore and evaluate multiple ideas to create value. It means encouraging students to wonder about possibilities and be adaptable to different ideas and solutions. It allows them to test out ideas, make comparisons and to continually reflect on (and adapt) the usefulness of their proposed solutions to problems. The generating of ideas that have value to oneself and then others is at the core of what it means to be entrepreneurial, creativity is a driving force behind these ideas and how they are designed and implemented.

Promotes active entrepreneurial learning through real-world contexts

Entrepreneurial learning is best promoted when students have regular opportunities to interact with the world outside the classroom. This includes engaging with real-world problems and issues within the community and further afield. This goes beyond arranging visits where students are largely passive recipients of information, but towards activities such as community projects planned, developed and evaluated by students in collaboration with others.

Fosters purposeful collaboration both in and beyond the school

The Education Endowment Foundation defines collaborative learning as an 'approach which involves pupils working together on activities and learning tasks in small enough groups that everyone is able to participate in the assigned collective task. Pupils may work on separate tasks contributing to an overall outcome or work together on a shared task.' The EEF argues that the impact of collaborative learning is consistently positive, although it concedes that group size and poor planning can affect this. The most impactful learning occurs when tasks are well-designed and there is time for students to talk and interact.

8) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu

Encourages students to create value for others through their learning

Value creation pedagogy is when teachers support their students learning by applying their competences (future or existing) to create something of value to at least one external stakeholder. This could be a stakeholder outside their own group, class or school. The value that the student creates for someone else can be economic, social or cultural.

Stimulates reflection, flexible thinking and learning from experience

This means teachers need to be open-minded and think flexibly in the way they approach their planning, teaching and assessment. At times, they may plan lessons along the path of prescribed learning objectives but on other occasions plan in a more open manner in which students set their own goals they hope to achieve in an entrepreneurial project. This calls for a willingness to learn from experience, to embrace mistakes as part of such learning and take risks in teaching and learning. By modeling such behaviours, teachers create the kind of climate that is conducive to entrepreneurial learning. By allowing students to practice these behaviours, they encourage the development of entrepreneurial competences.

Makes entrepreneurial competences an explicit part of learning and assessment

To improve the quality of entrepreneurial learning we need to make explicit what is expected of students: clear entrepreneurial learning objectives and criteria to achieve these. It calls for teachers to align their assessment to the objectives and ensuring that students have sufficient opportunities to demonstrate entrepreneurial competence. Teaching in lessons and the feedback provided needs to focus explicitly on entrepreneurial competences and revolve around how well students collaborate and turn their ideas into action. This is a pressing need because too often entrepreneurial competences are not being made visible in current learning.

TOOLBOX TASK
DISCUSSION

- ***Which of the guiding principles do you already include in your teaching?*** *Share an example.*
- *Based on the* ***principle of deliberate practice****, how might you set about improving your professional competence in one of guiding principles you are not so familiar with?*
- *Who might be a good coach or source of professional advice?*

I.9 HOW LEARNING THEORIES CONNECT TO ENTREPRENEURIAL EDUCATION

Learning theories are explanations as to exactly what happens when we learn

Basic understanding of how learning occurs is essential to teaching entrepreneurial competences[9].

Social constructivism

It sees learning as an active process of constructing meaning through interacting with others using cultural 'tools', such as language, books, social media and symbols. As such, it is best regarded as an 'umbrella' theory under which many approaches are recommended e.g. enquiry-based learning, project-based learning, problem-based learning.

Behaviourism

It explains learning as a response to stimulus, for example in students' answers to questions from teachers, or the holding of competitions for young innovators. At the most simplistic level, it reflects a view that learning is responding to teaching by telling. It can also be seen in competency-based programmes where students are observed performing skills, for example in vocational and technical education settings.

Cognitivism

It sees learning as a change in mental processes, such as observing and categorizing. It claims that behaviourism puts too much emphasis on overt behaviour to explain learning. Instead, cognitivist psychologists focus on what happens in the mind and the importance of memory and building on prior knowledge. An emphasis is placed on developing planning and self-management skills through the use of visual tools, mind maps and flowcharts.

Humanistic theory

It emphasizes the inherent goodness in people and their learning capacity for growth and self-direction. It sees learning as self-directed, personal fulfilment and suggests cognitivism downplays the role of emotion. Learning to manage setbacks, for example, is a life skill. And highly creative people report that the sense of fulfilment they get from their work matters a great deal to them. This theory can be seen in practice when students contribute to community projects to 'give something back', adding social value.

9) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu

Social learning theory

Later renamed social cognitive theory, it draws on both behaviourist and cognitivist views. It sees learning as occurring when individuals interact with others and their environment, i.e. when individuals learn how they 'fit in' with others and what behaviour is appropriate in particular contexts. Mentoring programmes and participation in entrepreneurial networks are examples of this theory in action.

Connectivism

It is a recent theory which suggests that in an age of technologies we increasingly learn by forming connections within digital networks. These nodes can be people or resources such as social media. Connectivism is behind such developments as open online courses and the importance of entrepreneurial networks.

The complexities of entrepreneurial learning mean that no single theory holds true in all contexts. Over time, behaviorist, cognitivist, humanist, social and constructivist theories have all exerted varying degrees of influence in explaining how entrepreneurial learning occurs.

However, in recent years there has been a shift away from explanations which stress 'learning from explicit instruction and in pre-defined ways' (cognitivist and behaviorist theories) towards those which highlight entrepreneurial learning as a process where concepts are derived from and modified in the light of experience (social and experiential learning).

Learning theories are important because they empower educators, as professionals, to make informed decisions and justify their decisions to others.[10]

I.10 GREEN KNOWLEDGE AND UNDERSTANDING

What is **greening**?

The process of pursuing knowledge and practices with the intention of becoming more environmentally friendly, enhancing decision-making and lifestyle in more ecologically responsible manner, that can lead to environmental protection and sustainability of natural resources for current and future generations[11].

Green knowledge generally refers to knowledge and understanding of environmental sustainability and practices that aim to reduce negative impacts on the environment.

This includes knowledge of renewable energy sources, sustainable agriculture, waste reduction, and conservation of natural resources.

10) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu

11) Reference: UNEVOC, "Greening Technical and Vocational Education and Training: A practical guide for institutions," UNESCO-UNEVOC International Centre, Bonn, 2017

I.11 GREEN SKILLS

Green skills refer to the knowledge, abilities, and values needed to work towards a sustainable future and reduce the negative impact on the environment.

Teachers play a **critical role** in educating the next generation about environmental sustainability and promoting green skills.

The European Centre for the Development of Vocational Training CEDEFOP in the **Terminology of European education and training policy** divides green skills into:

- **Generic green skills**

  They help develop awareness-raising or implementation of resource-efficient activities, ecocitizenship, etc.

- **Specific green skills**

  Required to implement standards and processes to protect ecosystems and biodiversity, and to reduce energy, materials and water consumption.

- **Highly-specialised green skills**

  Required to develop and implement green technologies such as renewable energies, sewage treatment or recycling.

I.12 THE DEMAND FOR SKILLS IN A GREEN ECONOMY

Skills for a green economy	Skills needs[12]
Skills supporting **resource efficiency**	All businesses need generic or light green skills including: ▪ Strategic business management to build resource-efficient business models leading to bottom line benefits and in preparation for new regulations ▪ Business/financial accounting services around carbon and natural environment accounting ▪ Skills to design and adopt technologies, products and processes increasing resource efficiency ▪ Project management skills with clear understanding of resource efficiency ▪ Operator level actions to maximise resource efficiency (e.g. reducing waste in production).
Skills supporting **low carbon industry**	Low carbon industry focuses on energy generation and industry with high energy requirements. Skills include: ▪ Scientists and engineers with training or transferable knowledge for nuclear and renewable energy ▪ Technicians with training or transferable knowledge to install energy efficiency measures and retrofit at a household and business premises level ▪ Skills to design and adopt technologies, products and processes to minimise carbon emissions ▪ Operator level actions to minimise carbon emissions (e.g. driving in a fuel efficient manner).
Skills supporting **climate resilience**	Business requires the capacity to adapt to changes in climate. The necessary skills include: ▪ Scientific and technical skills such as modelling and interpreting climate change projections ▪ Risk management such as assessments of future resource availability ▪ Skills to design and adopt technologies, products and processes to improve climate resilience ▪ Operator level actions to improve climate resilience (e.g. retrofitting water efficient technologies in households and business premises).
Skills supporting **natural assets**	Natural assets underpin all business practice. Skills to protect and manage them include: ▪ Accounting services for the natural environment ▪ Understanding of environmental impact assessments ▪ Understanding and interpretation of environmental legislation targets, ecosystem services design and management and land use planning ▪ Skills to design and adopt technologies, products and processes to manage natural assets.

12) Reference: Government of the United Kingdom, "Skills for a green economy: A report on the evidence," 2011. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/32373/11-1315-skills-for-a-green-economy.pdf

I.13 WHY ARE GREEN SKILLS IMPORTANT?

Developing green skills in teachers is important for promoting environmental sustainability in the classroom and beyond.

Teachers who possess these skills can help students become **environmentally conscious and active citizens who are committed to creating a more sustainable future**.

I.14 HOW CAN TEACHERS INTEGRATE GREEN SKILLS?

Understanding environmental issues

Teachers can develop a deep understanding of environmental issues and the science behind them. This includes knowledge of climate change, renewable energy, biodiversity, and ecosystems.

Incorporating sustainability into lesson plans

Teachers can integrate sustainability into their teaching by incorporating environmental themes into their lesson plans. For example, they can teach about the impact of human activities on the environment or the importance of reducing waste.

Encouraging critical thinking

Teachers can encourage students to think critically about environmental issues by asking them to evaluate evidence and data, consider different perspectives, and identify potential solutions.

Practicing sustainability in the classroom

Teachers can model sustainability by practicing eco-friendly behaviors in the classroom. For example, they can encourage students to reduce waste by using reusable water bottles or implement recycling programs.

Promoting sustainable behavior

Teachers can promote sustainable behavior among students by encouraging them to take actions that reduce their environmental impact. This can include actions such as conserving energy, reducing waste, or participating in environmental initiatives.

TOOLBOX TASK
DISCUSSION

- *Which of the integration methods do you already include in your teaching?* ***Share an example.***
- *Discuss your experience with your colleagues.*

I.15 GREEN SKILLS AND TVET

Knowledge of sustainable practices

TVET programs can incorporate training on sustainable practices that are relevant to the specific industry. This could include topics such as renewable energy, green building, sustainable agriculture, or waste management.

Use of green technologies

TVET can train individuals to work with green technologies, such as solar panels, wind turbines, or energy-efficient appliances.

Understanding of environmental regulations

TVET programs can educate individuals on environmental regulations and policies, and how they impact different industries.

Promotion of sustainable behavior

TVET can promote sustainable behavior among individuals by encouraging them to adopt eco-friendly practices in the workplace, such as reducing waste or conserving energy.

Innovation and problem-solving

TVET can encourage innovation and problem-solving by training individuals to develop solutions to environmental challenges. This could include designing new sustainable products or developing more efficient manufacturing processes.

TOOLBOX TASK
GREENING TVET

Watch video: *Greening TVET, developed by UNESCO*

Source: UNESCO

Then reflect on the following question:

What are the key messages you take from the video that makes you think differently about your practice? (You could think of the impact on your practice from different perspectives such as yourself, your teaching, your students, your subject, your colleagues, your experiences, your working methods)

II

Entrepreneurial and green competences: key to green and entrepreneurial learning

“Ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development”.

Terminology of European education and training policy

II.1 COMPETENCE MEANING

"Ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development"

(Source: Terminology of European education and training policy).

II.2 HUMAN'S ABILITIES AND COMPETENCES

A person is a significant resource in achieving each organisation's goals and objectives.

Human resources possess many hidden potentials that can contribute to the development of the organisation. If that potential is discovered and even further encouraged it will lead to a healthy and positive work environment that leads to an overall success of the organisation.

A successful transition cannot be expected if the one who implements it does not possess the appropriate qualities, knowledge and skills.

People are characterised by their own skills, competences and attitudes that enable them to find their place in the society and work effectively with others, while using their personal mark to contribute to a personal, professional and societal development.

A machine will do the work as programmed, with precision and efficiency, but it is the human who can see opportunities, use personal skills and create something that will further increase the value of the product and the work process.

II.3 EUROPEAN APPROACH TOWARDS KEY COMPETENCES FOR LIFELONG LEARNING

The European Commission supports and reinforces the development of key competences and basic skills for all, from an early age and throughout life.

Key competences include knowledge, skills, and attitudes needed by all for personal fulfilment and development, employability, social inclusion and active citizenship:

1. *Literacy*
2. *Multilingualism*
3. *Numerical, scientific and engineering skills*
4. *Digital and technology-based competences*
5. *Interpersonal skills, and the ability to adopt new competences*
6. *Active citizenship*
7. *Entrepreneurship*
8. *Cultural awareness and expression*

The European approach is to promote key competences by:

- Providing high-quality education, training and lifelong learning for all
- Supporting educational staff in implementing competence-based teaching and learning approaches
- Encouraging a variety of learning approaches and contexts for continued learning
- Exploring approaches to assess and validate key competences.

13) Reference: European Commission, «Key competences for lifelong learning,» Publications Office of the European Union, Luxembourg, 2019

II.4 COMPETENCE FRAMEWORKS

Competence frameworks clearly define competences and skills that individuals need to successfully perform tasks and activities in a particular area.

