

CE-E VET

Circular economy and
entrepreneurship to
boost VET students'
employability &
resilience

CE-E VET EDUCATORS MANUAL

Sommario

CE-E VET EDUCATORS MANUAL	1
Introduction	3
About the manual for VET teachers	3
The library with inventory of resources ready to use	4
Benefits for VET schools	5
The project CE-E VET	5
The partners	6
PEDAGOGICAL KNOWLEDGE FOR VET EDUCATORS	7
About 21st century skills	7
Educators as Continuous Learners	7
Conquer Challenges	7
Innovate to Improve Learning Outcomes	8
Act as a Role Model for Students	8
Microlearning pedagogy applied to VET sector	8
What is microlearning?	8
The microlearning model	9
Pedagogy	10
Technology	10
The most used tools and strategies in microlearning	11
Microlearning best practices	14
VET educators as coaches or mentors	20
What is mentoring?	20
Implementation of a mentoring project	20
The mentor role	21
Criteria to choose a mentor	21
Benefits of mentoring to the organisation	22
Using software to run the mentoring program	23
Development and assessment of skills for VET educators	33
Problem-Based Learning as an effective approach to VET educators develop VET learners' skills	33
An example of a PBL activity and students' assessment	35
ICT TOOLS AND NON-FORMAL TECHNIQUES APPLICABLE IN VET EDUCATION	41
Non – Formal Education Method to Create the Necessary Learning Environment (The theoretical notion for educators)	41
ICT tools and non-formal techniques applicable in VET education	43
KNOWLEDGE AREAS FOR A GREENER AND SUSTAINABLE VET SYSTEM	50
Entrepreneurial Mindset	50
Green Entrepreneurship	51
Sustainable entrepreneurship and green skills	53
Why is Green Entrepreneurship important?	53
Where does sustainability fit in?	54
Sustainability Competences	55

The Role of Individual Responsibility in the Transition to Environmental Sustainability	59
Examples of lessons and strategies for developing green skills and entrepreneurship	60
Conclusions	70
References	73
Additional Sources	76

Introduction

About the manual for VET teachers

Young students may lack the necessary knowledge, experiences, and skills to determine if self-employment is a suitable career choice. In addition to traditional entrepreneurial courses focusing on economics, business planning, and financial management, it is essential for these students to develop transversal skills such as creativity, innovation, teamwork, and communication. This is particularly crucial for students from disadvantaged backgrounds, such as those in Turkey or Romania. Through this project, partners aim to provide these students with a new opportunity for self-improvement and success. To prepare students for the job market, VET schools (or institutions supporting VET teachers' development) must continuously enhance and update their competences to meet student needs. The skills of the school staff play a key role in this process, as teachers must continually update their skills and support students in achieving success in both their careers and lives.

The proposed resources aim to ensure that VET equips the workforce – young and old – with the skills to support the COVID-19 recovery and the green and digital transitions in a socially equitable way. The SPECIFIC support for VET trainers and teachers offered by this document will support teachers and educators learning of new concepts, techniques, and methods. Through this training, VET educators will enhance their ability to enrich their students' learning experiences. Moreover, they will gain the essential skills to address the challenge of aligning slow-moving education systems with the rapidly evolving needs of the labour market and society.

The educators will receive training to cultivate the GreenComp' competences (Bianchi et al., 2022). In terms of ICT tools, the objective is to enhance their capacity to strategically integrate various combinations of online and offline activities, both individual and group-based, while effectively managing the learning environment. This will prove to be a valuable asset, particularly in the event that schools are required to offer online learning classes, as they have done during the COVID-19 pandemic and continue to do so at the time of writing this proposal.

There is a direct link between decent employment and a dignified livelihood; as new entrants to the world of work, young people are particularly vulnerable (UNDESA, 2018). Unemployment prevents young people from gaining job experience, with implications for their future employability, productivity and earning potential. People who take longer to find stable employment accumulate less skills than those who can begin on-the-job learning at an earlier age, and this can lead to lower earnings throughout the life cycle. This lost human capital also represents a loss in productivity to firms and the economy.

The role of educators' teaching competences is pivotal in ensuring the delivery of high-quality VET initiatives; that's why this project aims at creating opportunities for VET professionals to meet current societal demands. VET institutions should overcome the presented challenges by significantly increasing the capacity of their staff to quickly adapt to changing societal and stakeholder needs, fostering their capacity to cooperate with their international counterparts, implement better local networks and foster better regional connections. VET trainers and teachers need to know how to combine face-to-face and online, remote learning, virtual class-based activities to increase participants' learning possibilities, and, most of all, allow learners to control their own timing and schedule. Students must be able to study anywhere and at any time they want, and this flexibility of learning is going to be addressed during the project.

The provision of a customised support enhancing their transition to concrete forms of self-employment (either entrepreneurial projects or joint/group efforts) would provide a strong contribution to their social inclusion and employability, while maximising the output in terms of contribution to the sustainable development of their local context.

To achieve this aim, educators need to count on more sophisticated skills and methods, to offer young participants a tailored approach, crucial for bringing young people back on track. This would require a broader approach to boosting VET learners' employability skills that also includes mentoring, coaching and the provision of wider transversal skills than the ones provided during their study.

The main complementarity aspects to the present project and the insurance for innovative and quality products was ensured by the nature, experience, and expertise of the partners in the consortium. The consortium capitalised on the capacity and skills offered by the 6 partners to create tools and products that can be easily used by their staff and other VET educators. All partner organisations have carried out initiatives and projects in the field of entrepreneurship, in-service training, sustainability and use of digital competences in different settings, and in general contribute in offering innovative solutions to foster their students' ability to cooperate on the labour market.

This manual aims to enable educators to develop the necessary competencies and skills to effectively create and ensure the transfer of the CE-E VET product in a self-sustaining manner. It focuses on training/learning approaches based on the program's products in each partner country.

The library with inventory of resources ready to use

Various resources have been presented in several formats to allow teachers to have a selection of tools that can be easily associated with any class or activity. The library is composed of ready to use materials, such as (micro-lessons, text, games, reading materials, exercises, presentations, infographics...) VET teachers can associate to any class or lesson on key concepts encompassing sustainability, entrepreneurial skills, responsibility.

Each topic and contents presented in each item is introduced by a short summary, just to recap on the focus skills and competence they need to focus on to successfully complete the assignments and tasks. In this way, VET learners will have time to reflect on their initial level of skills and be prepared to practise, reinforcing and experiencing what they studied, making them more aware of their capacities and, if needed, get back to the learning materials to deepen some topics. These instructional strategies adapted for each student' needs could help to engage them on their learning goals.

The proposed training materials available in the project's website are considered essential for the successful project implementation, as it will provide benefit to the project as follows:

- ✓ increase educator competencies on topics as EU level skills frameworks and topics as Entrepreneurship for Sustainable Development, Entre Comp: The entrepreneurship competence framework and Green Comp: The European sustainability competence framework;
- ✓ Transferring the program methodology and the results to the other trainers;
- ✓ Increase the educators of the partners' countries to competences for effectively delivering the project products during the piloting phase of the project and after the conclusion of the project;
- ✓ Increased capacity for cooperation and enhanced professionalism and improved competences in VET educators;
- ✓ Build capacity by participating organisation to support VET learners in their development path;
- ✓ Increased opportunities for professional development for VET trainers, VET educators and the participating institutions;
- ✓ Increased understanding on respective practices and the EU priorities and practices, more positive attitude towards the European project and the EU values especially in relation with GREEN skills needed by the labour market and sustainability requirements from SMEs
- ✓ More committed and professional services at local level, better informed on new techniques produced specifically for the target group.

To increase sustainability the digital resources can be used in 3 different ways: (1) a student studying

completely by him/herself, (2) a teacher introduces the main concepts, (3) real blended learning approach, encompassing both individual learning and class-based activities. The manual will describe the possible interplay and combination of the digital contents (digital materials, exercises, evaluation, etc.) in combination with class-based and online teaching activities, making the delivery of the program easier and more effective.

This time and cost-effective solution should free educators from preparing the contents, helping them in focusing on how to facilitate skills acquisition and final validation of the results.

Benefits for VET schools

Given the tight schedule and the limited resources VET schools have access to, the project's library and other resources and tools can offer a solid support to foster students' abilities and get them ready to enter the labour market (via apprenticeship, duality program or first employment). In particular, by introducing an easier way to develop employability skills in students, the partners expect to increase both engagement and learning outcomes.

The features of the digital products make them easy to share among younger generations, used to the online environment but also because digital solutions will offer an easy way to deliver and transfer them, with a wider impact and easier possibility for implementing follow up activities.

All stakeholders involved and benefitting from the project's results will have a useful program to help companies in identifying the gap between employers' needs and expectations in terms of sustainable and responsible behaviours by employees. The project will support the enhancement of competences as critical thinking and forward-thinking, entrepreneurial mind-set and other key transversal competences needed to succeed on the actual labour market and ensure the creation of sustainable and competitive organisations.

The project CE-E VET

CE-E VET offers innovative ways for VET schools and VET providers to boost VET learners' key competences using sustainable entrepreneurship and circular economy as activators of employability skills and ability to adapt to the ever-changing labour market conditions.

The CE-E VET project contributes to vocational and technical education to equip students with the so-called employability skills, such as those abilities and competencies every employee and workers need to possess to be an effective and efficient member of the labour market.

In the CEE VET project, the circular economy and sustainability are going to be used as motivation to youth to increase their knowledge and be prepared to find solutions to current issues connected to their profession specifically.

The partners

Country	Institution	Collaborators
 Italy	Associazione culturale FRAMEWORK, ITALY	Valeria Elia
 Poland	Branżowa Szkoła I Stopnia Stowarzyszenia "Edukacja-Młodzież" w Pleszewie	Anna Nowicka
 Portugal	Polytechnic Institute of Santarém	Ana Torres Bento Cavadas
 Romania	"Gheorghe Marzescu" Technological High School of Electronics and Telecommunications Iasi	Maria Miron, Oana Curteza, Ana-Maria Bogdan, Adrian-Marius Tomus, Liliana-Elena Covăsnianu, Adrian-Ioan Frentescu
 Spain	AEGARE	Arturo J. Gonzalez Ascaso
 Turkey	Vocational and Technical Anatolian High School Evliya Çelebi	Fatma Akdeniz, Fazıl Melikşah Yılmaz, Çağla Küçükaltun, Bekir Öfkeli

PEDAGOGICAL KNOWLEDGE FOR VET EDUCATORS

About 21st century skills

A 21st century education is about promoting in the students the skills development they need to succeed in this new world and helping them grow the confidence to practise those skills. With so much information readily available to them, 21st century skills focus more on making sense of that information, sharing, and using it in smart ways.

The national not-for-profit organisation Battelle for Kids (2019) and the coalition P21 (Partnership for 21st Century Learning) has created a framework for 21st century learning with four main skills under the learning & innovation domain, the 4Cs:

- ✓ Creativity
- ✓ Critical thinking
- ✓ Communication
- ✓ Collaboration

These four skills are not to be understood as units or even subjects, but as competences that should be overlaid across all curriculum mapping and strategic planning. They should be part of every lesson in the same way as literacy and numeracy. Collaborative learning, for example, provides the opportunity for students to maximise their own and each other's learning. Carefully structured collaborative learning ensures that students are actively involved in constructing their own knowledge while at the same time engaging with each other to achieve their learning goals. In the traditional model the faculty usually held the power and control. In the new model, student empowerment is encouraged and co-operation between faculty and students is established. Research evidence continuously points out the benefits of incorporating pedagogical methods like collaborative learning, peer instruction and critical thinking skills (Angelo & Cross, 1993 , Boyer, 1998 ; MacGregor et al, 2000) .