The key for delivering green and entrepreneurial learning to students is teachers/trainers to develop and strengthen their competences.

In order to better understand the competences which are needed for delivering green and entrepreneurial learning, let's get familiar with two key competence frameworks:

- **EntreComp:** the Entrepreneurship Competence Framework
- **GreenComp:** the European Sustainability Competence Framework

II.5 ENTREPRENEURSHIP AS A COMPETENCE

"Entrepreneurship as a competence applies to all spheres of life. It enables citizens to nurture their personal development, to actively contribute to social development, to enter the job market as employee or as self-employed, and to start-up or scale-up ventures which may have a cultural, social or commercial motive." [14]

The EntreComp framework describes entrepreneurship as a transversal competence which can be applied by citizens to all spheres. The entrepreneurship is not only about developing and staring new businesses, but also about developing an entrepreneurial mindset that can be applied in many areas and contexts to achieve a decent life and society.

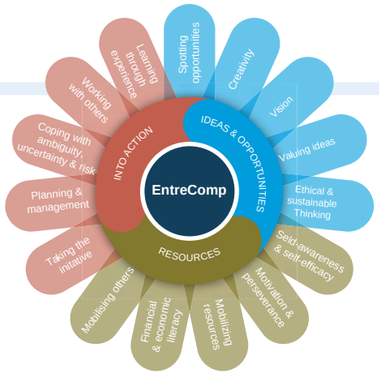
Therefore, the EntreComp framework promotes acquisition and application of entrepreneurial competences and skills, as well as lifelong learning that can help people to face the contemporary challenges and respond to the rapid changes.

14) Reference: M. Bacigalupo, P. Kampylis, Y. Punie and G. Van den Brande, «EntreComp: The Entrepreneurship Competence Framework,» Publication Office of the European Union, Luxembourg, 2016. [Online]. Available: https://publications.jrc.ec.europa.eu/repository/handle/JRC101581

II.6 THE ENTRECOMP MODEL

The EntreComp[15] framework is broken down into specific competences or building blocks that lead to an entrepreneurial mindset. The framework provides a practical and accessible way for educators, trainers, and individuals themselves to develop and improve their entrepreneurial abilities.

The framework is consisted of 3 competence areas and 15 competences in total, as depicted below.



Three competence areas:

- Ideas and opportunities
- Resources
- Into action

An overview of each competence, with its descriptor, is presented in the following pages.

Each competence can be explored through the following online tool, which introduces the *EntreComp* competences to teachers: *https://s.pointerpro.com/flower*

COMPETENCE AREAS

COMPETENCES	IDEAS AND OPPORTUNITIES	RESOURCES	INTO ACTION
	1.1 Spotting opportunities	2.1 Self-awareness and self-efficacy	3.1 Taking the initiative
	1.2 Creativity	2.2 Motivation and perseverance	3.2 Planning and management
	1.3 Vision	2.3 Mobilizing resources	3.3 Coping with uncertainty, ambiguity and risk
	1.4 Valuing ideas	2.4 Financial and economic literacy	3.4 Working with others
	1.5 Ethical and sustainable thinking	2.5 Mobilizing others	3.5 Learning through experience

15) Reference: M. Bacigalupo, P. Kampylis, Y. Punie and G. Van den Brande, «EntreComp: The Entrepreneurship Competence Framework,» Publication Office of the European Union, Luxembourg, 2016. [Online]. Available: https://publications.jrc.ec.europa.eu/repository/handle/JRC101581

The EntreComp model: **Ideas and opportunities**

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

The EntreComp model: **Resources**

Competence	Descriptor
2.1 **Self-awareness and self-efficacy** Believe in yourself and keep developing	▪ Reflect on your needs, aspirations and wants in the short, medium and long term ▪ Identify and assess your individual and group strengths and weaknesses ▪ Believe in your ability to influence the course of events, despite uncertainty, setbacks and temporary failures
2.2 **Motivation and perseverance** Stay focused and don't give up	▪ Be determined to turn ideas into action and satisfy your need to achieve ▪ Be prepared to be patient and keep trying to achieve your long-term individual or group aims ▪ Be resilient under pressure, adversity, and temporary failure

Competence	Descriptor
2.3 **Mobilizing resources** Gather and manage the resources you need	▪ Get and manage the material, non-material and digital resources needed to turn ideas into action ▪ Make the most of limited resources ▪ Get and manage the competences needed at any stage, including technical, legal, tax and digital competences
2.4 **Financial and economic literacy** Develop financial and economic know-how.	▪ Estimate the cost of turning an idea into a value-creating activity ▪ Plan, put in place and evaluate financial decisions over time ▪ Manage financing to make sure my value-creating activity can last over the long term
2.5 **Mobilizing others** Inspire, enthuse and get others on board	▪ Inspire and enthuse relevant stakeholders ▪ Get the support needed to achieve valuable out-comes ▪ Demonstrate effective communication, persuasion, negotiation and leadership

The EntreComp model: **Into action**

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

II.7 SUSTAINABILITY AS A COMPETENCE

"A sustainability competence empowers learners to embody sustainability values, and embrace complex systems, in order to take or request action that restores and maintains ecosystem health and enhances justice, generating visions for sustainable futures."

GreenComp is a reference framework[16] for sustainability competences. It provides a common ground to learners and guidance to educators of what sustainability as a competence entails.

Therefore, the GreenComp framework promotes acquisition and application of green and sustainable competences and skills that can help people to face the contemporary challenges, respond to the rapid changes and even be a catalyst for change.

II.8 THE GREENCOMP MODEL

The GreenComp framework describes a set of sustainability competences which can help learners think, plan and act with empathy, responsibility, and care for the planet.

The framework is consisted of 4 competence areas and 12 competences in total, as depicted below.

FIGURE 3: Visual representation of GreenComp

Source: European Union

16) Reference: G. Bianchi, U. Pisiotis and M. Cabrera, "GreenComp: The European sustainability competence framework," Publications Office of the European Union, Luxembourg, 2022. [Online]. Available: https://publications.jrc.ec.europa.eu/repository/handle/JRC128040

Four competence areas:

- Embodying sustainability values
- Embracing complexity in sustainability
- Envisioning sustainable futures
- Acting for sustainability

An overview of each competence, with its descriptor, is presented in the following pages.

Further information is available at *GreenComp: The European sustainability competence framework, Publications Office of the European Union*, Luxembourg, 2022. [Online]. Available at *https://s.pointerpro.com/flower*

COMPETENCES	COMPETENCE AREAS			
	EMBODYING SUSTAINABILITY VALUES	EMBRACING COMPLEXITY IN SUSTAINABILITY	ENVISIONING SUSTAINABLE FUTURES	ACTING FOR SUSTAINABILITY
	1.1 Valuing sustainability	2.1 Systems thinking	3.1 Futures literacy	4.1 Political agency
	1.2 Supporting fairness	2.2 Critical thinking	3.2 Adaptability	4.2 Collective action
	1.3 Promoting nature	2.3 Problem framing	3.3 Exploratory thinking	4.3 Individual initiative

The GreenComp model: **Embodying sustainability values**

Competence	Descriptor
1.1 Valuing sustainability	▪ To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values
1.2 Supporting fairness	▪ To support equity and justice for current and future generations and learn from previous generations for sustainability
1.3 Promoting nature	▪ To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems

The GreenComp model: **Embracing complexity in sustainability**

Competence	Descriptor
2.1 Systems thinking	▪ To approach a sustainability problem from all sides; to consider time, space and context in order to understand how elements interact within and between systems
2.2 Critical thinking	▪ To assess information and arguments, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions
2.3 Problem framing	▪ To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems

The GreenComp model: **Envisioning sustainable futures**

Competence	Descriptor
3.1 Futures literacy	▪ To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
3.2 Adaptability	▪ To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk
3.3 Exploratory thinking	▪ To adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas or methods

The GreenComp model: **Acting for sustainability**

Competence	Descriptor
4.1 Political agency	▪ To navigate the political system, identify political issues responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability
4.2 Collective action	▪ To act for change in collaboration with others
4.3 Individual intiative	▪ To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet

II.9 WHY ARE THESE COMPETENCE FRAMEWORK IMPORTANT?

Competence frameworks provide a common language and understanding for stakeholders involved in green and entrepreneurial learning, including teachers/educators and students themselves, as well as other stakeholders.

These competence frameworks are important as they define and explain what is needed to deliver green and entrepreneurial learning.

EntreComp and GreenComp show that when we speak about entrepreneurship, innovation, green and sustainable principles, we do not always refer to unknown and totally new concepts.

- **Focus on developing soft and transferable skills.**
- **Technical knowledge and expertise are important but are not sufficient on their own to succeed in the green and entrepreneurial teaching and learning.**
- **Communication, teamwork and creativity are essential for identifying and addressing complex challenges.**
- **It is necessary to have both soft skills and technical knowledge/skills to be able to apply technical knowledge in innovative and sustainable ways**

TOOLBOX TASK
ENTRECOMP & GREENCOMP

Now that you are familiar with EntreComp & GreenComp...

- *Take a few minutes to reflect on your knowledge of these competences. Write down your thoughts on whether you believe you are familiar or unfamiliar with these competences.*
- *Compare the Green Competences and EntreComp frameworks to identify any similarities. Write down your observations and consider how you might integrate these shared competences into your teaching.*

III

Planning and organising green and entrepreneurial learning environments

“Education institutions should be able to develop skills and competences among their students that will pave the way to a greener and more sustainable society, as well as a stronger economy”.

TOOLBOX TASK
HOW DO YOU PERCEIVE THE PLANNING IN YOUR PROFESSION?

Now that you are familiar with EntreComp & GreenComp...

- *If you think of your lesson plans in the next week or couple of weeks, are there opportunities for engaging your students and encouraging them to show initiative?*
- *Do you follow the interests and progress of your students when you plan the upcoming lessons and teaching activities?*
- *...or you mostly follow the given curriculum?*

Before we dive into the essentials of green and entrepreneurial learning environments, let's take a moment to reflect on your own planning practices.

Write down the first words that come to your mind when you read the questions. Do not spend more than 5 minutes on this introductory exercise.

III.1 GREEN CULTURE AND GREEN LEARNING ENVIRONMENTS

Although each human being recognises the global issues and is concerned about its own future, but also the future of the next generations, the concept of green and sustainable development might not be fully clear.

It is understandable that the process of delivering green education and fostering employment skills in an environmentally friendly way might be challenging for teachers/educators.

However, it is important for each teacher/trainer/educator to engage, take initiatives and take small steps for establishing an appropriate learning environment that promotes green and entrepreneurial learning.

More than ever education institutions face the concerns about climate change and sustainable development. They should be able to develop skills and competences among their students that will pave the way to a greener and more sustainable society, as well as a stronger economy.

III.2 SUSTAINABILITY IN TVET INSTITUTIONS

- Greening the campus
- Greening the curriculum and training
- Greening research
- Greening the community and workplace
- Greening institutional culture

Sustainability in TVET institutions: Greening the curriculum

"In every discipline, there is an opportunity to contribute to a basic understanding of sustainability and its importance for the future."[17]

Creating green learning environments should also address social and economic aspects and to guide students to align their skills with the needs of the economy.

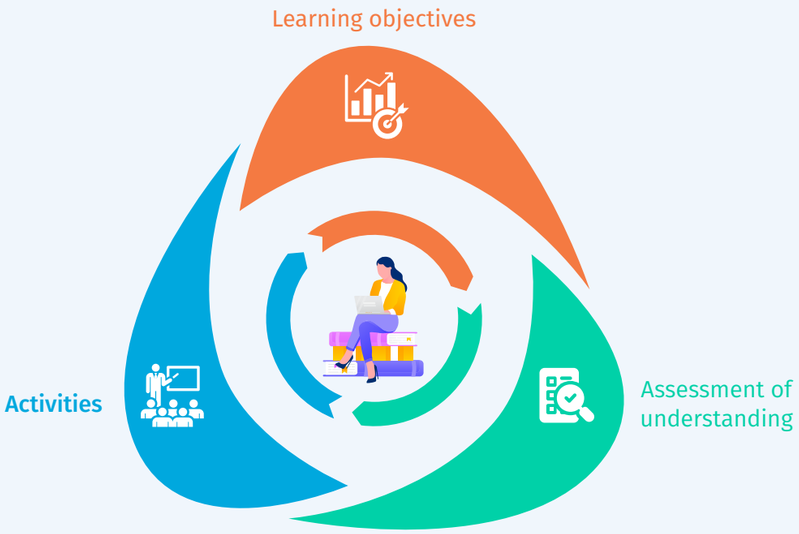
Source: UNESCO-UNEVO

17) Reference: Greening Technical and Vocational Education and Training: A practical guide for institutions United Nations Educational, Scientific and Cultural Organization, UNESCO-UNEVOC International Centre

III.3 PLANNING LESSONS

As a teacher, trainer or educator you have to plan lessons, modules and/or schemes of work, even when you are provided with teaching plans.

Speaking about green and entrepreneurial learning, there should be an alignment between intended learning goals or outcomes, activities, and assessment., in the same manner as with any other learning. The planning is considered as a series of stages, suggesting that the learners should be familiar with the learning objectives, the set activities that will enable them to achieve these objectives and the chosen assessment strategies.



If you want to learn more about learning goals, objectives, and outcomes, check out *this learning material*.

III.4 LEARNING OUTCOMES OF ATTITUDES, KNOWLEDGE AND SKILLS[18]

Attitudes – motivators of performance

Self-awareness and **self-confidence** are the entrepreneurial attitudes which constitute the basis for all other aspects of entrepreneurship. They entail discovering and trusting in one's own abilities which then allow individuals to turn their creative ideas into action. In many countries, these attitudes might be pursued as general education goals. **Taking the initiative** and **risk taking**, c**ritical thinking, creativity** and **problem solving** are also fundamental, but they are also specific attributes of an 'enterprising self'.

The European Commission in their publication 'Entrepreneurship Education at School in Europe: National Strategies, Curricula and Learning Outcomes', provides a breakdown of the broad dimension of entrepreneurship education into a framework of attitudes, knowledge and skills, which has been adopted by European Countries.

Knowledge – outcome of assimilation of information by learning

Knowledge of career opportunities and the **world of work** are learning outcomes that are not exclusively related to entrepreneurship, but usually form part of students' general preparation for their future career choices. However, a sound knowledge of the nature of work and different types of work involve an understanding of what it is to be an entrepreneur. This knowledge also allows students to define and prepare their place in the world of work with a well- developed awareness of opportunities and constraints.

Economic and **financial literacy** including knowledge of concepts and processes that can be applied to entrepreneurship.

Knowledge of business organisation and processes is specific knowledge of the environment in which entrepreneurship is often applied.

Skills – ability to apply knowledge

Communication, **presentation** and **planning skills** as well as **team work** are transversal skills essential to entrepreneurs.

Practical exploration of entrepreneurial opportunities incudes the various stages of the business set up process, including designing and implementing a business plan.

This can be useful to help students to see the bigger pictures such as who the stakeholders are and how ideas can develop into viable business that understand how cash flows in and out of the business. However, an over fixation on a business can also be counterproductive as plans have to change as the situation and knowledge evolves.

18) Reference: A. Penaluna, K. Penaluna, E. McCallum, C. Brentnall, C. Jones, S. Brown, R. Polenakovikj, D. Sutevski, I. Stankovska, L. Polenakovikj, B. Jovanovski and T. Velkovski, "How to teach entrepreneurship? WHAT, WHY, WHEN and WHO," National Centre for Development of Innovation and Entrepreneurial Learning, Skopje, 2015. [Online]. Available: http://ncdiel.mk/wp-content/uploads/2016/05/How-to-teach-entrepreneurship-MKENG-web.pdf

TOOLBOX TASK
ATTRACT ATTENTION[18]

It is really important to raise interest among students and to keep them motivated to follow the lesson. The instinct to believe that students will listen when something important is to be shared is usually wrong.

A skilled teacher/educator should be able to keep the attention of the students and to engage them during the lessons.

Do you practice some ways to make sure that your students will be aware of the importance of the topic and will be interested to follow you?

For example, it can be confirmed without any doubt that the pre-flight safety announcements are of a high importance. However, many of the passengers do not listen carefully to the instructions. For that reason, airlines are trying to find various creative ways to transfer the critical information to the passengers.

Take a few minutes to think if you implement some methods in your teaching that make the lessons interesting and creative, thus managing to get the full attention of your students.

Plan to attract attention

- Share local news stories
- Raise a topical question or issue in the community
- Share an extract from a letter about a product/service that needs improving
- Bring some objects with you that are relevant for your course
- Bring recycled or reused materials
- Include video or audio materials
- Share a short story or a poem to foster green & entrepreneurial learning
- Set a scenario “”What would you do if…?”

19) Reference: “EntreCompEdu,” [Online]. Available: https://entrecompedu.eu/

Start thinking about…

- Engaging students in the planning process and motivating them to set their own learning goals
- Helping students to develop a deeper understanding of the subject
- Building a sense of community in the classroom, foster connections and encourage students to express their opinions and ask questions
- Helping students to learn from experience and not to be afraid of mistakes
- Developing routines for students to review their own progress

The study programmes are predefined based on the occupational standards and needs of the market. TVET programmes in general prepare students for specific occupations and success in the chosen field. However, each individual lesson within a programme can provide its own unique value to the students.

A good teacher can and should motivate students to explore further the subject matter and develop a passion for the topic. Teachers should communicate the learning objectives of each lesson and the overall goals of the course from the beginning, and to continuously remind students of these objectives. It is even better if students themselves are encouraged to create their own goals and lead their own learning process.

Do not forget

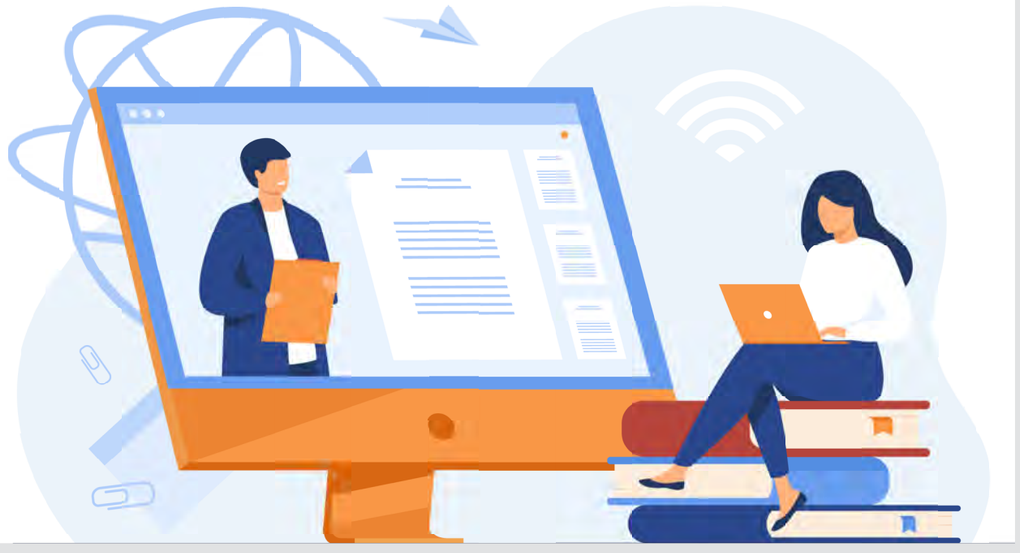
- It is important to have a clear plan, clear learning objectives and clear learning outcomes, but students should have the flexibility to explore their ideas and solutions
- Students should be guided in the right direction to acquire the needed competences, but also to have an opportunity to be creative and imaginative
- This kind of learning environment could lead to development of the desired green & entrepreneurial competences

TOOLBOX TASK
LEARNING ENVIRONMENTS BEYOND THE CLASSROOM[20]

Design a flexible classroom environment to suit the purpose of the learning, such as: modifying seating arrangements to facilitate teamwork, individual coaching, or practical tasks.

Involve your students in a re-design process to create the most convenient learning environment

Nowadays, learning extends beyond the classroom and encompasses a diverse range of public spaces, including museums, galleries, laboratories, and virtual environments, which significantly contributes to fostering innovative, entrepreneurial and sustainable mindset.



20) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

TOOLBOX TASK
ASK YOUR STUDENTS

Make an exercise with your students and ask them to assess the current usage of the learning space, whether it is your classroom or the whole TVET, specifically looking for areas that could be better utilized for the purposes of the subject that you are teaching.

Be creative! Adapt the exercise and integrate key elements of your area of expertise/teaching subject to guide your students through the exercise.

Get inspired how to make the most out of the available resources.

Assess the feasibility, provide feedback to students and share the best ideas with the management.

The idea is to engage students to generate ideas for improving the use of available resources. As a teacher, you will get inspired to transform the learning environment according to the needs and interests of your students.

General guideline how to conduct the exercise:

1. Introduce the exercise to the students explaining that the goal is to identify areas that could be improved with the available resources. (5 minutes)
2. Divide students into groups of 4-5 and ask them to write down 3 ideas per group. (15-20 minutes)
3. Each group presents the ideas briefly, while you are writing them on a whiteboard. (15-20 minutes)
4. Ask each student to vote for the best idea while you note them down on the whiteboard. (10-15 minutes)

Additional suggestions:

- **Be creative and organise the exercise to suit your subject, i.e. what students need to understand the subject better.**
- **The duration of each sub-activity depends on the size of the class, involvement and your teaching plan.**
- **Try to set some budget constraints to motivate students to take the financial aspect into account, but also to try to make the most out of the existing capacities.**

TOOLBOX TASK
ASK YOUR COLLEAGUES

- *Initiate a simple brainstorming activity with your colleagues on how to improve your teaching and learning environment.*
- *Think about and exchange opinions on how to use different physical spaces or online learning spaces/tool, and how to use time differently?*
- *Why? Because a well-designed environment inspires and empowers students to learn and reach their full potential.*

Forget about: "I don't have money to do anything about my learning spaces"

Instead of that: Rethink, redesign and think of affordable but impactful ideas.

III.5 PROMOTING SUSTAINABILITY

The principle of "act local and think global" can and should be applied when planning the lessons and the overall curriculum in order to promote sustainability in the educational institution. Start from simple promotion and small initiatives and keep growing[21].

- **Discuss the sustainable development goals during your lessons**
- **Participate in a tree-planting scheme**
- **Undertake a project "Make a garden into your classroom"**
- **Set challenges for students to find ways in which the school could go paperless/use resources more efficiently/manage waste properly...**
- **Begin a student-run recycling club**

Many organisations have value statements which reflect their commitment to care for the environment. Students might review the top 10 most eco-friendly companies in the world and consider how these examples illustrate the concept of corporate social responsibility. Additionally, students might review the top eco-friendly companies in their area of learning.

20) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

TOOLBOX TASK
THINK ABOUT YOUR TEACHING ACTIVITIES

Can you show that green and entrepreneurial learning is already part of your teaching?

- *Remind yourself of the competence frameworks EntreComp and GreenComp by going through the second learning material.*
- *Write down how a simple activity you have used before contributes to development of EntreComp and/or GreenComp*
- *...and do not forget to share the experience with your colleagues!*

For example, you might have encouraged discussion on current challenges and environmental issues among your students. Or you have shared a recent success story on green and entrepreneurial endeavour.

Also, you might have assigned a challenge-based task to foster creativity, teamwork and systems thinking...

Read carefully the competences and select your activities that you find most useful in delivering green and entrepreneurial learning. You might even encourage your students to design a creative poster to share the good practice.

IV

Teaching and training methods

Teaching is...

- *“the most important influence in improving students’ learning;*
- *combination of knowledge of a particular matter and pedagogical principles;*
- *meant to inspire and engage students;*
- *moving into action;*
- *more than sharing knowledge; it involves providing care, support and motivation to students”.*

TOOLBOX TASK
RANDOM WORD[21]

Random word involves choosing a word at random, making as many associations with that word as you are able and then relating those back to your problem. The word that you choose will usually be a noun, but need not be. It will usually be emotive, but need not be. It will certainly bring to mind a range of images and associations.

To choose the word you can use a book or a dictionary and allow them to fall open at random.

- **Feedback:** Random word becomes a favourite for a reason. It works and works well. It is easy to explain to others and we would almost always use it as an early demonstrator of a creativity technique. Some people want to choose a word that is relevant to their problem. Don't do this. Use a random word - it will turn out to be appropriate.
- **Outcome:** You will find that alone or in groups you have no trouble engaging with this technique. It will produce results.
- **Variations:** If working with a group you can make a show of the randomness by getting someone else to choose the word or call out a number to select from a list. An alternative source of a random word is to input word-like nonsense into a PC spell checker, then see what emerges.

IV.1 INSPIRE GREEN AND ENTREPRENEURIAL LEARNING

As a teacher/trainer/educator you are very well aware of your personal role in the classroom and your impact on each student's life. Depending on your area of expertise and the subject matter you teach, you are probably using various teaching methods and techniques to facilitate the learning process. At this point, it is important to consider how you can expand these methods to support your students in developing an entrepreneurial and sustainable mindset.

21) Reference: A. Penaluna, K. Penaluna, E. McCallum, C. Brentnall, C. Jones, S. Brown, R. Polenakovikj, D. Sutevski, I. Stankovska, L. Polenakovikj, B. Jovanovski and T. Velkovski, "How to teach entrepreneurship? WHAT, WHY, WHEN and WHO," National Centre for Development of Innovation and Entrepreneurial Learning, Skopje, 2015. [Online]. Available: http://ncdiel.mk/wp-content/uploads/2016/05/How-to-teach-entrepreneurship-MKENG-web.pdf

Take a moment to reflect on your teaching practices. In your opinion, do you use specific methods to encourage creativity, spotting and taking opportunities, to promote critical thinking and collaboration, as well as ethical and sustainable thinking in your students?

The nature of your role as a teacher can be flexible depending upon what you are trying to achieve. There are likely to be times when you may adopt a more didactic role as instructor, telling students precisely what you want them to do. On the other hand, there are times when students need to learn on their own, e.g. to respond to individual assignments.

You should be aware that you can inspire your students whether you are taking the central place in the classroom or make your students do the same. You can engage students in both individual and group tasks. Students will make progress and gain the desired knowledge whether it is directed by you or managed on their own.

Whatever you decide to implement, make sure that students have a great and meaningful say in their learning.

Most of the pedagogies[22] associated with entrepreneurial learning value the primary role of the teacher as a facilitator e.g. in supporting students working together (**collaborative learning**), learning in and from experience (**experiential learning**) and tackling real-world issues (**problem- and project-based learning**). In a similar way, the pedagogies associated with sustainable development and green future, focus on **student-centred learning** activating both analytical and emotional skills among students, **inquiry process of learning** involving critical thinking and experimenting, and **learning through active participation** addressing multidisciplinary and multidimensional learning experience.