Under the innovative learning approaches, educators are designers of learning methods. They are managers, promoters, mentors, coaches, and facilitators of student learning. They are actively involved in how students learn, considering the individual differences in learning and specific needs of education and exploiting for example, the potential of new technology to provide remedial measures for people with disabilities and for people with specific needs (Marouchou, 2004).

The equity-focused policies of the 21st century have implications for how education systems should accommodate the needs of all individuals. To address this, education systems must offer relevant educational experiences that align with the realities of the 21st century. This entails the integration of new learning domains characterised by transferable skills and competencies.

Educators as Continuous Learners

Lifelong learning means that learning should take place at all stages of the life cycle and that it should be life-wide; that is embedded in all life contexts from the school to the workplace, the home and the community (Laal, 2011). Lifelong learners have the following characteristics:

Conquer Challenges

People with a lifelong learning mindset treat mistakes and challenges as part of the learning process. They do not see mistakes as failures. Mistakes give them new information they can use as they continue to find ways to solve a problem or challenge. Educators never know what types of questions students will ask.

Lifelong learners make learning a regular habit to adapt to changes and student actions. According to Jun (2014), “By embracing a student-like mindset and learning to turn self-education into a daily habit, you can hone your current skills and develop new ones while enriching your mind - Then, when the time to adapt arrives, the transitions are less bumpy.”

Innovate to Improve Learning Outcomes

When educators engage in courses and collaborate beyond their professional development, they are exposed to creative teaching methods. By collectively brainstorming innovative ideas for teaching, educators can achieve improved student outcomes compared to using outdated teaching methods. Experimentation and learning from experience can serve as reliable approaches to develop new teaching methodologies and facilitate the growth of learners.

Act as a Role Model for Students

Educators who engage in lifelong learning set an example for their students because they practice what they teach. This, in turn, encourages their students to develop into lifelong learners. Effective educators accomplish this by sharing experiences of working through the learning process (Eastern Washington University, 2018).

According to Costa (2011), curious people are always in a continuous learning mode. They find joy and motivation in the pursuit of lifelong learning. The combination of their confidence and inquisitiveness drives them to continually seek new and improved methods. These individuals embody a growth mindset, constantly striving for personal growth, learning, adaptation, and self-improvement. They view problems, situations, tensions, conflicts, and circumstances as valuable opportunities for learning and development.

Educators have a crucial role in modelling this behaviour. They can demonstrate online awareness and appreciation by designing innovative lessons that integrate the technology necessary for their students' needs.

Microlearning pedagogy applied to VET sector

Currently, time is more valuable than money. Everything that surrounds us becomes faster, more accessible, smaller, and more functional. This is also the case on the e-learning training market, and although microlearning is not a new concept, it has an increasingly significant approach to education in various fields, including vocational education. It is true that the transfer of knowledge in small pieces is nothing groundbreaking, but on the training market there is a noticeable increase in the use of microlearning as a way of providing knowledge in organisations.

What is microlearning?

Microlearning, knowledge delivered in a nutshell, is a form of asynchronous learning, used to meet the specific needs of students as quickly as possible. Kapp & Defelice (2019), in their book *Microlearning. Short and Sweet*, in addition to describing the origins of microlearning, defined it as a short (no longer than 3 to 5 minutes) lesson sequence that aims to achieve a specific learning outcome. It can be used to convey formal content, but it is more often used for informal information with particular emphasis on increasing the efficiency of its use. However, micro knowledge does not mean that its content will disappoint the learner about its quality. Microlearning is a form of learning in which the main recognition element is short, factual content delivered using the latest technologies.

Microlearning refers to a learning strategy designed using a series of short learning content and short activities that makes a mini course. It is also called bite-sized learning because it utilises small, well planned, bite-sized chunks of units or activities (Hug, 2005). It is designed to suit the limits of the human brain with

respect to its attention span and avoid cognitive overload. Although the concept of micro teaching existed for a long time, the term microlearning has not been used until a decade and a half ago (Hierdeis, 2007) and research that supports the integrating technology to create microlearning environments is still growing in the field of higher education.

Microlearning is ideal when a student needs to consolidate knowledge and use it in practice. Even if you don't have time to organise training, learning can be effective. Fast, concise and focused on a specific person.

The microlearning model

Hug (2006) identifies seven dimensions of microlearning, namely time, content, curriculum, form, process, media, and learning type. These dimensions primarily focus on the design aspect of microlearning. Hug argues that the main three elements in creating an effective microlearning environment are content pedagogy, and technology as shown in Figure 21.

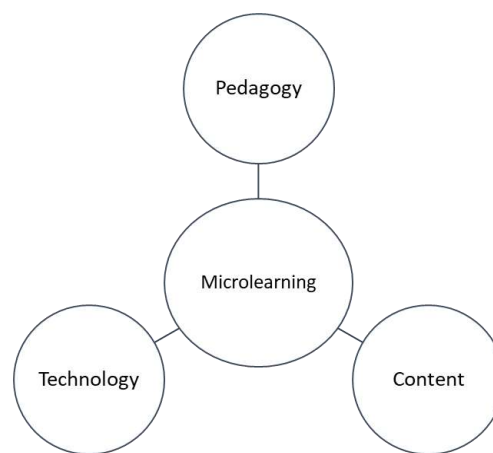


Figure 21. Microlearning model (adapted from Hug, 2006).

Content

The first element in creating a microlearning environment is content. It is necessary to identify areas in the curriculum where technology integration is appropriate for microlearning units and activities. For example, introducing the concept of regression analysis in a statistics lesson. Students can learn the concept by a microlearning technique, then apply that knowledge in the classroom. To choose appropriate content for microlearning, the following questions should be considered:

- What do I want my students to know and understand to move forward?
- What is worth my students' time outside of the classroom?
- What are the most common mistakes students make that affect their learning and their grades?
- What topics do I think that can be broken down into small pieces?
- What are the 3 or 4 most important things I want my students to learn?

These are just some example questions to ask for choosing appropriate content. Once content is identified, it is essential to think about the pedagogical model to use and the design of the microlearning environment.

Moore & Kearsley (1996) emphasised the importance of learner interaction with content in online learning environments. A recent study by Alqurashi (2017) explored the relationship between four predictor variables (online learning self-efficiency, learner-content interaction, learner-instructor interaction, and learner-learner interaction) and student satisfaction and perceived learning. Results indicate that all four predictor variables together significantly predict student satisfaction and perceived learning. Learner interaction with the content in an online learning environment was the strongest and most significant predictor of student satisfaction, where self-efficacy was the strongest and most significant predictor of perceived learning.

Pedagogy

Baumgartner (2013) discusses the theory behind microlearning and proposes a model of a competence spiral to scaffold students' learning. In the first phase called *Learning I*, students absorb knowledge; this knowledge is basic and has no meaning yet (relates to behaviourism). In the second phase called *Learning II*, students acquire knowledge. Students in this phase interact with artificial environments and make their own experiences. Learning here is active with meaningful feedback provided by the instructor (relates to cognitivism). In the third phase called *Learning III*, knowledge is constructed where instructors and students work together to master the course materials (relates to constructivism). In *Learning I+*, students proceed to a higher level with more advanced concepts. Based on Baumgartner's model, Göschlberger (2016) proposed a social microlearning platform designed for all four phases. In *Learning I*, students create and share microlearning content. In *Learning II*, students evaluate, rate and improve the microlearning content. In *Learning III*, students can tag and collect content items. Learning I+, students interact with the microlearning content and solve low stakes quizzes, which they can take repeatedly to help them learn the materials.

Microlearning can be implemented as a flipped classroom. This means that learners can complete microlearning activities before class time, which can be the first and the second phase in Baumgartner's model; class time can be used to apply knowledge, discuss ideas, and master the concepts. This can be the third and fourth phase in Baumgartner's model. Microlearning can also be implemented as a supplement to classroom instruction. Learners can be asked to complete microlearning modules, units and activities after class time to solidify concepts. This can be done for both traditional and online classes.

Technology

Microlearning is typically designed in multimedia formats to cater to users who learn at their preferred time. Its availability across various devices, including tablets and smartphones, ensures easy access, quick familiarisation, and effective utilisation of content. To be effective, microlearning must strike a balance between specificity and comprehensiveness. While quizzes alone may not yield positive results, incorporating clearly defined tasks into videos or infographics enhances their efficacy. Interactive exercises and simulations further enhance the practical application of knowledge. Microlearning tools can be tailored to specific goals, offering clear and concise information that consolidates learning and provides modern training methods. Ultimately, this approach enhances knowledge acquisition for students.

Research conducted to investigate the opportunities of integrating technology to create microlearning environments is still at its infancy, and it focuses heavily on corporate training and adult learning. Research on higher education is very limited though. If students were introduced to a well-designed microlearning environment, this can help enhance student's confidence in their capabilities to learn the content in a digital environment (i.e. high self-efficiency). Alqurashi (2016, 2017) argues that self-efficiency in online learning is very critical to students' learning. However, there is a need for research to be done in higher education. The focus of research in the past was mainly on technology self-efficiency (Al Qurashi, 2016). Although technology skills are important, it is important to consider how new generations of learners have changed in terms of their fluency with technology.

In the current classroom landscape, many technologies used are mobile-friendly due to the widespread availability of mobile devices among students. Consequently, **it is crucial for digital microlearning environments to be mobile-friendly**, enabling learners to engage in learning activities while on the move and at their convenience. Hug (2010) explored the integration of mobile devices in creating microlearning environments, highlighting several key reasons for their significance:

Microcontent: Mobile devices are well-suited for displaying microcontent, which aligns with the bite-sized nature of microlearning. The compact screen size and limited attention span associated with mobile devices

make them ideal for delivering short bursts of learning material.

Screen Size: Mobile devices typically have smaller screens compared to other devices. Adapting the design of microlearning content to fit these smaller screens ensures optimal viewing and engagement.

Micro-Steps: Mobile devices enable the design of micro-steps in both formal and informal learning environments. Learners can engage in quick, incremental learning activities that align with their on-the-go lifestyle.

Lastly, mobile devices play a crucial role in bridging the gap between digital and physical learning experiences within microlearning environments. They enable learners to access learning content and activities on the go, blurring the boundaries between traditional classroom settings and digital learning environments.

The most used tools and strategies in microlearning

How When designing and creating an effective digital-based microlearning environment, several key characteristics should be considered:

User-Centred Design: The microlearning environment should prioritise the needs, preferences, and characteristics of the learners. User-centred design ensures that the content, format, and delivery methods align with the target audience's learning styles and preferences.

Bite-Sized Learning Units: The content should be broken down into bite-sized learning units that focus on specific topics or skills. Each unit should be concise, easily consumable, and self-contained, allowing learners to engage with the content in short bursts.

Interactive and Engaging Content: Incorporating interactive elements, multimedia formats, and gamification techniques enhances engagement and promotes active participation. Interactive quizzes, videos, simulations, and interactive exercises can make the microlearning experience more immersive and enjoyable.

Mobile-Friendly and Accessible: The microlearning environment should be designed to be mobile-friendly, allowing learners to access the content anytime and anywhere, using a range of devices such as smartphones or tablets. This ensures flexibility and convenience for learners.

Just-In-Time Learning: Microlearning is particularly effective when it provides learners with immediate access to relevant and practical information. Designing the content to address specific performance gaps or immediate learning needs enables learners to acquire knowledge or skills right at the moment of need.

Assessments and Feedback: Incorporating assessments and providing timely feedback helps learners gauge their progress and understanding. Assessments can be in the form of quizzes, interactive exercises, or scenario-based simulations, allowing learners to apply their knowledge and receive feedback on their performance.

Moreover, the microlearning environment should be scalable and adaptable to accommodate different learning needs and changing requirements. It should allow for easy updates, additions, and customization to address evolving educational demands. **Coursmos, Grovo, Panopto** are amongst the most commonly used microlearning tools today.

Coursmos (Coursmos, 2017) is an online platform designed for creating micro courses comprised of mini lessons followed by quizzes. Each micro course can consist of up to seven micro lessons, with a maximum duration of 5 minutes per lesson (as depicted in Figure 22). The platform features an intelligent and personalised course recommendation system, suggesting other relevant courses created by different instructors. It also facilitates the connection of micro courses, forming a knowledge cloud, and enables easy sharing of micro courses on social media or websites. Coursmos serves as a convenient learning tool,

allowing students to complete micro lessons using their mobile devices, while instructors can monitor students' attendance and track their learning progress.

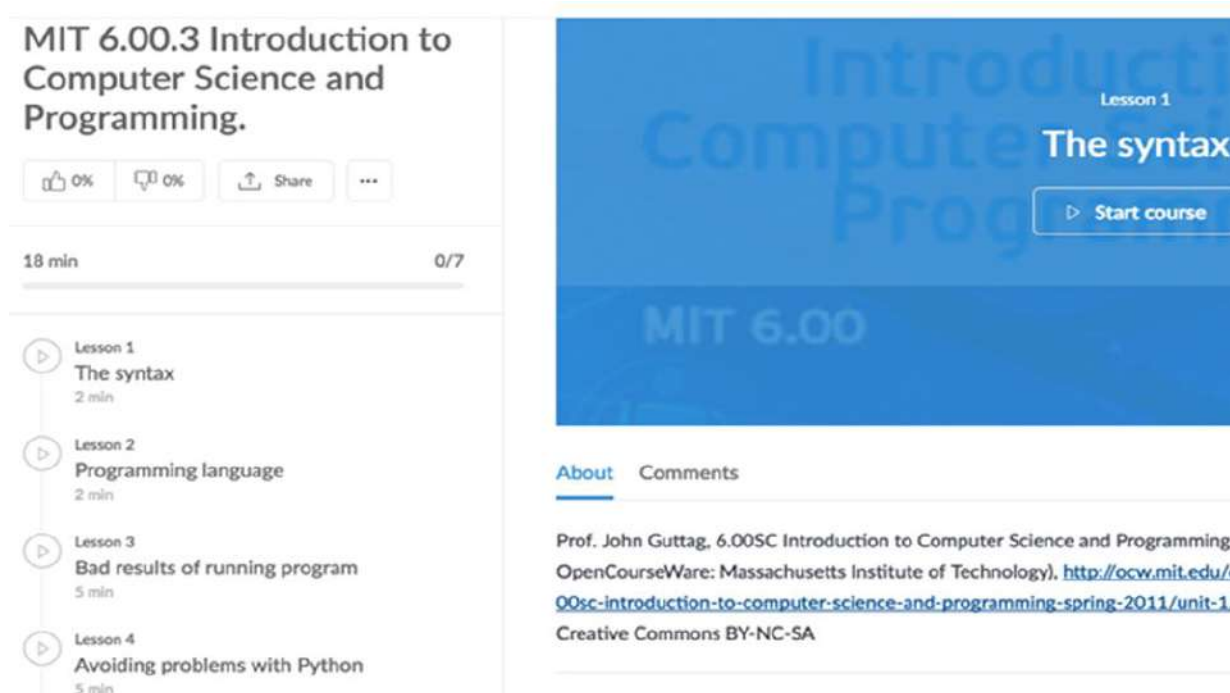


Figure 22. Example of a Coursmos micro course.

Grovo (Grovo, 2017) is an online microlearning platform as shown in Figure 3. Typically, mini lessons in Grovo are up to 90 seconds long, which allow learners to quickly complete a mini course assigned to them.

Each lesson combines video, gifs, quizzes, and other engaging activities to keep learners on task. The platform can be integrated into different learning management systems for easy access, and include ready-made templates to create micro content. Instructors can monitor students' progress, identify at-risk students. This can be presented with graphs to view learning analytics.

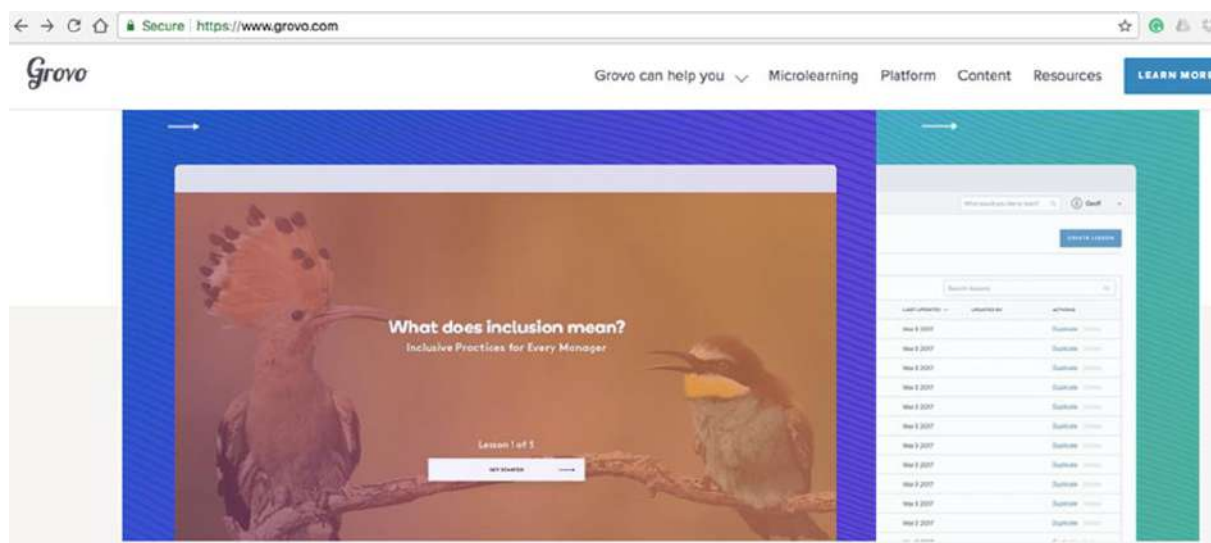


Figure 23. Example of a Grovo micro course.

Panopto (Panopto, 2017). It is a video content management system that provides lecture recording, screencasting and video streaming to create a microlearning environment as shown in Figure 4. It allows the integration of the system in learning management systems for instructors and students. Panopto system allows

instructors to transcript their videos with a click to make it accessible, and allows for creating interactive video quizzing. It also provides instructors with detailed reporting of student progress and performance, and identifies where students are spending the majority of their time reviewing.

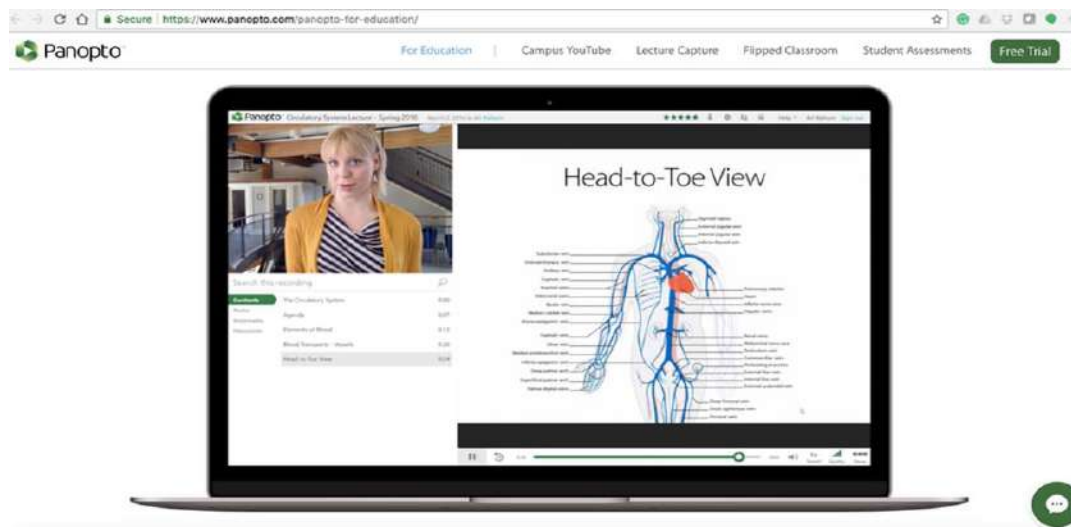


Figure 24. Example of a Panopto micro course.

Concluding, the microlearning model ensures that students are engaged in the online content outside of the classroom, more research is needed to understand if it leads to higher levels of perceived learning as well as satisfaction. It does help usually distracted individuals to learn in short focused micro content. Instructors must also focus on the learning experience in the big picture when implementing microlearning. The application and the construction of knowledge that occur in class after students complete their microlearning content outside of class. By including all elements of microlearning (i.e. content, pedagogy, and technology), it can increase student engagement, enhance student satisfaction, and positively impact the learning experience. Benefits of microlearning

What are the benefits of microlearning-based training?

There are many benefits of incorporating microlearning into employee education. And it's not just about the user's perspective, because the "nuggets" of knowledge can also benefit business. In higher education for example, a study by Liu et al. (2016) found that 80% of college students took active part in teaching activities. They stated "it promotes multidimensional interaction and increases deep-levelled cooperation and understanding" (p.870). The researchers also found that microlearning environments inspired and improved the learning environment itself and students' interest in learning. When Zhamanov and Zhamapor (2013) started to implement microlearning techniques in their university course they found that students expressed a higher level of interest to learn the subject matter. The next section presents some benefits of microlearning:

- **Takes less time:** It is an ideal solution for adult learners with a shorter attention span and is attractive to Millennials.
- **Inexpensive and agile:** Due to the short training time, the costs of microlearning are lower than those of traditional eLearning. Projects are created and implemented much faster than traditional ones.
- **User-centric:** The condensed way of transferring knowledge inspires the learner and gives more control in creating a flexible and personalised learning path. The varied formats used to create knowledge 'clumps' are more suited to individual learning styles.
- **Available in many devices.** The use of various multimedia formats allows for better memorization of the acquired knowledge. We do not have to limit ourselves to our desk and computer screen. Microlearning is created for many devices, which makes it easier for the user not only to receive it, but also to decide how and

when he wants to acquire knowledge.

- ✓ **Available at the selected moment:** Probably the biggest advantage of microlearning. The knowledge is available to the user exactly at the moment of his learning needs. A big benefit is also the fact that knowledge is on demand, i.e. it is more of a pull than a push.
- ✓ **Shorter development cycle:** Due to the length and simple formats used to create microlearning, they have a much shorter production cycle.
- ✓ **Easy to update:** Information can be quickly updated and corrected.
- ✓ **Wider application:** Microlearning does not have to be part of a large training path. Its design allows it to be used as a single, separate training resource.
- ✓ **Huge impact:** Designed to meet narrow but specific results. This has a positive effect on learning and application. It can be effectively used to change behaviour.

There are also several studies which present other advantages of microlearning. For example, results from a study by Bruck et al. (2012) with a university level course and two governmental training courses that showed learners had good satisfaction levels and high usage levels for the course materials. Similar results by Aitchanov, et. al. (2013), who examined the use of Twitter, a social media technology, in a microlearning technique for educational purposes. They collected data from college students enrolled in Advanced Programming in C++ course and found that the majority of them enjoyed learning the course materials when it was delivered in small chunks using Twitter. However, Students suggested that they would like the number of tweets to be increased, and to implement this technique to learn other spheres.