IV.2 GET INSPIRED

Company/Individual	Idea	Inspiration
Nike	▪ Goatek Traction shoe	▪ The movement of goats in Oregon Zoo
Rene Laennac	▪ Stethoscope	▪ Seeing a child hold its ear to the end of a long, hollow stick
Jorn Utzon	▪ Sydney Opera House	▪ Eating a cut-up orange
Herzog and de Meuron	▪ Beijing Olympic Stadium	▪ A bird's nest
George de Mestral	▪ Velcro	▪ Walking his dog and see burrs stick to its fur

Above are listed several examples of famous designers that have drawn inspiration from the nature.

The green and entrepreneurial process begins by exploring the world around us and 'spotting opportunities', which is competence 1.1. within EntreComp.

Students can gain inspiration from looking carefully at both the natural and human worlds. You can use these and similar examples in your teaching in order to raise interest among students by using real-life cases, but also to show the significance of motivation, inspiration and taking opportunities. Students can be taught specific techniques to improve their observational skills.

22) Reference: E. Eilam and T. Trop, "ESD Pedagogy: A Guide for the Perplexed," The Journal of Environmental Education, pp. 43-64, 2010.

TOOLBOX TASK
ENGAGE STUDENTS AND EXPLORE[23]

- *Spend a few minutes sitting outdoors observing the world (you can do it within your classroom/learning facility or to use your breaktime).*
- *Try to do this each day for a week at the same time.*
- *Take a different theme each day (e.g. colour, light, noise, temperature, happy, sad, wonder).*
- *Keep a note of what you see – both you and your students.*
- *What entrepreneurial opportunities did you spot?*
- *After a week, initiate discussion among students on the opportunities they have spot and which one of them they find worth taking.*

Recommended teacher's activity:

Watch video: *Creative thinking throughout the learning process*

Watch video: *Martin Lackeus: Encourages students to create value for others through their learning*

Watch video: *SDGs in teaching*

Take a look *at the Innovating Pedagogies blogs and reports*

23) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

IV.3 ENGAGE STUDENTS AND CREATE VALUE

The word 'value' means the extent to which something is held to be important and does not just describe its monetary worth. Value varies from one person to another and it makes no sense to create something new that doesn't provide value to anyone.

When it comes to green and sustainable learning, each idea, concept, product and/or service creates some kind of value.

The Sustainable Development Goals (SDGs) can be a great way to identify value that can be created for others. What kind of value could your students create for others, linked to the SDGs, through their learning experience with you?

IV.4 ENGAGE STUDENTS THROUGH DIFFERENT METHODS AND TOOLS[24]

Engaging students through different methods and tools can make the learning funnier and more interactive, thus can enhance the overall learning experience.

When students move from exercises such as answering questions on worksheets or in textbooks to exploring authentic problems in their school, immediate locality, or wider world, they are likely to work harder and engage in deeper thinking.

There are many different real-world contexts that can be used to engage students' interest and enable them to apply entrepreneurial competences in action and strengthen the green competences.

The important point to stress is that real-world contexts for green and entrepreneurial learning do not need to involve expensive resources or much more planning. You can look around the school environment to spot opportunities for students to ask and pursue questions e.g. 'Why is this the way it is?' 'Could this be done more effectively?

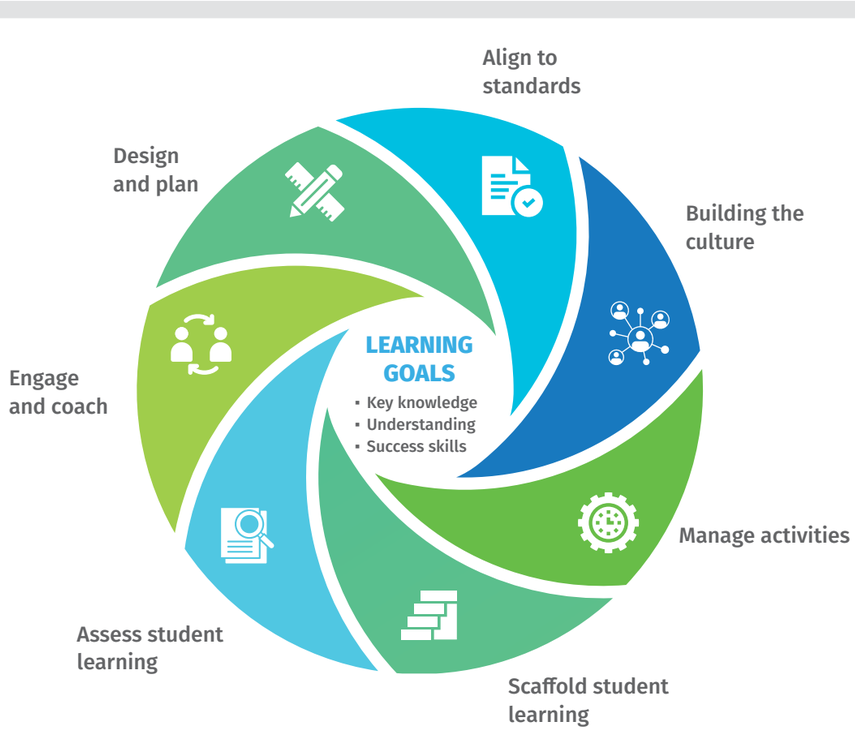
24) Reference: M. Maxwell, R. Stobaugh and J. L. Tassell, RealWorld Learning Framework for Secondary Schools: Digital Tools and Practical Strategies for Successful Implementation, Solution Tree Pres, 2015.

IV.5 PROJECT-BASED LEARNING[25]

Project-based learning (PBL) is a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging and complex question, problem or challenge.

During the PBL learning, teachers mostly act as facilitators and guide students throughout the project.

This kind of learning enables students to think critically, to frame and solve problems and to develop their collaboration skills, which corresponds to the desire to develop green and entrepreneurial competences among students. PBL integrates **Knowing and Doing**.



25) Reference: "What is PBL?," [Online]. Available: https://www.pblworks.org

The **Gold Standard** for PBL is a comprehensive and research-informed model on teaching in project-based learning.

Design and Plan

As a teacher, you create or adapt a project for the context of your subject and your students. You plan the implementation from beginning to end.

Align to Standards

As a teacher, you make sure to plan the project in such way that addresses key knowledge and understanding of the subject being taught.

Build the Culture

As a teacher, you should promote student independence and growth, team spirit and focus on quality implementation and results

Manage Activities

As a teacher, you work together with your students to organise the tasks and schedules by setting checkpoints and deadlines. Moreover, you help them to find and use resources.

Scaffold Student Learning

As a teacher, you use tools and instructional strategies to support the students in reaching project goals.

Assess Student Learning

As a teacher, you assess the knowledge, understanding and success skills. You should include self- and peer-assessment of students work.

Engage and Coach

As a teacher, you engage in learning and identify when students need skill-building, direction, encouragement or recognition.

IV.6 CHALLENGE-BASED LEARNING[26]

Challenge Based Learning (CBL) provides an efficient and effective framework for learning while solving real-world challenges.

The framework fuels collaboration to identify big ideas, ask thoughtful questions, and identify, investigate and solve challenges. This kind of learning is more than a transfer of hard skills and/or theoretical knowledge.

This kind of learning enables students to gain deep subject area knowledge and develop the skills necessary to thrive in an ever-changing world.

The Challenge Learning Framework is divided into three phases: Engage, Investigate and Act. Each phase includes activities that prepare you to move to the next phase. Within each of the phases there are opportunities for mini-investigation cycles and if necessary a return to an earlier phase.

26) Reference: "Challenge-Based Learning Framework," [Online]. Available: https://www.challengebasedlearning.org/framework/

Engage

As a teacher, you guide your students in moving from a big idea to a concrete and actionable challenge using Essential Questioning process. Essential Questioning reflects personal interests and needs of the community, e.g. Why is this important to me? Where does this concept intersect with my world?

Investigate

As a teacher, you help your students to develop contextualised learning experience and to conduct content and concept-based research to create a foundation for actionable and sustainable solutions.

Act

As a teacher, you support your students in developing and implementing evidence-based solutions and help them to have the results evaluated by appropriate audience.

The engagement phase focuses on abstracting the big idea, and the central problem behind the specific challenge, by using a detailed questioning process.

In the investigation phase, the learners build the foundation for a profound solution through research.

Finally, in the implementation phase, evidence based solutions are developed and evaluated by the team within group decision-making processes.

Throughout the challenge, make sure that your students document their experience (audio, video, photos) that will provide resources for reflection and documentation of the learning process.

IV.7 PROBLEM-BASED LEARNING[27,28]

Problem-based learning is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem, which drives the motivation and the learning.

The core of the problem-based learning is to guide and motivate students to solve problems in a unique way and develop the best possible solution to a particular problem.

In such way, students develop critical thinking and problem-solving, communication and collaboration skills. If the problem being solved relates to the global environmental issues, you encourage and support green and entrepreneurial learning.

The problem-based approach will help students to acquire the skills they need for lifelong learning, therefore supporting their personal and professional development.

Education might take place in small groups of students. Those groups are jointly responsible for the quality of the learning process. All students should be well-prepared, to participate actively and to explain the findings with their own words.

As a teacher, you should have an open attitude towards students and shows interest in their (study) activities. You will not act as a traditional teacher, but more as a supervisor. You should observe the group, analyse the process, ask questions and give examples. Try to communicate with your students both formally and informally to facilitate the process for them and give an opportunity to better understand the problem.

Watch video: *"What is Problem-Based Learning?"*

27) Reference: "Problem-Based Learning," [Online]. Available: https://teaching.cornell.edu/teaching-resources/engaging-students/problem-based-learning

28) Reference: G. Camp, A. v. h. Kaar, H. v. d. Molen and H. Schmidt, "PBL: step by step," Rotterdam, 2014

Problem-based learning in 7 steps:

Step 1 — Clarifying unfamiliar terms
Every group member should understand the given information.

Step 2 — Problem definition
The group has to agree upon the problem that should be solved.

Step 3 — Brainstorm
The ideas of all group members are collected, without critical analysis.

Step 4 — Analysing the problem
The ideas from the brainstorm are ordered and related to each other.

Step 5 — Formulating learning goals
The groups determines the lack of knowledge, and learning goals are formulated on these topics.

Step 6 — Self-study
The group search for relevant literature and prepare themselves for reporting the findings.

Step 7 — Reporting
Group members try to synthesize what has been found in different sources.

IV.8 GAME-BASED LEARNING[29]

Game-based learning (GBL) is an approach combining learning content with game elements to create a motivational learning experience for the students.

Games have been used for a long time as a means of learning, even from the earliest ages – children engage in games to explore the surroundings and acquire new knowledge and skills.

Games have the ability to foster the development of soft skills in students, which are essential for success in green initiatives and entrepreneurial ventures.

Similar to the previous learning approaches, through games students can develop many competences which are necessary for the real world, such as: critical thinking, creativity, problem-solving skills, teamwork, planning and management, etc.

Types of GBL

Board games

Monopoly can be considered an educational game to strengthen financial literacy, decision-making and risk management.

Real-life games

Escape rooms, Treasure Hunt – following clues and solving riddles to win (escape the room or find a hidden item.

Digital games

Minecraft is a video game that allows players to create and explore virtual world, creating their own structures and objects in a 3D world.

Duolingo is a language-learning application which can be used to learn foreign languages.

29) Reference: I. Falciani, "Game-Based Learning: What Is It? GBL vs Gamification: Types and Benefits," [Online]. Available: https://www.teacheracademy.eu/blog/game-based-learning

TOOLBOX TASK
GAMIFY YOUR CLASSROOM

- *Go through the report "Promoting Green Skills Through Games: State of the Art".*
- *Reflect on the findings and think if there are any insights or ideas that you find particularly inspiring or relevant to your context.*
- *Brainstorm ways to incorporate games and game-based learning into your teaching of environmental and sustainability issues.*
- *Write your ideas, share them with your colleagues and ask for feedback and suggestions*

An Erasmus+ project titled *Promoting Green Skills Through Games* (November 2017 – December 2019) aimed to utilize digital technologies as a means of non-formal learning about the climate crisis.

The aim of the report was to identify available formal and non-formal education and training opportunities, challenges, educational needs, and recommendations. It was compiled from regional reports produced by four partner countries: Austria, Croatia, Ireland, and Spain.

The report contains inspirative practices on game-based learning approaches and methodologies for teaching sustainability.

IV.9 COLLABORATIVE LEARNING[30]

We are wired to connect with others. Students enjoy being part of a peer group and talking to each other. They have a need to communicate and collaborate.

Teamwork is essential in the real world. Students need to be supported and gain regular experience practicing working together. Lower-achieving students need particular encouragement to talk about their thinking in collaborative tasks to ensure they benefit fully.

Your role as a teacher is to facilitate productive group work, monitor and assess the progress of the students.

How to facilitate collaborative learning?

Controlled discussion

Either the educator asks students questions, or the students ask questions or makes comments. This is useful for feedback and summarizing learning but shy students might not take part in the open discussion.

Step-by-step discussion

Where the educator shares a text, object, picture, sound, or video as a stimulus for discussion in an orderly, sequential way.

Buzz groups/talking partners

When students are asked to discuss in pairs their response to a question or issue. This allows the educator to check levels of understanding and provides a mental break from large group work.

Snowball groups

Pairs join together to form fours, then fours to eights, the discussion can snowball before calling for a plenary feedback. The starting point can be an individual writing a list in respond to a question, which is then shared with a partner, followed by the two lists being shared among four and agreed proposal solutions reached in group discussion of eight

Crossover groups

Students are given a number within a group and work on a task before moving around tables to join new groups and eventually returning to their 'home' tables to report on new learning. This works well when aspects of a topic are given to different groups.

30) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

IV.10 OVERCOME CHALLENGES OF COLLABORATIVE LEARNING[31]

Collaboration is essential to green and entrepreneurial learning, but there are potential limitations. Confident individuals can dominate what is said which are critical to moving ideas forward. In organizations, the danger of groupthink is that any thoughts outside the 'norm' are dismissed or not even aired.

To overcome these challenges prepare students for possible conflicts, set time for each group member to contribute or try to mix the groups on a regular basis. Additional suggestion when you think some students are not contributing as they should, try to form two groups, one of which discusses the chosen topic and the other observes and listens using a checklist linked to the learning outcomes. In the end, bring both groups together to discuss the different views.

For students to work well in groups, they need to be clear about their roles and responsibilities. The nature of these roles can vary. They might include a notetaker (someone to keep a record of decisions), a timekeeper (moves the team along so that they complete the task), a researcher (to find out relevant information) and a chairperson (to sum up progress at regular intervals).

TOOLBOX TASK
STUDENTS ACTIVITY[31]

- *Find some simple everyday objects that you could use to engage students to think innovatively.*
- *Make a collection of these objects and, once a week, ask your students to brainstorm their ideas as to alternative uses e.g. a water bottle, plastic lid, peg, sticky note.*
- *Write down students' ideas on a board or flipchart.*
- *Repeat the activity each week with different objects to keep students engaged.*

31) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

TOOLBOX TASK
SUSTAINABLE BUILDING DESIGN AND SUSTAINABLE AGRICULTURE BUSINESS PLAN

Teach students about sustainable building design, how to apply green principles in their building designs and how to develop a business plan for sustainable agriculture venture.

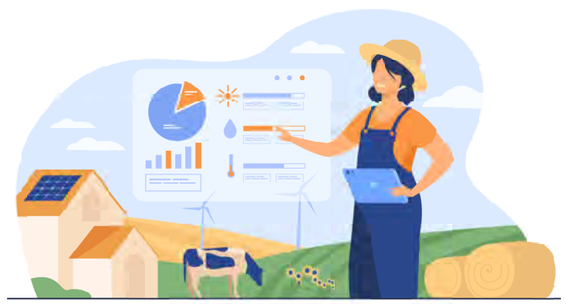
- *Introduce the concept of sustainable agriculture to your students.*
- *Provide a list of sustainable agriculture practices to your students (e.g., water conservation, organic farming)*
- *Ask students to research a crop they would like to grow using sustainable agriculture practices (growing requirements, potential market demand, etc.).*
- *Instruct students to develop a business plan for their sustainable agriculture venture.*
- *Final presentation in front of the class.*

To implement this exercise you will need:

- Access to the internet
- Drawing paper and pencils
- Ruler and calculator
- A list of sustainable agriculture practices
- A list of business plan components

By implementing this practice, students will learn about sustainable agriculture practices and how to develop a business plan for a sustainable agriculture venture. They will also develop critical thinking and problem-solving skills and will improve their communication and collaboration skills.

Modify the exercise to fit your needs and the elements of the subject(s) that you teach.



IV.11 INSPIRATIONAL TEACHING AND GREAT TEACHERS

Inspirational teachers see the potential of bringing real-life learning into the classroom. A project on food could lead to students running a restaurant, while a study of plants might result in a visit to the local garden centre to observe how staff tender plants or their approach to customer service.

Inspirational teachers/educators do not see green and entrepreneurial learning as an additional component to an already packed curriculum. Rather they teach subjects in an enterprising way, while integrating environmental sustainability practices.

TOOLBOX TASK
INSPIRATIONAL TEACHING AND GREAT TEACHERS

Inspired by the ideas so far, design one way of real-world learning for your teaching. Then take action in one of the following ways

- *Discuss your idea with a colleague. What innovative pedagogies do they use in their teaching?*
- *2. Do the activity with your learners. How did it go? What GreenComp and EntreComp competences did they use?*

V

Assessment practices and tools

“All methods used to appraise performance by gathering evidence to determine whether learners, trainers, training methodologies, programmes and institutions have achieved the required standards”.

Source: ILO Guidance note: Anticipating and matching skills and jobs (2015)

V.1 ASSESSMENT MEANING[32]

"All methods used to appraise performance by gathering evidence to determine whether learners, trainers, training methodologies, programmes and institutions have achieved the required standards"

Source: ILO Guidance note: Anticipating and matching skills and jobs (2015)

"The process of gathering and judging evidence in order to decide whether a person has achieved a standard or objective"

Source: NCVER (Australia), VOCEDplus: Glossary of VET, (accessed 12/2022)

"A way of judging learner performance. Assessment methods include: teachers' feedback; peer group critique; written and oral course work, portfolio development, tests and examinations"

Source: EU, European Adult Learning Glossary, Level 2, 2010

Checking students progress to reveal the added value to students' learning over a period of time. The progress can be described as the gains in knowledge and understanding, skills and attitudes, students make between two given points (e.g. beginning and end of a course).

As you suppose, taking into consideration the integration of green and entrepreneurial learning, it may not be a simple task to assess the progress of students.

For example, how can you quantify students' development in creativity, risk-taking, coping with ambiguity and valuing sustainability?

Do you remember what has been said about green and entrepreneurial competences and skills? You may check out again the second learning material titled "EntreComp & GreenComp: Key to green and entrepreneurial learning". EntreComp and GreenComp show that when we speak about entrepreneurship, innovation, green and sustainable principles, we do not always refer to unknown and totally new concepts.

Given the nature of what it means to be entrepreneurial and have a green and sustainable mindset, measuring students' progress in hard, numerical terms is not straightforward. For example, how might you quantify students' development in creativity, risk-taking and coping with ambiguity? How can you measure the critical and exploratory thinking, as well as adaptability and futures literacy? Each student is an individual with unique circumstances which means that any check on their 'progress' is always a conditional one.

32) Reference: "TVETipedia Glossary," [Online]. Available: https://unevoc.unesco.org/home/TVETipedia+Glossary&context=

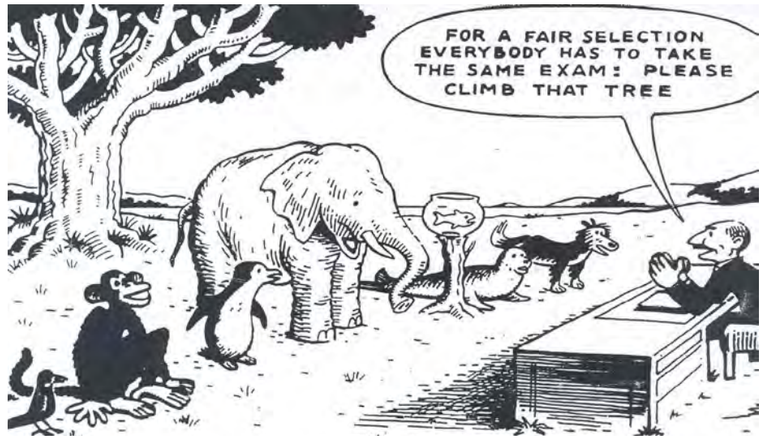
TOOLBOX TASK

HAVE A LOOK AT THIS POPULAR CARTOON AND THINK ABOUT IT

Inspired by the ideas so far, design one way of real-world learning for your teaching. Then take action in one of the following ways

What is the primary takeaway from it?

How could it impact the evaluation of green and entrepreneurial education?



V.2 EACH STUDENT IS AN INDIVIDUAL WITH UNIQUE CHARACTERISTICS[33]

The message that is sent with the picture on the previous page is clear: a single assessment method cannot adequately measure the unique abilities and strengths of individuals, as they all have different backgrounds, experiences, and learning styles. One assessment method may not accurately capture the potential of each student, and may even disadvantage some students who do not fit into it.

Any assessment task should be:

- **valid** – measures what it claims to;
- **reliable** – if repeated in another context, the results would be very similar; students taking the test would receive the same score regardless of where or when they take it.

When you pick the assessment methods and tools, you should think about the wording of the questions and the scale of measurement.

Think about this:

You ask your students "'How often have you presented an idea in front of your class during the last month?".

What measurement scale would you use?

A numerical scale (0-1-2-3-4-5+ times) is more valid than words such as 'rarely', sometimes' and 'often' because students may interpret these words in different ways. One student might think 'sometimes' means twice, another three times.

33) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

V.3 MAIN REASONS FOR ASSESSMENT[34]

Assessment of learning

To find out what stage, level or standard students have reached, often in comparison to their peers.

To establish what 'level' or stage' students have reached, in comparison to what might be expected of their age (norms) or set criteria.

LED BY: TEACHERS

It is common to conduct assessment with tests and examinations of what students know, understand and can do. Such assessment of learning provides on the level or standard they have reached.

Assessment for learning

To diagnose what students are doing well, areas for improvement and a plan of action to address.

To find out what students are doing well, what needs to be improved and how to do this.

LED BY: TEACHERS

Teachers are encouraged to share learning objectives and assessment criteria with students so there are no secrets. Students do not have to guess what teachers are looking for because the assessment process is made visible and understood by all.

Assessment as learning

To promote students' responsibility in assessing their own progress.

For students to reflect on their learning as they go along so that they can improve.

LED BY: STUDENTS

As students engage in tasks, assessment is an integral component of what they are doing. Students should be encouraged to take responsibility for their learning and assessment, but you should not forget that they are learners and still need your guidance.

34) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

TOOLBOX TASK
MAIN REASONS FOR ASSESSMENT[35]

Assessment of and for learning do not go far enough if we want students to become independent learners and demonstrate the kind of green and entrepreneurial competences that are in high demand. These competences do not lend themselves to traditional assessment arrangements where students take pen-and-paper tests at the end of a specified period.

As a teacher you surely are familiar with the main reasons for assessment.

But, do you think in this way when preparing and conducting the assessment?

Do you encourage students to assess their own progress?

V.4 GET INSPIRED TO ASSESS GREEN AND ENTREPRENEURIAL LEARNING

As mentioned before, it might be challenging to measure and quantify students' progress in green and entrepreneurial learning. The required competences could not be fully assessed with the traditional arrangements where students take pen-and-paper tests at the end of a specified period. Assessing green and entrepreneurial competences requires a more holistic approach.

You should combine both formative and summative approaches, i.e. to monitor student learning to provide ongoing feedback and to evaluate the learning after a particular unit or the whole course is completed.

What really matters is that you and the students are clear about the purpose of any assessment task that you set.

It is crucial to understand the significance of continuous monitoring and feedback, as well as final learning assessment. Integrating green and entrepreneurial outcomes into education is considered crucial and the assessment practices are quite important to achieve that goal.

It is important to understand that green and entrepreneurial learning outcomes can be relevant to various disciplines and not limited to entrepreneurship or environment-related subjects. By incorporating green and entrepreneurial learning outcomes, teachers/educators can prepare students to become more socially and environmentally responsible employees, leaders, entrepreneurs, innovators. This not only benefits individuals but also contributes to creating a more sustainable future for our society and the planet.

Check out the following examples of learning outcomes that are related to green and entrepreneurial learning and try to integrate them into your own lessons.

35) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu

Competence	Learning outcome
Self-awareness and self-efficacy	▪ To identify and assess individual and group strengths and weaknesses.
Taking the initiative	▪ To act and work independently to achieve goals.
Learning through experience	▪ To reflect and learn from both success and failure.
Promoting nature	▪ To assess own impact on nature and consider the protection of nature an essential task for every individual.
Exploratory thinking	▪ To combine knowledge and resources to tackle sustainability challenges.

No matter what subject you are teaching, these examples of learning outcomes related to a particular green or entrepreneurial competence can and should be fostered among your students.

For example, in the agricultural sector students learn about sustainable practices without damaging the environment, in the electrical sector they learn about energy efficiency and renewable energy sources, while the mechanics classes focus on the whole lifecycle of the product, recycle and reuse of materials.

V.5 ASSESS TO ASSIST[36]

Think of any work that you set a student as being viewed through two different types of assessment:

- **Implementation**: doing things that are determined by teachers and matching against their expectations.
- **Innovation:** producing multiple and varied solutions that respond to change and often surprise the teacher.

If the assessment meets standards or known solutions, we can ask the student to perform tasks that will lead them to this goal – the Learning Outcome we desire. In this case, the student will 'Implement' a staged learning process that leads them to the well-known goal.

However, speaking about green and entrepreneurial learning, the goal is students to think broadly and widely, i.e. practice the divergent thinking as opposed to the convergent thinking.