Kovachev, et al. (2017), investigated the effect of delivering the Engineering Mechanic Experiment content in short, sequenced videos. As a result, the author reported that "the engineering mechanics experiment grade of undergraduate students has improved significantly, the service efficiency of mechanical equipment and degree of familiarity has improved sharply" (p. 130). The design of those short videos, however, resulted in limited student-student and student-instructor interaction. Interaction with the digital content in this case is the highest.

In terms of evaluations, Giurgiu (2017) assessed whether students respond better to evaluation questions when they watch small segments of content followed by a number of evaluations, or when they watch large amounts of content with fewer evaluations. Findings suggest that smaller chunks of content helped students to better retain information and better perform in end-of-course tests. Students who learned through microlearning technique took 28% less time to answer their evaluations and did 20% better, took three times less to cover the course materials compared to students who did not. This suggests that trying to learn large content at once results in little interaction with content.

What should be kept in mind to develop VET students' talents and increase their effectiveness during microlearning?

Microlearning best practices

Supporting education and development of students is important for the effectiveness of their work and for increasing the benefits for the school. Appreciated and supported people feel the company's mission and identify with its tasks. Knowledge available in a friendly, short form is something that can be smuggled on the occasion, additionally, without absorbing them and not taking them away from their duties. Every person who takes their professional education seriously appreciates further development opportunities.

Thanks to modern technologies, microlearning fits perfectly into the phenomenon of increasing scope and the need for remote work. After all, the infographic can be viewed even with a child in your arms. Combining work and home responsibilities has become more of a challenge for many students, especially if they are parents. Microlearning is proof that they do not waste time, but they can build their knowledge in small steps and develop it literally everywhere.

Supporting talents results in their loyalty and willingness to develop the entire brand. Microlearning based on modern technologies has no limitations in its use on a large scale, but it can become a tool thanks to which specific employees will gain an additional source of knowledge and development. Use its tools to support both the entire team and individual employees.

In microlearning, the support of leaders is very important. Microlearning must be approved by school staff. Then the validity of the method and its effectiveness go hand in hand. Learning can take as long as necessary. However, it should not be too short or too long.

A micro lesson example about leadership skills

The capacity of learning leadership skills is important for future entrepreneurs that will work in sustainable business because mentoring a business that is friendly for the environment and also successful might be hard at first without a doubt. This is why some skills like communication but more importantly soft skills are very important for the long run in the green business world.

In the commercial world of today, soft talents are everything but "soft." The variety of intangible qualities that employees possess that influence how they perform and comprehend their tasks are referred to as soft skills. Businesses would fail without them because employees would find it difficult to cooperate and comprehend the significance of their tasks.

Leadership is the ability to help, inspire, and motivate people to reach a goal. It is a skill that can be applied in various facets of life, including school, college, and the workplace. The exercises in this lesson teach your students that effective leadership entails being proactive, being a good communicator, managing projects effectively, and other qualities that will help them succeed in their future jobs.

Thus, the aim of this lesson is to encourage students to explore the concept of leadership, its different styles, and the importance of teamwork when being a leader. It also teaches students to be more inclusive of others when demonstrating leadership skills.

The objectives are:

- ✓ To recognize the important skills associated with being a leader
- ✓ To understand and evaluate the different leadership styles
- ✓ To be able to inspire group aspirations

We realised this lesson with the help of <https://www.apple.com/app>, where the students will need to download the phone app or register on the website. The lesson can be accessed with this link: <https://link.edapp.com/Zwq2kBIKdvv>.

A micro lesson example about e-waste

Students must possess the information and abilities necessary to understand how the world works and how to address pressing global issues. Everyone should be aware of the many beneficial uses of e-waste recycling. For instance, keeping those devices out of landfills would preserve both human and environmental health. Alternatively, you can recover the components of the devices that are still useful and give producers recycled metals to use in the production of new goods. Students can learn how their activities can affect both local and global communities by learning about the causes and effects of e-waste. They also learn how to work together across disciplines to develop practical solutions.

Responsible e-recycling is a popular strategy in addition to reusing and repairing gadgets, but not everyone is aware of how to do it or even that they can. When teachers include students in civic engagement and teach them useful skills, they can have a significant impact on raising awareness of appropriate e-recycling.

Thus the meaning of this lesson is to make students realize the major ecological problem that is e-waste. With this information in mind, we can educate the pupils about how to combat this situation on a day-to-day basis knowing the steps and rules that should be taken.

The objectives are:

- ✓ To understand the meaning of e-waste
- ✓ To know how e-waste can pollute the environment and cause a problem
- ✓ To know that unwanted electronic goods can instead be re-used or recycled
- ✓ To be motivated to take practical steps to reuse or recycle unwanted electronic goods and play a personal part in preventing e-waste

We prepared this lesson with the help of <https://www.apple.com/> app, where the students will need to download the phone app or register on the website. The full micro lesson can be accessed with this link: <https://link.edapp.com/Zwq2kBIKdvb>.

A micro lesson example about circular economy

In our modern world, technology is naturally a driving force behind learning and the development of curricula. To achieve better results from learners, today's educators are increasingly utilising cutting-edge digital tools and strategies in their teaching methods. Gamification for learning is one of these strategies used increasingly by teachers around the world. Using gamified elements can positively impact student engagement and collaboration, allowing them to learn more efficiently as a result.

Gamification is the idea of adding game-like elements to a non-game environment, like leaderboards, point systems, different levels, and badge awards. The intention behind gamification is to make something more appealing by enabling users to have fun. When done right, it can significantly improve user engagement (Hemmer, s.d.).

This lesson explores the importance of improving the collection, sorting and recycling of E-waste as well as the role a circular economy can play in eliminating waste in the first place. But, at the same time, it shows the impact of smartphones and other electronic devices on the environment and how to create a circular economy for ICT appliances. The aim of this microlearning is to let you:

- ✓ understand the relevance of reusing, repairing, refurbishing, reselling and recycling in electronics
- ✓ critically think about sustainable alternatives in develop skills in app design and gamification

We try to show to the students how to reduce the waste of smartphones or other electronics, through games. So, the students have fun and realize that it is up to them to change the world. The full micro lesson can be seen at: <https://youtu.be/9sYPEpncmc4> (Tomus, 2022).

A micro lesson example about circular economy

Title of the lesson: Circular economy (the sequence) <https://youtu.be/5YUha42FXEU>

After the preparatory discussion stage that will introduce the topic to be addressed in the lesson and after the announcement of the title, in the next stage, that of communicating the new knowledge, it will begin with the presentation of the video, in small parts, with break on each key element of prioritising circular economy actions according to the European waste hierarchy: reduction, reuse, recycling and recovery. Each time, students will be asked to give other examples and detailed explanations will be provided.

The goal: acquiring a positive attitude towards the environment by implementing behaviors that contribute

to the reduction, reuse, recycling and recovery of materials used in the manufacture of products.

Objectives:

- ✓ To remember the four key elements of the circular economy according to the European waste hierarchy: reduction, reuse, recycling and recovery;
- ✓ To identify the practices of a thinking corresponding to a circular economy;
- ✓ To adopt behaviours that favour the reduction, recycling, reuse and recovery of the products purchased or intended to be purchased.

Results: students will retain theoretical and practical information about what the circular economy represents, the actions it entails, as well as the way of putting it into practice. In the next lesson, students will provide evidence with their own concrete examples of adopting environmental protection behaviour (pictures, written explanations of what they accomplished, practical experiments that can be brought and exemplified in the classroom).

A micro lesson example about sustainability and circular economy

With the help of two micro-lessons, we aim to create an introduction to the circular economy, what it means and what its importance is in the current situation.

In the linear economy, raw natural resources are taken, transformed into products and disposed of. On the contrary, a circular economy model aims to close the gap between the production and the natural ecosystems' cycles – on which humans ultimately depend upon (youmatter, s.d.).

These two micro-lessons were created with the help of the EdApp application. This minicourse has two micro lesson:

- ✓ Repair, re-wear & Recycle
- ✓ What You can do



The aim of these microlessons is to let you:

- ✓ understand the relevance of sustainability in circular economy
- ✓ understand the concept of circular economy
- ✓ critically think about sustainable alternatives to the current mobility system
- ✓ develop skills in app design and gamification

The first step is an overview of the topic, where we're also making them think about the context and what they know about the subject already. A simple introductory slide will do the job, but avoid presenting a wall of text as it will turn people off.

Repair, Re-wear & Recycle

Learn how we can support a circular economy.

SLIDE 1/9

What role does the Circular...

How would you rate your...

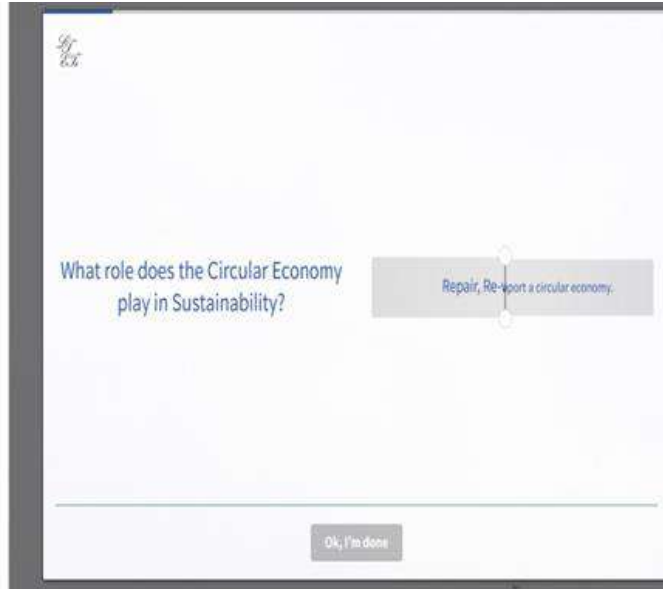
R's of Sustainability

What is a circular economy?

Circular Econom...

Missing Word

Repire din lecție



What role does the Circular Economy play in Sustainability?

Repair, Re-wear & Recycle a circular economy.

OK, I'm done

Now we are introducing interactive questions to help reinforce our elements. If our learners get the answer right, they can reinforce why the right answer was important. However, if they get it wrong, it's very important to quickly correct any misconception and explain what the right answer is: any delay will increase the likelihood of retaining the wrong information. Just as you would for answering the question correctly, it's important to tell our learners what the correct answer is and why the information is important – this will leave them with a lingering takeaway message.

Repair, Re-wear & Recycle

Learn how we can support a circular economy.

SLIDE 3/9

What role does the Circular...

How would you rate your...

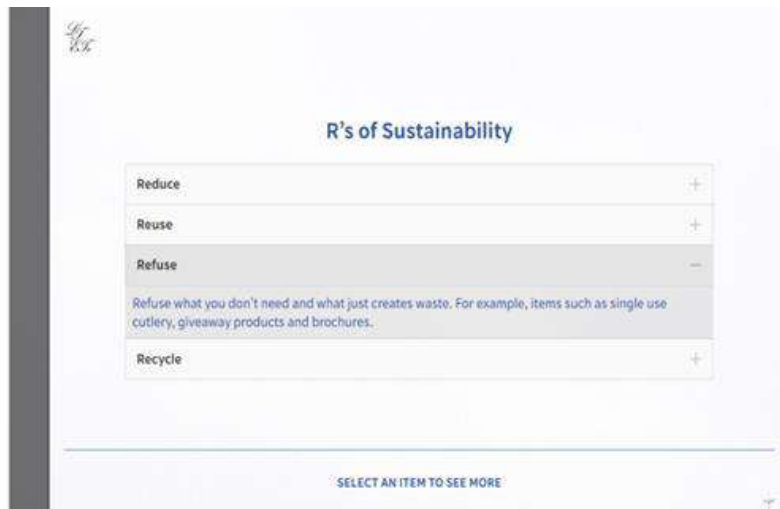
R's of Sustainability

What is a circular economy?