36) A. Penaluna, K. Penaluna, E. McCallum, C. Brentnall, C. Jones, S. Brown, R. Polenakovikj, D. Sutevski, I. Stankovska, L. Polenakovikj, B. Jovanovski and T. Velkovski, "How to teach entrepreneurship? WHAT, WHY, WHEN and WHO," National Centre for Development of Innovation and Entrepreneurial Learning, Skopje, 2015. [Online]. Available: http://ncdiel.mk/wp-content/uploads/2016/05/How-to-teach-entrepreneurship-MKENG-web.pdf

TOOLBOX TASK
ASSESS TO ASSIST[37]

Implementation – assessment types	Innovation – assessment types
▪ Can the student write and follow a business plan as direct by the teacher?	▪ Can the student respond positively to short term and ever-changing venture environments / do they come up with new ideas in response?
▪ Can the student come up with a good idea using the theories they have been taught?	▪ Can the student come up with many varied ideas that respond to changing circumstances?
▪ Does the student's solution match the expectation of the test or exam?	▪ Does the student's solution surprise through new insights and alternatives?
▪ Does the student respond to the problem identified by the educator?	▪ Does the student identify new problems and opportunities for themselves?
▪ Is the solution correct, finite and complete in the view of the educator / evaluator?	▪ Is the solution part of an on-going process of prototyping that responds to stakeholder feedback, maybe from outside experts?
▪ Can the solution be easily compared and contrasted to previous work and understandings?	▪ Does the solution offer new insights and potentially challenge accepted understandings?
▪ Can the student adhere to the use of accepted theories and practices when undertaking an assignment?	▪ Can the student experiment and self-define theories and practices that they have discovered, which may support or argue against their findings?
▪ Does the student follow the rules carefully when developing a solution?	▪ Does the student compare their solutions to rules and adapt accordingly? Ideas first, rules later?
▪ Does the solution require significant resource? A bank loan for example?	▪ Is the solution based on what the student has to hand in terms of resources and contacts?
▪ Is the assessment based on past understandings and texts?	▪ Does the assessment look to support new understandings – links and connections that the student has made for themselves?
▪ Does the assessment look to past events for guidance?	▪ Does the assessment consider future and unknown contexts that are 'best guesses?
▪ Does the leadership style in the task (teamwork) require decision-making by the manager?	▪ Does the leadership style (teamwork) require the management of an inclusive decision-making process?

37) A. Penaluna, K. Penaluna, E. McCallum, C. Brentnall, C. Jones, S. Brown, R. Polenakovikj, D. Sutevski, I. Stankovska, L. Polenakovikj, B. Jovanovski and T. Velkovski, "How to teach entrepreneurship? WHAT, WHY, WHEN and WHO," National Centre for Development of Innovation and Entrepreneurial Learning, Skopje, 2015. [Online]. Available: http://ncdiel.mk/wp-content/uploads/2016/05/How-to-teach-entrepreneurship-MKENG-web.pdf

As the learning environment changes, the student has to respond on a particular level of response that we can use to evaluate their performance. The more changes, the more opportunities for more ideas of course, but build this up slowly or the students may not be able to keep up. They will need practice to understand the reasons and the new way that they are being tested.

This above list is offered as guidance, so you might use it into your assessment.

Even better approach is to extend the list or make up your own that you will be shared with your colleagues.

TOOLBOX TASK
CONSIDER A PROJECT ASSIGNMENT AS AN ASSESSMENT PRACTICE

You might combine summative and formative approaches to assessment in the context of green and entrepreneurial learning by proposing a project assignment.

For example, ask your students to develop a new product and during the process of developing their idea, you or others might provide feedback based on the following questions:

- *What are the strengths and weaknesses of the idea?*
- *If we ask other students to make a suggestion to improve the idea, what might they say?*
- *How many possible barriers are there to overcome? How much maintenance is needed?*
- *How will you test the price?*
- *Will you have a particular event to launch the product or service?*

Finalise the project assignment with a presentation of the new product/service and focus on skills in communicating the idea, engagement with the audience, time management and so on. Give feedback on the teamwork skills, in areas such as cooperation, planning, and management of resources. Comment the involvement of students. You might invite an external audience to evaluate the product and the presentation itself.

If the final presentation is not on a satisfactory level, you might decide to ask students to resubmit. However, this is why it is important to follow the progress of students' ideas and provide formative assessment.

V.6 THE POWER OF ASSESSMENT AND SELF-REFLECTION

- **Assessment** is an ongoing process of growth and development, therefore it is not only crucial for students but also for teachers/educators.
- **Seeking feedback** is essential to improve the teaching and learning practices.
- **Self-reflection** is important to be more self-aware and analyse your own strengths and weaknesses.
- **Peer-feedback** is also important to provide and receive constructive feedback to and from your colleagues.

There are several (self)assessment tools that can help you assess your own teaching, but also to inspire you to assess the green, innovative and entrepreneurial learning among students.

EntreAssess tool

ENTRECOMPEDU

ENTREASSESS

The EntreAssess Reflection Tool

WHAT?
A teacher reflection tool

WHY?
To reflect on the what, where, when, who and why of your assessment approaches

DEVELOPED BY
EntreCompEdu project, co-funded by the Erasmus+ programme

TARGET GROUP
Educators

The tool is available online on the following link: *https://s.surveyanyplace.com/entreassess*

More details on the contents and why to use this tool follow below.

The tool is developed to assess the following areas:

- *Are you assessing entrepreneurial competences – such as those in EntreComp – through your teaching?*
- *What entrepreneurial competences are you assessing?*
- *When are you assessing Entrepreneurial competences?*
- *Where are you assessing Entrepreneurial competences?*
- *Who is involved in the assessment of entrepreneurial competences?*
- *Why are you assessing entrepreneurial competences?*

Answer the questions, then download your PDF collating your answers alongside ideas and examples for future practice.

MTEE tool

WHAT?
A measurement tool for entrepreneurship education

WHY?
To evaluate the activity as a teacher in entrepreneurial learning

DEVELOPED BY
LUT University, Finland

TARGET GROUP
Primary and secondary school teachers and principals

The tool is available online on the following link: *https://eumtee.lut.fi/*

To be able to follow your development you should create a user profile. Start from 'Register'. More details on the contents and why to use this tool follow below.

The tool is consisted of 6 areas that should be assessed:

- *Planning for entrepreneurship education*

  Evaluate your participation in the planning of entrepreneurship education by selecting **'yes' or 'no' answers.**

- *Entrepreneurship education in my institution*

  Evaluate the attitude of your institution towards entrepreneurship education by selecting the most appropriate answer option for each statement (**strongly disagree - strongly agree**).

- *Methods of putting entrepreneurship education into practice*

  Evaluate the attitude of your institution towards entrepreneurship education by selecting the most appropriate answer option for each statement (**strongly disagree - strongly agree**).

- *Guiding of the learners*

  Select the most suitable value for each claim (**completely disagree - completely agree**).

- *Importance of Entrepreneurship*

  Select the most suitable value for each claim (**completely disagree - completely agree**)

- *Background information*

Check out some of the questions that are part of this self-assessment tool in order to get a clearer picture of the assessment objectives.

- Have you planned, how to include entrepreneurship education in your work? (**yes/no**)
- Have you participated in the planning of entrepreneurship education in your school? (**yes/no**)
- In our educational organisation, we have the resources needed to implement entrepreneurship education (**strongly disagree - strongly agree**)
- The teachers in our organisation have an opportunity to participate in entrepreneurship education-related training every year. (strongly disagree - **strongly agree)**
- I have discussed with learners how entrepreneurship is related to the subject being taught (**move the cursor to the position that best describes the amount of your actions**)
- I have asked students to make presentations, interviews, writing or math assignments related to entrepreneurship (**move the cursor to the position that best describes the amount of your actions**)
- I encourage learners to assess ideas and to make choices between them (**strongly disagree - strongly agree**).

HEINNOVATE tool

heinnovate

WHAT?
A self-reflection tool for exploring the innovative potential

WHY?
To identify the current situation, respecting the local and national environments, and to agree on potential areas for action

DEVELOPED BY
European Commission's DG Education and Culture in partnership with the OECD

TARGET GROUP
Higher education institutions

The tool is available online on the following link:
https://www.heinnovate.eu/en/user/sign-in?destination=/en/self-assessment/create

To start a self-assessment please log in, if you already have an HEInnovate account. Alternatively, you can register a new account. Registration is free and confidential. You can also use the website as a guest user. Continuing as a guest means that no information will be stored about you, your self-assessment completion will be anonymous and automatically removed from the system after 90 days.

More details on the contents and why to use this tool follow below.

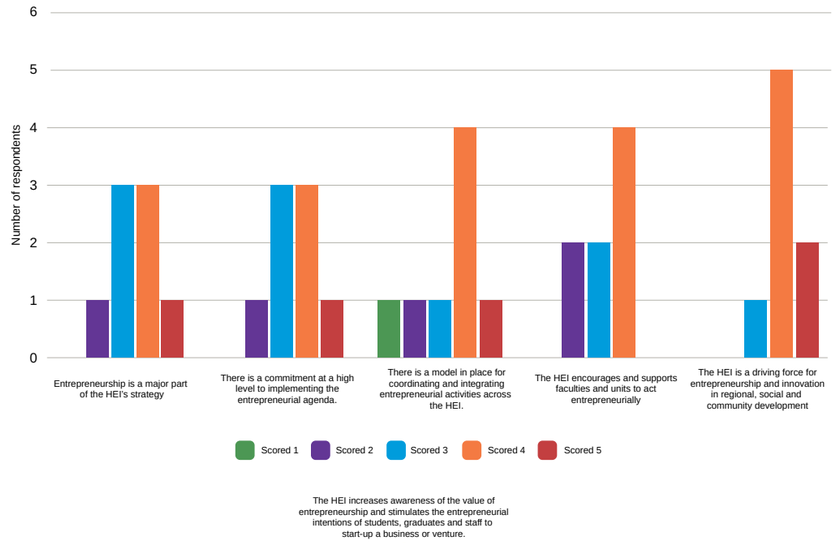
The tool is consisted of 8 areas that should be assessed:

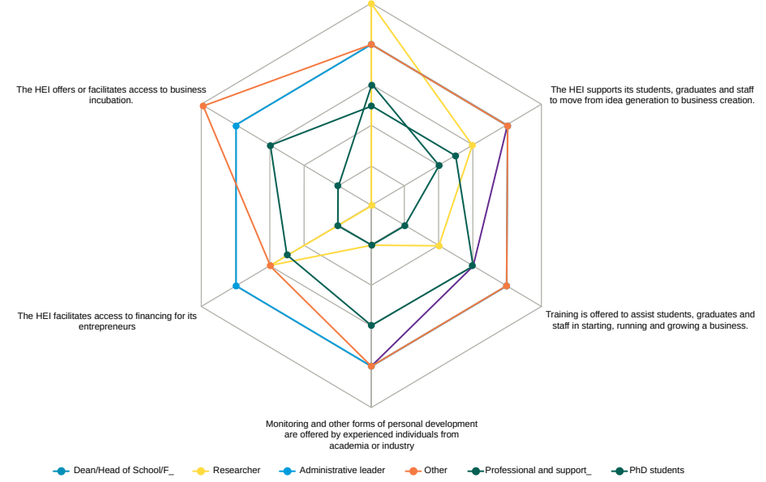
- *Leadership and Governance*
- *Organisational Capacity: Funding, People and Incentives*
- *Entrepreneurial Teaching and Learning*
- *Preparing and Supporting Entrepreneurs*
- *Digital Transformation and Capability*
- *Knowledge Exchange and Collaboration*
- *The Internationalised Institution*
- *Measuring Impact*

Check out some of the questions that are part of this self-assessment tool in order to get a clearer picture of the assessment objectives. The statements are assessed based on your level of agreement (from 1 to 5, including a N/A option). If some of the areas or questions are not relevant to your institution, you can skip them or mark that they are not applicable.

- Entrepreneurial objectives are supported by a wide range of sustainable funding and investment sources.
- The HEI has the capacity and culture to build new relationships and synergies across the institution.
- The HEI supports its students, graduates and staff to move from idea generation to business creation.
- Mentoring and other forms of personal development are offered by experienced individuals from academia or industry.
- The HEI is committed to collaboration and knowledge exchange with industry, the public sector and society.
- The HEI provides opportunities for staff and students to take part in innovative activities with business / the external environment.
- The HEI regularly assesses knowledge exchange and collaboration.

Upon completion of your self-assessment, the results are displayed, showing the average result for each of the eight areas as well as your detailed results (i.e. the scores given for the individual statements.





HEINNOVATE groups

Upon registration, any user can establish and manage multiple groups as a group administrator. Group administrators can invite individuals, both internal and external to the HEI, to participate in a self-assessment. The results can be aggregated and analysed to gain insight from various parts of the institution, as well as from staff, students, and external organisations.

The HEINNOVATE website contains valuable resources to assess the entrepreneurial and innovation potential of your institution. You can also get inspired by several case studies and user stories.

Our recommendations:

- *"Training Manual: A Guide to HEInnovate and Delivering Workshops"*
- *"HEInnovate: My commitment to action"*
- *"The link between entrepreneurship education and sustainability - The University of Applied Arts Vienna"*
- *"Events & webinars"*

GREENOVET tool

greenovet®
Skills for a Green Europe

WHAT?
A self-assessment tool on green and entrepreneurial education capacities

WHY?
To assess innovation and education capacities in regard to green innovation

DEVELOPED BY
Greenovet project, co-funded by the Erasmus+ programme

TARGET GROUP
VET providers

The tool is available online on the following link:
https://1drv.ms/x/s!Akwql-vDivh2gZIfl2W4_4Ar8drn5A?e=uH2Xnp

To start a self-assessment just download the file. It can be also downloaded from the Greenovet website (https://www.greenovet.eu/).

More details on the contents and why to use this tool follow below.