Circular Econom...

Missing Word

Repire din lecție



R's of Sustainability

Reduce	+
Reuse	+
Refuse	-
Refuse what you don't need and what just creates waste. For example, items such as single use cutlery, giveaway products and brochures.	
Recycle	+

SELECT AN ITEM TO SEE MORE

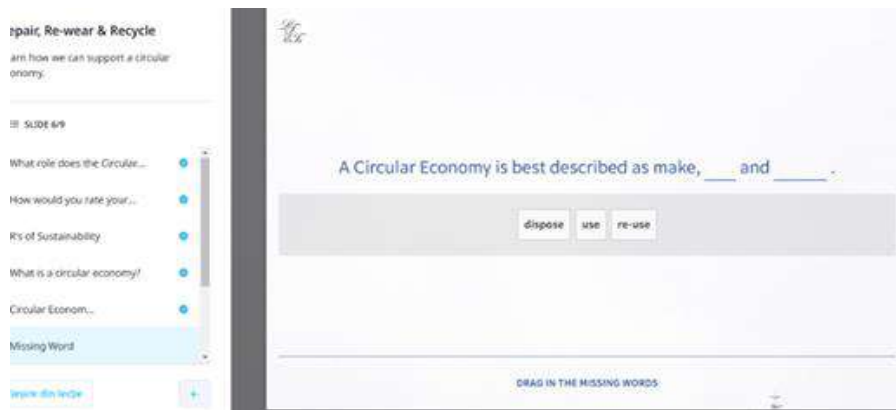
To make our lesson more interesting we introduce some games that make the learning more effective, but make, at same time, our lessons competitive (and even rewarding) and that will drive effectiveness even further.

Ed App's built-in rewards program is about earning 'stars'. Based on your preferences, you can easily reward your learners through stars, which can then be turned into real rewards like a Starbucks or Amazon gift card, for example.

Microlearning with built-in gamification training software is an amazing tool to adopt for the success of your organisation's training strategy. We know that microlearning has proven successes and one of the best things about it is that you have the freedom to implement the practice in many different ways, giving you the space to deploy custom, bespoke learning experiences to your audiences.

In the second lesson, the students find out information about a real company that makes and sells jewellery,

but applying the circular economy methods.



9th and 11th grade students learned, using this micro lesson on a mobile application, introductory notions about sustainability and economy. Thus, in a fun way and, this time, with the help of their mobiles, they were able to acquire important information for a safer future. The full micro lesson can be seen at: <https://youtu.be/WGRBjH8GFyM> (Tomus, 2022b).

VET educators as coaches or mentors

The disappointing performance of modern VET learners in partner countries and across Europe. To improve the learning outcomes of VET learners, their internal motivation and attitude towards education must be addressed.

Many VET students experience a decline in motivation, making learning a tedious duty rather than a personally significant goal. Mentoring and coaching can help shift students from passive participants to active, engaged learners. Coaching is often seen as a tool within mentoring. By working with a mentor or coach, VET learners can develop a conscious and meaningful approach to their educational activities, leading to improved performance. While not all VET learners face these challenges, mentoring and coaching can support those who struggle to achieve successful learning.

What is mentoring?

Mentoring is a professional relationship in which a more experienced or knowledgeable person, known as a mentor, provides guidance, support, and advice to a less experienced individual, known as a mentee. The mentor typically shares their knowledge, expertise, and insights to help the mentee develop their skills, knowledge, and personal growth in a specific area or field.

Mentoring is a collaborative process that involves regular communication, feedback, and goal setting. The mentor serves as a role model, offering guidance, wisdom, and encouragement to the mentee. They may provide advice on career development, skill enhancement, problem-solving, and navigating challenges in the mentee's personal or professional life.

The mentoring relationship is built on trust, respect, and confidentiality. It can occur within various contexts, such as workplaces, educational institutions, professional organisations, or community settings. Mentoring relationships may be formal, with structured programs and specific goals, or informal, developing naturally between individuals.

The benefits of mentoring include knowledge transfer, personal growth, professional development, increased self-confidence, expanded networks, and access to new opportunities. Mentoring plays a valuable role in supporting individuals in their personal and professional growth, helping them navigate challenges, and ultimately fostering their success.

Implementation of a mentoring project

Here are some guidelines to successfully implement a mentoring project:

✓ **Define clear objectives**

- Establish goals and objectives for the mentoring program
- Align the program with organisational strategy

✓ **Select suitable mentors**

- Identify mentors with relevant knowledge, skills, and experience
- Consider compatibility with mentees and willingness to participate

✓ **Match mentors and mentees**

- Carefully match mentors and mentees based on goals, needs, and compatibility
- Consider expertise, personality, career aspirations, and development areas

✓ **Provide mentor training**

- Offer mentor training programs to equip mentors with necessary skills and knowledge
- Cover areas such as communication, active listening, goal setting, and mentoring techniques
- ✓ **Establish clear guidelines and expectations**
 - Set guidelines for frequency and duration of mentoring sessions
 - Define communication methods and confidentiality agreements
- ✓ **Foster regular communication**
 - Encourage regular and open communication between mentors and mentees
 - Establish channels for communication and encourage active engagement
- ✓ **Monitor and evaluate the mentoring process**
 - Continuously monitor progress of mentoring relationships
 - Gather feedback from mentors and mentees
- ✓ **Provide ongoing support**
 - Offer ongoing support and resources to mentors and mentees
 - Provide access to training materials, networking opportunities, and additional resources
- ✓ **Acknowledge and celebrate achievements of mentors and mentees**
 - Recognize efforts and contributions to motivate others

The mentor role

The Role Model theory, also known as the Role Model Influence theory, suggests that individuals are influenced by and aspire to emulate role models who possess qualities, characteristics, or achievements that they admire or find desirable. Role models serve as sources of inspiration and can impact an individual's attitudes, behaviours, and aspirations.

The research (Ruskovaara & Pihkala, 2014), found that students who have teachers with entrepreneurial experience in their courses will experience a significantly greater increase in their entrepreneurial intentions than those students who have teachers with no entrepreneurial experience (Diegoli et al., 2018).

Currently, mentoring is becoming a system for managing corporate knowledge and skills of the organisation. Here, the role of the mentor is not only in teaching the employee what is directly related to his job duties, it also consists in the formation, transfer of knowledge about the values and uniqueness of the organisation.

Another important role of the mentor is integration of the new employee into the team. The mentor introduces the new employee to colleagues, facilitating the establishment of informal connections and helping to overcome the psychological barrier that is typical for such situations. Thus, mentoring allows us to solve an important task: bridging the gap between training and effective use of acquired skills in real work.

Criteria to choose a mentor

When appointing a mentor, it is necessary to consider not only his professional, but also human qualities. Therefore, the main criteria for choosing a mentor can be as follows:

- ✓ High level of professional competence;
- ✓ Ability and willingness to share experience;
- ✓ Well-developed communication skills;

- ✓ Support for standards and rules of work organisations;

In addition, it is necessary to be guided individually-psychological qualities of mentors and new employees to create the most comfortable working atmosphere that will contribute to increased employee satisfaction and, in general, will ensure the possibility of achieving high results in solving the tasks set.

As a rule, a mentor is a person who will not be the direct supervisor of this employee in the future. He must have a certain status in the organisation, prove himself as an excellent specialist in his field. The appointment of a mentor is also necessary in order to successfully complete the probationary period. In addition to the above, the mentor must possess the following qualities:

- ✓ a systematic approach to the employee training;
- ✓ focus on self-development and assistance in the development of others;
- ✓ willingness to transfer their knowledge and skills to young employees;
- ✓ sense of responsibility, patience and tact;
- ✓ communication skills.

Mentorship covers a narrow range of purely professional issues. Using mentoring as one of the methods of working with personnel helps to solve several problems at once:

- ✓ formation of a positive image of the company in the labour market;
- ✓ reduction in staff turnover by reducing the number of employee layoffs during and immediately after the probationary period;
- ✓ reduction in the number of mistakes made by an employee during the period of entry into duty, increasing the efficiency of its activities;
- ✓ improving the quality of training and qualifications of personnel;
- ✓ saving time of department heads spent on training new employees;
- ✓ providing mentors with opportunities for career growth, recognition of their merits to the organisation;
- ✓ transfer through the mentor of the experience accumulated in the organisation.

It should be noted that mentoring affects a variety of aspects and activities of the organisation. One of the important indicators directly related to this kind of activity is the economic efficiency of investments in personnel. The faster the return on investment in staff, the more time the employee will bring profit to the organisation.

Benefits of mentoring to the organisation

Organisations with an established mentoring system can utilise it to retain valuable employees and facilitate professional growth. Mentoring can serve as a criterion for advancement within the organisation, with the successful supervision of newcomers becoming a requirement for transitioning to higher positions. While mentoring alone cannot be the sole determining factor, it fosters healthy competition and raises the bar for individual achievements.

Additionally, mentoring helps retain key employees by providing continuous professional development opportunities for mentors themselves. They receive advanced training, seminars, and communication skills enhancement to effectively support and address the queries of new employees.

The implementation of a mentoring system offers several benefits for organisations, including reducing the onboarding time for new employees, promoting a cohesive team culture, enhancing the quality of training

and qualifications, decreasing staff turnover, achieving organisational targets more efficiently, keeping employees' knowledge up-to-date, mitigating the risk of burnout among experienced professionals, making timely decisions regarding promotions or changes in work conditions, building a highly skilled workforce, boosting motivation for both experienced and young professionals, fostering employee loyalty, and cultivating a positive organisational image in the market.

In selecting mentoring candidates, organisations can focus on employees with well-developed competencies to optimise resource utilisation during the mentor training phase. Establishing a model of corporate competencies within the mentoring project enables a shared understanding of mentor behaviour standards, objective evaluation of potential mentors, assessment of mentor performance, and identification of areas for ongoing competency development. This competency-focused approach ensures clarity regarding expected organisational behaviour for mentors, transparent evaluation of candidates and their activities, and mentor accountability for their professional growth and the development of mentees.

Using software to run the mentoring program

Mentoring for diversity helps the school, and the enterprise to achieve its diversity and inclusion goals, helps to increase the interest of students, employees for innovation, and creativity, employees to obtain higher incomes, and students for a merit scholarship. Diversity and inclusion are crucial, and for an easier way to true success, the use of a mentoring platform for a mentoring program will also be considered.

Volunteer Vision Organization¹ created Mentoring Software Together, on which you can create inclusive mentoring programs that help all members of an organisation to feel they belong and contribute to personal or organisational success. This organisation believes that to improve employee performance and promote an inclusive workplace, the stakeholders of the enterprise, human resources departments, and directors must work with the right concepts in mind.

The mentoring platform referred to before promotes the practices of IEI (Diversity, Equity, Inclusion), recommending these three steps:

"Diversity: Ensuring the presence of groups in which individuals of different racial, gender, religious, ethnic, sexual, financial and political backgrounds are represented, as well as those from the spectrum of abilities."

"Equity: promoting organisational systems and structures in which processes, procedures, and resources are distributed fairly, addressing the root causes disparate outcomes in society"

"Inclusivity: Ensuring that each individual has the opportunity to participate fully in the organisation, regardless of their past, personal experiences and abilities"

What is a mentoring platform?

A mentoring platform helps operate an effective mentoring program and removes friction and mundane work from the mentoring program to create an environment where everyone wins.

Organisations create a mentoring program to increase employee or student engagement, provide them with tools to develop their skills, and better manage their career path by using their in-house experts. Large corporations use the power of mentoring to launch strategic initiatives such as Diversity, Equity, and Inclusion; Change management; Career development, and other employee engagement programs.

Mentor platforms help companies design and launch for teams and help them accelerate their commercial and cultural transformation, leading to superior business outcomes, so they are also recommended in high

¹Volunteer Vision's Online Mentoring Software <https://www.volunteer-vision.com>

schools, adapted to the level of student development.

Organisations (enterprises, schools) need to invest in a mentoring platform that has multiple capabilities to operate a mentoring program. A mentoring platform is an essential and valuable tool to lead an organisation's transformation and qualitative growth.

The advantages of using the Mentor platform in the pandemic and not only:

- ✓ The mentoring platform matches mentors and mentees according to their skills, expertise, experience, and values.
- ✓ Provides workflows to guide mentors and mentees.
- ✓ The platform provides the audio, video, chat, and calendar tools needed to have a rich mentoring experience.
- ✓ It allows mentors and mentees to identify tasks to do and action elements during their mentoring conversations.
- ✓ The mentoring platform allows mentors and mentees to focus on specific mentoring topics to ensure learning and sharing expertise.
- ✓ It provides a mechanism for implementing different mentoring models: 1:1 mentoring, reverse mentoring, group mentoring, and peer mentoring.
- ✓ The mentoring platform also provides learning and training capabilities to help a mentor become a better mentor and to help a mentee become better.
- ✓ The platform helps build a community that learns together and grows together, in which participants help each other grow.
- ✓ The mentoring platform helps the administrators and sponsors of the mentoring program to design the program to create the best experience for mentors and mentees and to create great results for the organisation.
- ✓ It gives administrators the ability to manage participants in the mentoring program, create momentum in the program and measure tangible results.
- ✓ The platform allows participants to create direct discussions with executives and create team events to celebrate mentoring success.
- ✓ The platform integrates with the systems in the organisation to unify profile information throughout the organisation, to create a better user experience and better analysis.

Acquiring mentoring software does not solve the problem of launching a successful mentoring program. It takes a complete mentoring platform to design, launch and operate a successful program.

Mentoring programs help to create inclusive cultures at the level of a school, students feel that they belong to that school, and students are known, heard, and encouraged.

A good example,² is The Volunteer Vision Organization's partnership with Fujitsu, a Times Top 50 Employer for Women organisation. Volunteer Vision offers as a global provider of digital mentoring for the diversity, equity, and inclusion sector personalised support, based on analyses that confirm the positive impact of the development program, regarding diverse talents.

Step 1: Training mentors and mentees by Volunteer Vision on mentoring skills before starting sessions.

Step 2: The women in this organisation (mentors) invited junior professional women(mentees) to think about career development as a leadership and leadership skills with an experienced manager in the company.

Step 3: The mentoring pair uses the jointly developed format "Future Me", in which participants engage in a

²https://www.csrwire.com/press_releases/718721-empowering-diverse-talent-online-mentoring-case-study-fujitsu-and-volunteerthey

purely digital mentoring experience through video chat. This platform hosts the learning materials allowing Fujitsu to expand the program internationally.

Step 4: Each mentoring session focuses on developing a new and different skill, such as negotiation skills, leadership styles, or teamwork.

Step 5: Click on an eLearning script with each session. For Fujitsu, this means that every mentorship is guaranteed to receive a good standard of support from its mentor (materials, guidelines, 1-1 relationship)

Mentoring programs indeed have advantages, but some can also have failures, especially if they are only informal, mentors and mentees are not ready for meetings, do not find enough time for meetings, do not know what to talk about, there is no responsibility either on either side or the other. Such results must be avoided from the start to create positive mentoring at the individual level, but especially, organizationally by creating well-structured inclusive mentoring programs.

Best practices in online mentoring in Romania³

The management of the program is done by a mentoring committee called Mentoring Angels, from several countries. The mentoring program consists of four steps:

- ✓ Registering in the program by filling in the application forms – Mentee Profile or Mentor Profile – where the mentor and mentee describe their profile and the fit they are looking for. All profiles will pass among applicants for a first orientation in choosing the match.
- ✓ Launch of the program – within a special launch event, where mentors and mentees will gather for the first time.
- ✓ Mentors will complete their choice of a mentor (three options, in order of preference);
- ✓ Mentoring Angels will describe the process and inform participants about basic skills and best practices;
- ✓ Mentoring sessions will take place between mentors and mentees, online or face-to-face, depending on the conditions.
- ✓ The program evaluation event will summarise the results of the program.

The mentoring program involves the commitment of at least 6 sessions over a period of six months, either face-to-face or online. A potential mentorship complements the Mentee profile form, stating your goals, expectations, and little information about the mentee.

The Mentoring Angels team will find compatible pairs of Mentors and Mentees, who will start the activity respecting the proposed steps

ASSIST Academy is one of the programs that relate to education and personal and other development. What mentors and mentees have learned together from their experience and urge you to take over:

1. Actively build your self-esteem!- by looking for feedback about each result and success in everyday tasks.
2. Ask for support if necessary!
3. Never stop learning!
4. You always have a plan for your career!
5. Have your say!

Online mentoring in pre-university education in Romania

Within the project⁴ "[DEDICATED – Teachers for Disadvantaged Students](https://pwnbucharest.net/programs/mentoring.html)", Project POCU/73/6/6/106266 – "Interventions to Combat Early School Leaving" the main objective was to improve the competencies of 120

³<https://pwnbucharest.net/programs/mentoring.html>

⁴ <https://dascalededicati.wixsite.com/website>

teachers and support staff in pre-university education to increase the quality of educational services in 6 disadvantaged school units in Suceava County, through activities oriented to the needs of students and supporting the needs of students and supporting managers of these schools to increase quality in education." The partners in this project were 6 disadvantaged schools from Suceava County. 132 teachers with certain professional skills were selected, with a strong motivation for their improvement. (CV, Cover letter)".

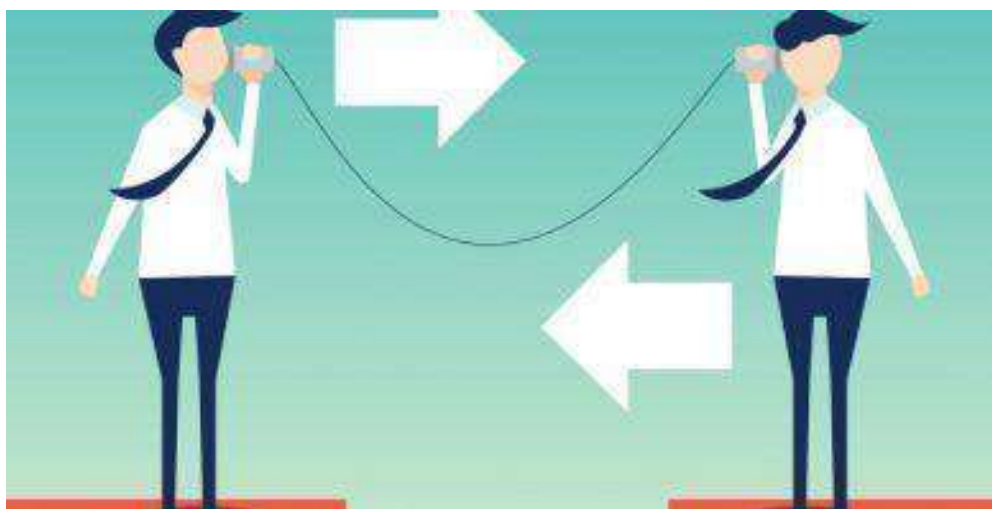
The following were assigned to the target group:

- Monitoring experts with experience as mentors and teachers;
- Functional platform (which also helps to achieve the ICT objective with training for use and technical support);
- A website for publishing articles, experiences, case studies, etc.;
- A chat room for direct and group communication;

The method of continuous motivation of the involvement in the project and of increasing the quality of the educational act consisted of the opportunity of publishing the articles, research, experiences, and relevant thoughts of the people from the Target Group on a public website.⁵

Work has been done on the online platform to train future mentors for beginning teachers in education because it is known that beginners have a better command of disciplinary knowledge (what they have to pass on to students) than procedural knowledge (how to teach, how to work with students).

The site on which it was worked includes the sections: Communications and materials, Participants, Results, About us, and Contact. In the Results, we find **the Mentor's Manual**, Support materials on reducing the risk of school dropout in disadvantaged schools, Articles published by the target group, progress reports after each activity, Newslatere, Examples of good practices for integrating disadvantaged students, Mini projects: **Psychosocial competences, Technology, and creativity**.



In the Mentor's Handbook⁶ it presents what mentoring is, quality standards are established, the mentor's roles and responsibilities, competencies, an action plan, evaluation and self-evaluation, the role of feedback, the rules of successful communication, communication strategies specific to the mentor-mentoring relationship, modern efforts in mentoring activity, prevention of school dropout, bullying. The annexes offer a lot of forms that can be used in the mentoring activity: questionnaires, evaluation and self-evaluation sheets, progress sheets, professional dialogue sheets, progress reports, feedback for my mentor, mentor portfolio, mentoring portfolio, mentoring action plan, mentoring action plan, annexes to prevent abandonment and education for adults.

⁵ <https://dascalidedicati.wikisite.com/website>

⁶ <https://www.dascalidedicati.ro/manualul-mentorului/>

Here is an excerpt from the action plan for the mentoring activity:

Objectives	Actions	Success criteria	Resource
Getting to know each other, establishing the first contacts	1. Meeting MENTOR /MENTORING TEACHER	Pleasant atmosphere, stress-free, encouragement from the MENTOR	Mentor, CAS, director, teachers, materials.
Identifying the needs of the mentoring teacher	1. Application of a questionnaire 2. Johary Window 3. Interview	Sincerity, the atmosphere of trust	Mentor, quizzes
Searching, proposing	Setting training priorities in the team with the TEACHER	Effective communication, responsibility, and seriousness	Mentor, MENTORING TEACHER

In this project, teachers from Iasi were also selected, which greatly supported online education in several schools, advantaged both the mentor teachers and the mentored teachers, to which were added the students from their schools.

The Mentor-Teacher and Mentoring Teacher relationship focused on technical aspects of the professional relationship, and the results of this project managed to improve the quality of online education during the Covid-19 Pandemic.

Online mentoring in LTETc "Gh. Marzescu" Iasi

The first online activities with students, plus mentoring, using it without knowing much about this method, took place starting with the school year 2009-2010, after the participation of 20 teachers in the Intel Tech training course. Some of the activities were carried out in the presence of the students, being trained by the teacher, and another part with the parents.

Here is the application of the Project Method by the maths teacher with him, the teacher having the role of mentor at certain times for the activities carried out on the Internet (blog, wiki, mail, at that time, students and parents did not have internet accounts, no internet or computers).

PROJECT METHOD⁷

Teacher: Ursan Rodica Mariana, Technological High School of Electronics and Telecommunications "Gheorghe Mârzescu", Iasi

The projects provide authentic real-life situations for contextualising learning activities and incorporating higher thinking capacities on important ideas.

Project-based learning is a student-centred training model. Education through the project method is oriented by important questions, which make the connection between performance standards and the thinking capabilities of students in a real-life context.

The implementation plan of this method involves:

- To send and collect forms through which parents consent to the participation of students in the construction of a blog or wiki.
- Ask parents who are trained in using the Internet to follow students' work on blogs and wikis.
- Reservation of the computer lab.

⁷Intel Corporation and the Institute of Computer Technology, "Intel Teach – Training in the Knowledge Society", version 10, 2009.

- Creating users of blogs and wikis and inviting students to these sites.
- Planning and determining how student files will be handled, including checking students' progress.
- Create an online assessment to obtain feedback on the success of studying this unit (for teachers and students).