The tool is consisted of 6 areas that should be assessed:

- *Organisational capacity of the VET institution (Infrastructure, Funding and HR)*
- *Methods for education (selection of teaching methods that are key for green education in VET)*
- *Assessment practices*
- *Measuring impact*
- *Research and development potential in respect to green innovation and entrepreneurship*
- *Enabling and hindering factors for development of green innovation*

Check out some of the questions that are part of this self-assessment tool in order to get a clearer picture of the assessment objectives. The statements are assessed based on your level of agreement (from 1 to 6).

- Our institution has set common goals for green innovation and entrepreneurial education.
- In our institution teachers/educators are encouraged to link the subject being taught with green learning methods, green innovation and green technologies.
- In our institution we apply inquiry-based learning, active learning promoting engagement, curiosity and experimentation in regard to green innovation and technologies.
- Teachers/educators in our institution pre-assess learners' capabilities and skills to provide more individual learning opportunities.
- Teachers/educators in our institution provide timely feedback to learners (also considering the collected feedback from the industry experts).
- Results of green innovation and entrepreneurship research are integrated in all educational programmes in our institution.
- Our institution is committed to collaboration and knowledge exchange with green industry, the public sector and society, and actively involved in relationships with a wide range of stakeholders.

V.7 WHY TO USE THESE TOOLS?

- Importance of self-assessment activities for self-reflections and continuous improvement.
- You develop green and entrepreneurial competences, then you are able to transfer them to your students.
- While answering the questions you get inspired how to implement green and entrepreneurial methods and practices in your classroom.
- The tools are developed in such way to provide feedback for the assessed areas that will help you improve your education

TOOLBOX TASK
ACT!

Implement one new assessment approach in your teaching – either face to face or online – something you have not used before.

Reflect on the following questions:

- *Which competences did you assess?*
- *How did you assess them?*
- *What worked well?*
- *What would you do differently next time?*

Share your reflections with your colleagues.

The right kind of feedback is important i.e. feedback which is clear, concise, well-timed and which helps move learning forward. On the other hand, the consequences of poorly timed, insensitive, vague or inaccurate feedback can be disastrous.

Students who do not receive quality feedback can struggle to make progress, regardless of the subject or age that you teach.

V.8 FEEDBACK MATTERS[38]

Feedback to students can take many forms, from a nod or frown in the lesson to praise, marked work, corrections and reinforcement.

Think about these three types of feedback:

- **Appreciation**: to thank, motivate and connect with someone.
- **Coaching:** to expand knowledge or improve skills.
- **Evaluation:** to rate or rank against a set of standards.

We all need to feel reassured (appreciation), to understand where and how we can improve (coaching) and to know where we stand (evaluation).

Do you practice these types of feedback in your everyday work? Do you think there is a possibility to improve the feedback that you give to your students?

Oral feedback gives immediate opportunity to correct or improve the work.

Written feedback provides a clear record for future reference.

Feedback should not be a linear, one-directional process.

Students should feel comfortable in their environment to suggest ideas, play around with their thinking, make mistakes.

Students should be encouraged to offer feedback to each other and to the teacher.

Effective feedback is a two-way process. In business contexts, it is very much about listening to what customers and other stakeholders have to say and weighing up the most appropriate response. In education, such interaction can take various forms e.g. during groupwork in a lesson this might simply be a thumbs-up gesture, a word of encouragement, a question, a show of interest, a direction to look at reference, sitting alongside the group, or a written comment. Feedback on green and entrepreneurial learning should encourage students to move towards the right side of the continuum.

The teacher adopts a facilitative role and aims to foster self-regulation among students so that they take control of their own ideas. The aim is not to draw students towards one right answer by correcting their errors. Instead, the teacher should prompt students to consider various viewpoints and encourage them to explore multiple solutions to a problem.

38) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

TOOLBOX TASK
THINK ABOUT THIS[39]

- *Which of the figures best sum up the kind of feedback that happens in your classroom (A, B or C)?*
- *Which do you think best suits green and entrepreneurial learning?*
- *Which element is most difficult to include in the assessment? Why?*

A

B

C

- Take a few moments and think carefully about these questions.
- Write down your opinions and answers on the questions. Make sure that you consider the current situation in your classroom, not the desired one.
- Make a brief exercise with your students and ask them to provide their opinion on the kind of feedback they receive in your classroom.
- Compare your own and your students' opinions.
- Gather together with your colleagues and discuss the topic. You can get many valuable suggestions to improve your teaching, but also to share your experience with your peers.

39) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

VI

Professional learning and development

“Evaluation is important because it informs decision making, simulates debate and can contribute towards improvements in programme design and teaching and learning experiences”.

VI.1 CASE STUDY FROM NORTH MACEDONIA[40]

In the Macedonian 4 year model theoretical concepts relevant to innovation and entrepreneurship are spread throughout all of the school years, and are designed to evolve and develop through practice. In each developing year the amount of and type of content and experience should not be the same, but should evolve in a series of steps that are ever increasing in complexity.

This case study hails from North Macedonia and serves as an inspiration to exchange knowledge and ideas with colleagues across the globe.

According to the illustration, there are five themes that are consistently used in each school year:

- Innovation and Creativity - central to the whole learning process
- Context theme - business context and the school's surrounding environment, social issues and relations with customers who the students will recognise
- Business understanding theme - business modelling
- Finance theme - basic financial principles related to buying and selling, and evolves to teach students how to plan, manage and organise resources in a business environment
- Communication theme - chance for students to express what has been learned, explain how it relates to their lives and their environments and to ultimately, lead to the development of a complete promotional strategy for a business.

40) A. Penaluna, K. Penaluna, E. McCallum, C. Brentnall, C. Jones, S. Brown, R. Polenakovikj, D. Sutevski, I. Stankovska, L. Polenakovikj, B. Jovanovski and T. Velkovski, "How to teach entrepreneurship? WHAT, WHY, WHEN and WHO," National Centre for Development of Innovation and Entrepreneurial Learning, Skopje, 2015. [Online]. Available: http://ncdiel.mk/wp-content/uploads/2016/05/How-to-teach-entrepreneurship-MKENG-web.pdf

1. ***First year*** *in secondary school*
   Students will develop a social/community action project – to solve a problem discovered in the community.
2. ***Second year*** *in secondary school*
   Students will develop a business project that connects with global economic opportunities that they have discovered.
3. ***Third year*** *in secondary school*
   Students will develop and apply their entrepreneurial management skills – to develop a business idea over the year.
4. ***Fourth year*** *in secondary school*
   Students will apply all of their prior learning to develop a company.

The upper years should be more oriented toward application of the knowledge than the lower years, who will be building their knowledge through experience and mentoring from the teacher. This principle has been applied to the development of the main aims for each school year. Every aim originates from the main entrepreneurial topic for that particular school year. These titles therefore define and guide the goals that the teacher is aiming to achieve in any particular year.

VI.2 EVALUATING IMPACT

*Evaluation is a process of determining the value of something in a **systematic way.***

*It is important because it informs **decision making, simulates debate and can contribute towards improvements** in programme design and teaching and learning experiences.*

*Accurate, evidence-based and honest self-evaluation is widely r**ecognized as essential** to individual and whole-school improvement.*

Evaluation is a process of determining the value of something in a systematic way. It is important because it informs decision making, simulates debate and can contribute towards improvements in programme design and teaching and learning experiences. Accurate, evidence-based and honest self-evaluation is widely recognized as essential to individual and whole-school improvement. Over recent years, much has been said about educators evaluating the impact of their teaching on students' learning.

John Hattie, for example, makes the point that evaluation of 'processes, products, people, and programs, needs to be an inherent part of all schools. And so, how do we measure the impact of our teaching of entrepreneurial competences?

VI.3 HOW DO WE MEASURE THE IMPACT OF OUR TEACHING OF ENTREPRENEURIAL COMPETENCES?[41]

The starting point should be **how you view entrepreneurship education**. Example:

For Hattie, what matters most is for teachers to become evaluators of their teaching and this means adopting a **set of 'mind frames'**. Taken together, these eight mind frames represent an expansive approach to teaching and learning and are a useful reference point to begin thinking about your view of entrepreneurship education and how you might evaluate your teaching.

The starting point should be how you view entrepreneurship education. The extent to which you believe in the value of entrepreneurial education and your ability to be successful (self-efficacy) play a major part in students' learning experiences. This is why it is a useful exercise to undertake a self-assessment exercise to reveal your underlying attitudes, beliefs and values.

What really matters then is developing what Hattie calls ***collective teacher efficacy*** which is the shared belief teachers have in their ability to positively affect students. One could argue that this is particularly important in areas such as entrepreneurship education where many teachers lack knowledge, confidence and experience.

However, belief by itself is not sufficient. Teachers cannot teach how to be entrepreneurial without themselves being entrepreneurial. And, for Hattie, what matters most is for teachers to become evaluators of their teaching and this means adopting a set of 'mind frames'. Taken together, these eight mind frames represent an expansive approach to teaching and learning and are a useful reference point to begin thinking about your view of entrepreneurship education and how you might evaluate your teaching.

41) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

Hattie's mind frames applied to entrepreneurship education

Mind frame	Prompts to consider and examples	EntreCompEdu references	EntreComp link
To see the main task of teaching as evaluating the effect of their teaching on students' learning and achievement	▪ How do I really know that students are developing entrepreneurial competences e.g. are being productive while working in groups?	3.5 Promoting productive working with others	3.4 Working with others
To believe that student success reflects on their teaching	▪ How can I encourage students to be more independent, responsible and self-aware? ▪ To what extent do I promote self-help strategies and enable students to teach others?	3.4 Building self-awareness, self-esteem and self-confidence to support learning	2.1 Self-awareness and self-efficacy
To talk more about learning than teaching	▪ What do I know about how students learn? ▪ Do I provide opportunities for students to learn how to behave entrepreneurially across the curriculum?	1.3 Understanding how students develop entrepreneurial competences	1.3 Vision
To see assessment as feedback on their teaching	▪ Who did I teach well and not so well? ▪ Do I make entrepreneurial learning objectives and success criteria clear, so students understand the 'why', 'what' and 'how' of lessons?	4.2 Sharing feedback on entrepreneurial learning	3.5 Learning through experience
To engage in dialogue and not monologue	▪ How can I make more time to listen to students and their ideas rather than dominate classroom talk?	2.2 Making connections	1.4 Valuing ideas
To enjoy the challenge and never retreat to 'doing your best	▪ Are the tasks I set students engaging them in real-world contexts and opportunities to be creative?	3.3 Teaching through real-world contexts	1.2 Creativity
To believe in developing positive relationships	▪ How can I build a classroom climate in which students feel okay about making mistakes and live with uncertainties?	2.3 Creating an empowering entrepreneurial learning environment	3.3 Coping with uncertainty...
To inform all about the language of learning	▪ How can I reach out to parents and others to establish a shared language about entrepreneurial learning?	4.3 Celebrating progress and achievement	2.5 Mobilizing others

Not everyone agrees with Hattie. His sixth mind frame suggests that teachers should refrain from encouraging students to do their best, which goes against the notion of 'personal bests'. One writer argues: 'teachers [should] embrace the challenge to achieve a personal best every day, in every class, for every student.' (J. Knight, High-impact instruction: A framework for great teaching, Corwin Press, 2012).

However, Hattie's general argument, based on substantial evidence, is a strong one.

TOOLBOX TASK
MINDSET[42]

- *Reflect on the mindsets in the table "Hattie's mind frames applied to entrepreneurship education ".*
- *How do these compare to your thinking about entrepreneurship education?*
- *Share your reflections?*

42) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

VI.4 REFLECTIVE PRACTICE[43]

- Evaluation can be informed by reflection
- When we encourage students to **challenge certain assumptions**, we are developing a 'disruptive' attitude which in an entrepreneurial sense a **very positive behaviour in pushing the boundaries of innovation**.

Evaluation can be informed by reflection. Human progress is based on challenging assumptions. For example, not so long ago in history most people assumed that humans could never fly.

When we encourage students to challenge certain assumptions, we are developing a 'disruptive' attitude which in an entrepreneurial sense a very positive behaviour in pushing the boundaries of innovation. Critical reflection is the process of challenging taken-for-granted beliefs or assumptions. It is what Brookfield (1997) calls 'hunting assumptions' or questioning what we think about teaching and learning. The value of being critically reflective is that our decision making improves because we are better informed.

TOOLBOX TASK
LOG YOUR PROGRESS

Consider drawing up a log of your own entrepreneurial achievements and progress as well as the highlights from your students. Use prompts such as the following:

- *Our entrepreneurial achievements...*
- *Compared with the start of the term or year, I now know that...*
- *Compared with the start of the term or year, I am now able to...*
- *Compared with the start of the term or year, I can now teach a colleague to...*
- *The most important thing I have learned about my teaching is...*
- *The most important thing I have learned about my students is...*
- *When I first heard the term 'entrepreneurial' I thought... Now I think...*
- *The one achievement I am most proud of is...*
- *I plan to share such practice by...*

43) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

VI.5 RESEARCH-INFORMED AND EVIDENCE-BASED PRACTICE[44]

Evidence-based teaching means using data to establish where students are in their learning, making necessary changes to pedagogy and then monitoring the impact of any such interventions.

When educators are research-informed and base their decisions firmly on evidence, they are in a good position to make wise choices and justify their actions.

Evidence-based teaching means using data to establish where students are in their learning, making necessary changes to pedagogy and then monitoring the impact of any such interventions.