Observation! The individual or group mentoring activity consisted of guiding students and parents by the mentor teacher to open accounts by mail, build a blog, collaborate with other colleagues on the wiki, fill out a questionnaire or an online assessment, open files, folders, to work in excel, some of the students being mentors, in turn, others mentored, too, and the parents were the first mentors of the teacher.

The teacher's portfolio includes the following directories and files:

1. Assessment (presentation of students' learning needs, evaluation of the product made by the student, other assessments).
2. Unit plan (unit plan, implementation plan, bibliography).
3. Unit assistance (publication about learning through projects, documents to support the learning process-respectively support material, and facilitation material).
4. Student application (presentation of theoretical notions for the unit "Reports and percentages", portfolio evaluation, worksheets, links).

In the Unit " Reports and percentages", in mathematics⁸, the students from the VI-th grade, study the notions of:

- Relation to the applications in the calculation of the probability of an event, the concentration of a substance, and the determination of the scale of a plane.
- Percentage - with applications in problems of finding out the p% of a number, finding out a number when we know the p% of it, and calculating the percentage ratio.

The students will participate in solving individual and group applications, with a progressive degree of difficulty and differentiated according to the learning styles and the level of understanding oriented on:

- identification of problems in which the types of learned reports intervene (probability, concentration of a substance, scale of a plan);
- finding real-life problems solvable with the help of percentages, making representations through circular graphs and bar graphs to express themselves to these issues;
- identification of problem situations that can be transcribed in mathematical language, using algebraic calculus.

The approximate time required to complete this unit is four lessons of 50 minutes each. The students will complete a KWL chart to identify their knowledge needs. The teacher will ask the students to write in the first column what they know about the reports, and the percentages, and in the second column what they want to know about these topics, taking into account that the notion of the report was also studied in the fifth grade.

They will be divided into groups according to their level of understanding, they will work differently on the completion of the worksheets elaborated by the professor and they will complete the lists of progress. They will be evaluated during the evaluation unit based on the observation sheet to monitor their involvement, skills, communication within the group, and compliance with the rules.

To communicate, and exchange opinions to improve certain content, the blog and wiki will be used to view the products. Analysing the portfolios will be done as follows: Presentation - with the grid of criteria for presentation. Students will also complete the table **I know- I want to know – I have learned**, to appreciate the progress made. Each student will fill out a feedback form on the blog for their colleagues' presentations. Based on the presentation, and the evaluation of the activity, a scoring guide was drawn up. Students will be appreciated with a grade.

First-class: To develop the portfolio of the learning unit, the students must have theoretical knowledge regarding the concepts in this unit. A short initial test will be given. The students will be divided into

⁸ "Mate 2000+8/9, sixth grade" – Dan Brânzei, Dan Zaharia, Maria Zaharia - Paralela 45 Publishing House, Part I

homogeneous groups and will complete the KWL chart. The students individually search for information about the notion of the report that they save in a "Resources" directory. For each notion, they will write the definition and formula. The students from each group will be asked to fill in their worksheet number 1, then respectively sheet 2, which will contain exercises with a progressive and differentiated degree of difficulty for each group. Within each group, students can work individually by distributing work tasks. **Each group will post on the wiki the worksheet** to have a look at the sample year, to be able to view the activity of the other groups, and **will fill in a progress checklist on the blog**. This activity begins in class and will be continued at home.

Second hour: Information is collected about the notion of percentage, the calculation formula for finding out the p% of a number, finding out a number when we know the p% of it, and calculating the percentage ratio.⁹ The students will have the tasks according to the worksheet in excel to compose problems inspired by reality, transpose the results into a table, and then draw up graphs in the form of a circle or bar graph.

Third hour: They work with reports and percentages by worksheets number 3 and number 4 respectively. In excel according to the sheet, the number 5, applies a summative evaluation test.

Fourth hour: Presentation of the final products of the groups, the evaluation/self-evaluation of the presented product is carried out, with a self-assessment sheet of the teamwork.

As necessary materials and resources were used: computer, internet connection, printer, database, spreadsheet, document processing, wiki site of [the Learning Unit http://matemari.wikis.ro](http://matemari.wikis.ro), the blog site of the Learning Unit: <http://matemari.21classes.com>, printed materials (manual, collections, calendar planning, worksheets).

The students participated with great interest in carrying out the tasks due to the technology used and the development of skills for the real world, such as the ability to: have initiative, communicate effectively and online, make good decisions, and autonomy.

The use of the latest technology is a means accepted with ease and interest by students, and that is why I believe that it is very important for combating early school leaving. Using computer applications and computers will attract students to classes, and absences should be fewer.

Bibliography:

An interesting project that benefited several schools in Romania, implicitly also in Iasi, including LTETC "Gh. Marzescu", was the **ROSE** project, a project that had a network of mentors.¹⁰

There were around 50 mentors in the ROSE project. Their role was to support, from a pedagogical and educational perspective, the high schools benefiting from grants and to contribute to the achievement of their objectives, such as reducing the school dropout rate in high schools, increasing the graduation rate, and improving the performance of the baccalaureate exam.

Mentors facilitate the transfer of good practices and support the pedagogical team in designing, implementing, and monitoring interventions. They use coaching and training techniques to ensure coherence and consistency in achieving project objectives. Mentors provide support through coordination meetings, classroom observation, and guidance sessions. They help identify learning difficulties and individual student needs, adapting the curriculum and assessment tools accordingly. Mentors are professionals included in the selected schools for the project.

⁹ "Mathematics textbook for the sixth grade" – George Turcitu, Ionică Rizea, Ion Chiriac, Constantin Basarab, Maria Duncea, Petre Ciunge – Radical Publishing House.

¹⁰ <http://www.ctetc.ro/index.php/proiect-rose/20-proiecte/proiect-rose/59-activitati-din-cadrul-proiectului-rose>

The project was initiated in response to the pandemic and spanned over five years. It focused on mentoring activities that yielded positive results at each high school. During the 2020-2021 academic year, the activities were conducted online for students. Each high school teacher had a mentor, and the mentoring activity primarily took place online using various applications and platforms.

The directions in which the mentoring activity produces effects:

1. The development of professional collaboration, over 370 high schools have set up support groups at the school or inter-school level, as a result of the mentors' initiative, establishing their action plan;
2. Awareness of the importance and increasing teachers' interest in documentation, information, professional development, and participation in the mentoring process;
3. By changing the mindset of teachers about their limits, they begin to recognize what they do not know and should know. Also, in terms of access to learning, the mentality is changing, no longer being associated with learning only in the classroom and school;
4. Increasing the participation of students in online pedagogical activities, as a result of the identification by high schools and teachers of alternative solutions for equipping students with the necessary resources to participate in online learning;
5. Awareness of the importance and use of reflection, analysis of teachers' activity, presentation of the action plan, as a result of identification: methods and techniques of reflection, self-evaluation, evaluation, techniques, methods, and tools to achieve the objectives/targets set by the mentoring.

Mentored students could contact their high school mentor at any time.

The ROSE platform¹¹ is still a real support in the teaching activity in our school.

The Erasmus + project "Digital Ambassadors of Cultural Heritage" offered teachers and pupils from our school and partner schools very beautiful surprises and satisfaction. The activities took place between 2020-2022, the students aged 14-19 years, our partners were from Turkey, Portugal, Latvia, and Lithuania.

In the first school year, 2020-2021, as the situation with the Covid 19 Pandemic was getting worse, we decided to continue the activities on the European platform eTwinning. Before starting the twinning activities, 8 teachers from our school participated as mentors in an online workshop "Digital Maps", then, in turn, they became mentors for the pupils participating in the activities which were supposed to start on the European platform, to make the digital map.

In addition to the Erasmus+ partner schools, we had three more partners from Bursa, Turkey, to make our project visible in the region. The activities were planned between February and June. Even though a large number of project members have registered, 25 teachers, and 108 students on eTwinning, we have formed mixed international teams and we have created a digital map of the material and cultural heritage of the partner countries in collaboration, each with a mentor teacher team to guide the pupils for the development of the materials, each group having a different subject in a partner country.

The mixed teams also created a common electronic story called "The Adventure of a Traveller." Each international team took turns writing a story of a traveller who begins in his partner country Portugal and ends in Göbeklitepe-Turkey by searching for a password. The traveller receives the proposition: "TRY TO FIND AND PROTECT THE REAL TREASURE". TO UNVEIL THE TREASURE IS "PRESERVING THE WORLD'S CULTURAL AND NATURAL HERITAGE"

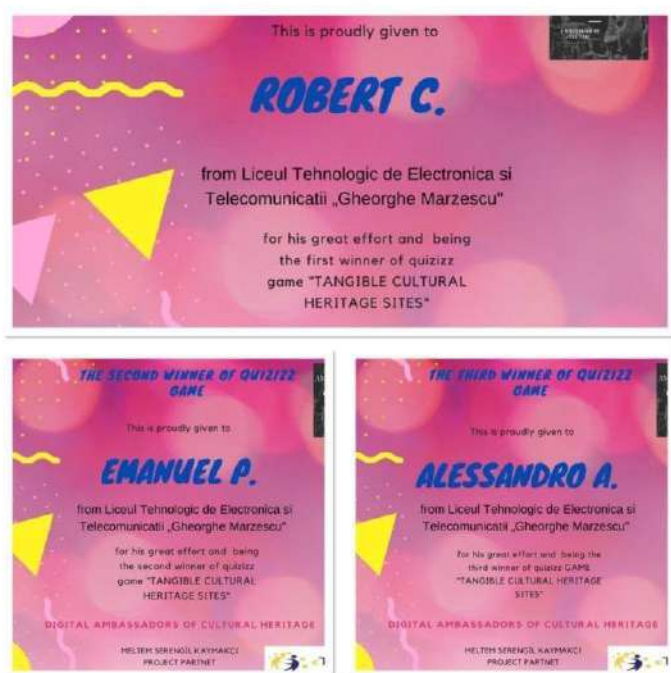
They also created an electronic magazine, which includes elements of the intangible cultural heritage of the Partner Countries that were proposed by the partner schools from the UNESCO list.

Permanently, there has been very good cooperation between each mentor teacher and the students in his mixed team, trying to overcome the language barriers and digital skills to achieve the product proposed for the online period on the platform. Until the products were made and presented on the platform,

¹¹<https://www.rose-edu.ro/reteaua-de-mentor/>

communication was made on WhatsApp and by mail, being planned. In our school, we had 8 mentor teachers. They taught both teachers and students to work on different applications and programs, preparing different materials¹².

To increase self-esteem, one representative from each team presented the material made by his team to the other participants at the meeting on the platform, also at the end of each meeting, there were organised Kahoot competitions on topics of European cultural heritage each time from another partner country. For each competition, the students from each group proposed questions and answers, and finally, these were selected by the mentors. Our students were very pleased with the mentor teachers from our high school, who prepared them for these competitions, the test being individual because they took all the prizes at each contest.



Also, 2 teachers from the school received the European Quality Certificate <http://www.ctetc.ro/images/proiecte/digital-ambassadors/European-Quality-Label.pdf>

The products that the students guided by the mentors have created can be visited from the links below:

<https://twinspace.etwinning.net/114220/home>

<https://d-ambassadors.com/diary-romania/>,

The Story of a Common Product:

https://docs.google.com/presentation/d/1eLWLwrcE8p806tnNL17qkTptCHDEG4DK_mlaWLSmESM/edit?usp=sharing, <https://d-ambassadors.com/e-twinning/>

Project's Collaborative Works-outputs

<https://sway.office.com/tCfC0fTnbLCWXXib?ref=Link&loc=play>

Project's evaluation

<https://sway.office.com/L0txi44HYvAcVwHw?ref=Link&loc=play>

¹²<http://www.ctetc.ro/index.php/proiecte-erasmus/digital-ambassadors-of-cultural-heritage/2-uncategorised/109-activitate-online-platforma-etwinning>

Our project diary started to be written by our school until LTT 1 in Romania, October 2021:

<https://d-ambassadors.com/diary>

In the second year, we started the mobilities, considering the participation of the students and mentors that the same mentor teachers guided in creating other products for each mobility, but the mentoring was carried out in a hybrid system.