The evidence itself can come from various sources e.g. the views of students, colleagues, parents, test results, lesson observation fieldnotes and your own reflections. Such locally collected data should also be informed by external research evidence e.g. what we know about effective teaching practices from databases such as the Education Endowment Foundation and Visible Learning.

To develop your teaching so that it becomes evidence-based calls for increasing awareness of where to find research on entrepreneurial education, to reflect on its reliability and how this might apply to your setting.

44) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

Finding research on entrepreneurship education is one thing, but it is quite another to evaluate its quality. There are some general pointers to consider:

- *How relevant is this research to my professional interest?*
- *When was the research conducted? If more than five years ago, is it still relevant?*
- *Who were the author(s)? What do I know about their backgrounds?*
- *Having read the abstract (if an academic paper) do I get a clear sense of what the article is about? Does the research generally read well?*
- *How definitive are the conclusions?*

Locally collected data should also be informed by external research evidence such as **Research Gate** and **Google Scholar**

Research Gate

For those with access to Research Gate, a leading social networking site for researchers, it is possible to tap into wide-ranging knowledge. Searching using terms such as 'entrepreneurial learning', 'entrepreneurship education' or 'teaching entrepreneurship' will return many publications available for free download or provide the option to request access, particularly:

- McCallum, Elin & Weicht, Rebecca & McMullan, Lisa & Price, Alison. (2018). *EntreComp into Action: get inspired, make it happen*
- Williams-Middleton, Karen & Donnellon, Anne. (2014). *Personalizing Entrepreneurial Learning: A Pedagogy for Facilitating the Know Why*. Entrepreneurship Research Journal. 4. 167-204.
- Floris, Michela & Pillitu, Daniela. (2019). I*mproving entrepreneurship education in primary schools: a pioneer project*. International Journal of Educational Management. 33. 1148-1169.

Google Scholar

Similarly, Google Scholar allows users to search for both digital and physical copies of sources, including peer-reviewed papers. These can be sorted by date, to filter the most recent publications.

There are also specialized journals such as E*ntrepreneurship Theory and Practice (Entrepreneurship Theory and Practice: SAGE Journals* (sagepub.com, Sage, since 1976), while useful material also appears in journals not specifically limited to education e.g. in fields such as psychology, creativity and business.

For busy teachers, finding research on entrepreneurship education is one thing, but it is quite another to evaluate its quality. This is especially so given that academics themselves often argue over the reliability or validity of specific research outcomes.

Reliability refers to whether the research can be replicated using same methods and validity refers to whether the research measures what it set out to measure. For discussion over the quality of education research see, Tooley, J. and Darby, D. (1998). Educational research - a critique. London, Office for Standards in Education.

A **useful starting point** is to consider whether any literature reviews have been conducted on entrepreneurship education. In one example, the researchers looked at 129 articles on entrepreneurship education and found a wide range of teaching methods and curricula content, from case studies, business plans, networking, role play, generating ideas, mentoring and internships. There was a strong focus on 'learning by doing' and experiential teaching methods. However, the authors also report a lack of agreement over the meaning of entrepreneurship education with much left to teachers' own interpretations. These reviews can be helpful in providing a broader view in which to examine your own practice.

- Becoming research-informed also calls for a willingness to engage in conversations with others about such research, either face-to-face in staffrooms or through technologies such as social media and various forums.
- And also, it requires a commitment to apply the research in the classroom.
- The most effective teachers, in all subjects and contexts, evaluate their practices drawing on a range of evidence including research.

These three features[45] of being evidence-informed (**awareness, engagement and use**) take time to demonstrate. The most effective teachers do so with a critical eye and do not simply apply what is reported to work well elsewhere. While keeping an open mind, they challenge evidence and reflect on what this means in their particular context.

TOOLBOX TASK
EVIDENCE BASED TEACHING[46]

If you are interested in carrying out action research in entrepreneurial learning, read the research advice on the MESH Guides which aim to support teaching as an evidence-based profession. The MESH guide relating to entrepreneurship education is also highly relevant.

What part in your entrepreneurial learning do you think would be interesting to study and why?

Share your reflections.

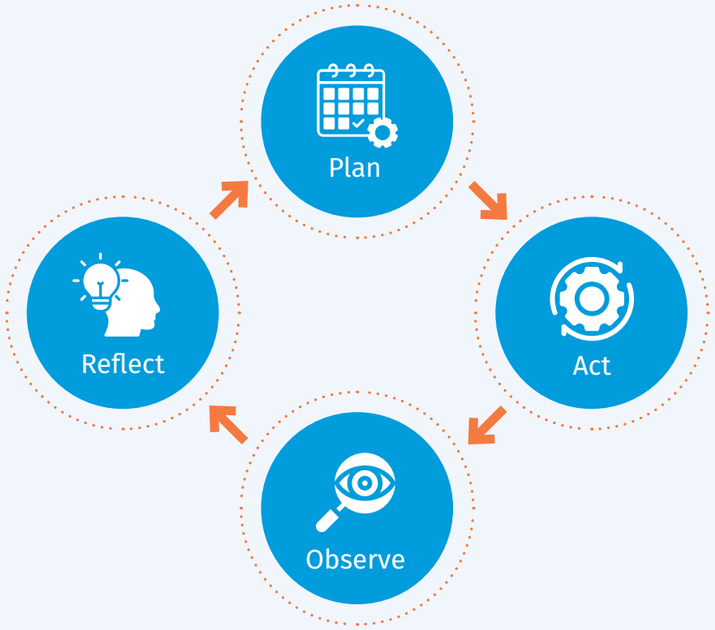
45) Reference: F. Sirelkhatim and Y. Gangi, "Entrepreneurship education: A systematic literature review of curricula contents and teaching methods," Cogent Business & Management, 2015

46) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

VI.6 ACTION RESEARCH

It allows teachers to systematically inquire into their practice and sharpen their skills. The process begins with planning what you want to explore. This could emerge from you observing your students, their comments, feedback from a colleague or something that you read about in education.

There are many approaches to educational research which can be harnessed to support your entrepreneurial professional development. Here we will discuss action research, which has a long history. It allows teachers to systematically inquire into their practice and sharpen their skills. The process begins with planning what you want to explore. This could emerge from you observing your students, their comments, feedback from a colleague or something that you read about in education. At the planning stage, you also need to think about who will carry out the research and how you will find out i.e. the methods you will use to collect data (data (e.g. through observations, surveys, interviews). If you are doing the research yourself, then this is a form of practitioner research. Or you may decide to ask for external advice or support. The action is then implemented, and you see what happens. The third stage is reflecting on the findings. And finally, you amend your original plan and repeat the cycle.



Action research has been criticized for lacking impartiality (individuals have vested interests in the outcomes) and is seen as too subjective or unscientific.

Central to being entrepreneurial is to experience the 'joy' of failure. The real challenge for educators is not only managing students' desire to succeed but also their desire not to fail.

Is important for students to see that failure is something to learn from in all walks of life.

Fear of failure can paralyze creativity... Entrepreneurial success invariably involves a series of setbacks...

We live in societies preoccupied with success. The real challenge for educators is not only managing students' desire to succeed but also their desire not to fail. This is why it is important for students to see that failure is something to learn from in all walks of life (e.g. writers, artists, engineers, musicians, dancers).[47]

CASE STUDY

STUDYING ENTREPRENEURIAL LEARNING IN A PRIMARY SCHOOL SETTING IN SWEDEN

SEMANTIC **SCHOLAR**

One example of how action research works is a case study of teachers in Sweden who worked alongside university lecturers to explore whether entrepreneurial learning might support problem solving in primary-school mathematics and vice versa.

One of the tasks set was for Grade 5 children to work in pairs and produce tasks for a given answer i.e. '45' or '96'. This was contrary to the usual approach in which teachers expect students to answer given tasks. This was the first time these students were to produce own tasks in this way.

Through such tasks, the researchers found that children needed to demonstrate certain entrepreneurial competences, such as courage and tolerance of ambiguity. They also showed a sense of initiative, for example in using calculators to check the correctness of their tasks before presenting them in the whole class session.

However, the researchers also acknowledged that the research was challenging e.g. for the academics not to interfere with the teachers' implementation of the project and for the teachers to step back and allow students to struggle:

"Studying Entrepreneurial Learning in a Primary School Setting in Sweden"

"Failure is simply the opportunity to begin again, this time more intelligently"

Henry Ford

47) Quoted by Bayley, S. and Mavity, R. (2019) How to Steal Fire, Bantam Press, p.169.

TOOLBOX TASK

BRILLIANT FAILURE[48]

- *The notion of 'brilliant failure' is widely promoted in entrepreneurship by the likes of Paul Iske, from the Institute of Brilliant Failures.*
- *Thinking of your own teaching context, how might you research or gather evidence of how your students see mistakes?*
- *In your role as an evaluator, why might such evidence be useful?*
- *Share your reflections*

VI.7 BUILDING AND SUSTAINING ENTREPRENEURIAL NETWORKS

As a teacher, it's likely that you are a member of one or more professional bodies which provide guidance to support your work.

These are useful starting points to explore whether there are contacts or resources to support entrepreneurial education.

Below are listed some examples of entrepreneurial events, networks and organisations that are from Europe and around the world. While some of these networks may not operate in your region, it can be worthwhile to visit their websites because of the classroom ideas and resources that they provide.

48) Reference: "EntreCompEdu," [Online]. Available: https://entrecompedu.eu/

Organisation	Description
European Entrepreneurship Education Network	This network, led by JA Europe, seeks to improve the quantity, quality and impact of entrepreneurship education. It advocates that every young person should have at least one practical entrepreneurial experience before they leave school.
JE Europe	Junior Enterprise concentrates on enhancing the entrepreneurial experiences of university students.
JA Europe	This network focuses on engaging students from primary school through to higher education. JA's Education Pathway sets out development in entrepreneurship, work readiness and financial literacy.
YES	The European Confederation of Young Entrepreneurs aims to connect young entrepreneurs across Europe.
PIETE - Partnership for Initial Entrepreneurship Teacher Education	This is an Erasmus+ funded project comprising several universities across Europe which aims to raise awareness of the importance of entrepreneurship education in initial teacher education
Network for Teaching Entrepreneurship	A network which provides educational opportunities in business to underserved high school students in the United States.
Global Entrepreneurship Week	Billed as 'a collection of tens of thousands of events, activities and competitions each November that inspire millions to explore their potential as an entrepreneur while fostering connections and increasing collaboration within their ecosystems
International Women's Entrepreneurship Day	An organisation which supports women in business worldwide. The official day is 19 November
European School Network	European Schoolnet is the network of 34 European Ministries of Education, based in Brussels. As a not-for-profit organisation, we aim to bring innovation in teaching and learning to our key stakeholders.
ERENET - Entrepreneurship Research and Education Network of Central European Universities	This organisation publishes research in entrepreneurship education and arranges conferences and other events
The British Council	The UK's international organisation for educational opportunities provides brief guidance on the value of enterprise and entrepreneurship education
The United States Association for Small Business and Entrepreneurship® (USASBE)	This is the largest American organisation dedicated towards promoting entrepreneurship. Its website includes an education section with student exercise such as how to create a market, 'client hunting' and creating new companies in the classroom

At a local level, it can prove rewarding to establish links with other schools who might have a particular interest in promoting entrepreneurship education.

One important way of sustaining networks is through social media.

If, for whatever reason, you find that it is challenging to build a professional network around entrepreneurial education then it's worth browsing Meetup groups, contributing to online discussions or writing your own blog.

You could also contact education departments in local universities as well engaging in relevant community events held by civic clubs, libraries, or businesses, even though not everyone you meet will have a direct connection to entrepreneurship or education. One important way of sustaining networks is through social media. This is becoming a primary avenue for professional learning and development opportunities. Contributors to the likes of Twitter and LinkedIn post ideas and stories which can open up opportunities for further professional learning. You might follow colleagues or experts in entrepreneurship education on social media.

If, for whatever reason, you find that it is challenging to build a professional network around entrepreneurial education then it's worth browsing Meetup groups, contributing to online discussions or writing your own blog. There are also possibilities using Google+ HangOut, SecondLife, or Skype. There are online education communities such as Classroom 2.0 and opportunities to create your own websites or virtual spaces through the likes of wix.com.

One way of building networks is to seek partners who are willing to collaborate in professional development.

By participating actively in professional networks, the likelihood is that your entrepreneurial and broader professional knowledge and practice will develop.

Studies show that when networks are well run, have a nurturing ethos and clearly focus on improving practice, then there are substantial gains.

- For example, opportunities may present themselves through Erasmus+ (2014-2020), funded by the European Union and similar programmes, such as the recent Erasmus for Young Entrepreneurs programme.
- Working closely with other schools or colleges, you might decide to develop some resources to support entrepreneurship education, implement and evaluate an intervention that you are all interested in, or carry out some comparative research. You might compile an e-portfolio of your professional activities not only to evidence the work that you are doing but as a source for later reflection.

TOOLBOX TASK
ENTREPRENEURIAL NETWORKS

- *Are you associated with any of the organisations mentioned in the previous table?*
- *Yes? Reflect on the benefits that this has already brought and how you might share these within your context.*
- *Not yet? Take the initiative and join one or more of these organisations and begin to build up your own network.*
- *Share your reflections*

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Vienna International Centre
Wagramerstr. 5, P.O. Box 300
A-1400 Vienna, Austria

+43 1 26026-0

www.unido.org

unido@unido.org

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