Digital Tool for students to learn or get help from mentors interactively¹³

Another example of good practice in the field of online mentoring is the one developed by the Technological High School of Electronics and Telecommunications "Gh. Mârzescu" within the Erasmus+ DIGITAL TOOL FOR MENTORSHIP AGAINST DROPOUT project.

DIGI-TOOL MENTORS is a project to tackle dropout among students between 14-19 years at High Schools in partner countries using technological and educational changes throughout the world.

As part of this project, a digital tool was created through which students increase the feeling of belonging to the school which will prevent dropouts and truancy, can express themselves, improve their skills, get help on some topics, and make their career.

Student coaching or mentoring systems are generally applied in schools to increase the academic success levels of students. In this system, a risky group of students was selected and the content was created according to their needs. This digital mentoring program, which is only valid for students in partner schools during the project, is open to other students for a period of one year after the end of the project. In this way, students have the opportunity to do peer mentoring on the same platform with their peers who have experienced the same problems.

A mentor on the DIGI-TOOL MENTORS platform is a person who guides students during their education life and helps them solve problems and reach their goals. It is clear that if the student gets help from someone who is an expert in specific fields, he will make fewer mistakes comparing those who don't get any help. The system offers key methods for academic success, fulfilling educational goals, in solving problems, and tries to achieve this as soon as possible. The followings are aimed with this system;

- Continuous communication with an educator at school.
- To evaluate their development periodically with the mentors and to know that they are monitored by the mentors.
- To be more active in academic and social fields.
- Developing personal planning and evaluation skills.
- Identifying development needs.
- Improving attention.
- Learning to organise work habits in a way that best suits their characteristics and needs.
- Increasing motivation.
- Taking responsibility for their success.
- Increasing academic success.
- Increasing communication and coordination between the school and parents.

The mentors of the DIGI-TOOL MENTORS platform:

- Keep track of the student's progress, they review the student's situation at school once a month and ensure that they are evaluated by the student.
- Evaluate to what extent the objectives are achieved and what is needed to achieve all.
- Support the student to determine new goals when necessary.
- Listen to the student's problems with family and friendship and direct them to the appropriate unit.

¹³<https://www.digitoolmentors.com/en>

With the digital mentoring program, it will be possible for risky students in schools to solve their problems when they cannot speak face-to-face with their mentors and to rehabilitate the risky students through videos, and articles related to the content be determined by the results of the needs analysis applied to them. In this way, discipline problems in schools are expected to be reduced by at least 10% and absenteeism problems by 20%.

The DIGI-TOOL MENTORS platform can be accessed at this link: <https://www.digitoolmentors.com/en>.

Development and assessment of skills for VET educators

Problem-Based Learning as an effective approach to VET educators develop VET learners' skills

There is wide consensus in literature that educational approaches based on real-life problems are powerful settings to address sustainability education (Bessant et al., 2013; Cörvers et al., 2016). Cörvers et al. (2016) articulated that inquiry approaches, such as *problem-based learning* (PBL), project-based learning and its hybrid forms can foster educational innovation in student-centred learning for sustainable development.

Commonalities between PBL and project-based learning, such as group work and simulations of professional situations, are valuable for education on sustainability (Brundiers & Wiek, 2013). PBL has been found to enhance students' understanding of sustainability and their interest in related topics (Günter et al., 2017). However, it is important to extend PBL beyond isolated problems and address global issues for greater sustainability (Noordegraaf-Eelens et al., 2019).

PBL helps students acquire and apply knowledge, develop cognitive flexibility, and tackle real-world problems (Youngerman & Culver, 2019). However, embedding sustainability literacy through PBL presents challenges, including teacher and student training (Bessant et al., 2013). Proper preparation and collaboration are crucial for effective PBL implementation (Wyness & Dalton, 2018). VET trainers must consider these constraints when using PBL to develop sustainability competences in learners. PBL fits within the domain of inquiry-based learning and can be structured using the inquiry phases of Orientation, Conceptualization, Investigation, Conclusion, and Discussion (Pedaste et al., 2015).

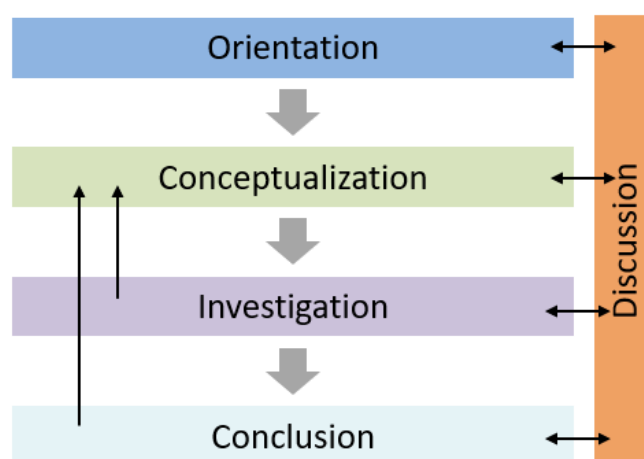


Figure 7. Five general inquiry phases (Adapted from Pedaste et al., 2015).

In the next section, the five inquiry phases proposed by Pedaste et al. (2015) are going to be crossed with the sustainability education of VET learners, in the framework of the CE-E VET project.

The goal of the *orientation* phase is to stimulate the VET learners' curiosity about a topic and address a learning challenge through a problem statement. In the CE-E VET context the problem should address

sustainability. This phase is closely related with the GreenComp area of embracing complexity in sustainability, because it promotes the development of the problem framing competence, since its goal is to formulate current or potential challenges as a sustainability problem.

In the next phase – *conceptualization* - the VET learners should generate a research question based on the stated problem. Sometimes, the research question could lead to the process of generating hypotheses (Figure 8). This phase is closely related with the GreenComp area of embracing complexity in sustainability, because it promotes the development of the systems thinking competence, by approaching a sustainability problem from all sides.

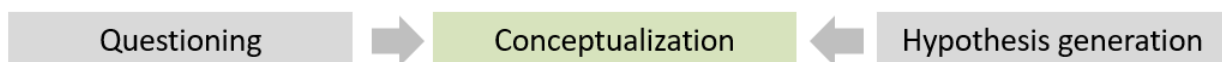


Figure 8. Inquiry activities of the conceptualization phase (Adapted from Pedaste et al., 2015).

The *investigation* phase consists in the process of planning exploration or experimentation of the sustainability problem. These inquiry activities are followed by data collection and analyses, based on the research design or exploration (Figure 7). The difference between exploration and experimentation is that exploration is the process of systematic and planned data generation based on a research question, and experimentation consists in the process of designing and conducting an experiment to test a hypothesis. Both processes are based on observation to collect data. VET learners should carefully analyse data, and, through data interpretation, they should produce meaning of the data collected and synthesise it into new knowledge. VET learners, when conducting the investigation phase, are developing their critical thinking competence of the GreenComp because they are assessing information and arguments, and identifying assumptions, for example (Figure 9).

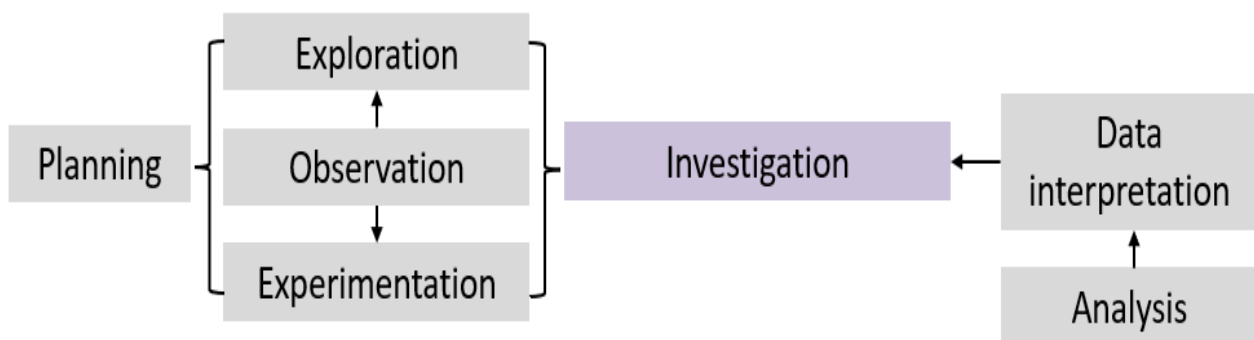


Figure 9. Inquiry activities of the investigation phase (Adapted from Pedaste et al., 2015).

In the *conclusion* phase, VET learners should look for relationships and draw conclusions from the data. They also should compare the inferences made based on data with the previous hypothesis to answer the research question. The mobilisation of critical thinking competence is essential at this phase because VET learners should reflect on how personal, social, and cultural backgrounds influence thinking and conclusions.

During PBL, *discussion* crosses all the other phases. In discussion, the VET learners should present findings of a particular phase or the whole inquiry cycle, communicating with others. At this phase, VET learners should also reflect about one specific phase or the whole process (Figure 10).



Figure 10. Inquiry activities of the discussion phase (Adapted from Pedaste et al., 2015).

Ideally, the process should promote the GreenComp area of acting for sustainability by leading VET learners to opportunities of development of their individual initiative or collective action concerning sustainability problems.

An example of a PBL activity and students' assessment

This section presents an example of a PBL activity focused on developing students' sustainability competences, as an example of how a VET educator could promote skills development on its VET learners. The activity was carried out by one of the partners of the CE-E VET project.

Initially, the professors of the curricular unit contextualised the activity to the students, stating that its main aim was for them to select and research about a sustainability problem. In a second moment, the teachers presented to the students the five phases of the inquiry cycle proposed by Pedaste et al. (2015): orientation, conceptualization, investigation, conclusion, and discussion. The teachers' role in each of the previous phases and how some groups have done their work is going to be presented. The products made by the students in each of the previous phases are presented in Table 3.

Table 3. Products of the environmental education students in each PBL phase.

PBL phase	Groups of environmental education students			
	G1	G2	G3	G4
Orientation	Contextualization of the theme of renewable energies.	Contextualization of food waste.	Contextualization of invasive species.	Contextualization of human impact on terrestrial ecosystems.
Conceptualization	What is the role of renewable energy in the future?	How can we reduce food waste?	What can we do to combat invasive species?	How to reduce human impact on terrestrial ecosystems?
Investigation	Development of a future sustainable city model; Interviews to stakeholders.	Interviews to stakeholders; Production of a set of videos on measures to avoid food waste.	Interviews with higher education teachers specialised in the problem.	Online search; Interviews with biologist and environmental technician.
Conclusion	Alternative characteristics of future sustainable cities and use of renewable energy.	Specific examples of reducing food waste. Social activism in food waste.	Specific measures to combat invasive species.	Specific measures to reduce human impact on terrestrial ecosystems.
Discussion	Reflection on future sustainable cities and use of renewable energy.	Production and discussion of a personal video on strategies to reduce food waste.	Reflection on individual and collective actions to prevent and combat invasive species.	Discussion of a video about an outdoor visit to a natural park.

The products created by the environmental education students were aggregated into an online page created by each group. The sections of the online page created are according to the phases of orientation, conceptualization, investigation, conclusion, and discussion. The sections "references" and "credits" were also added (Figure 9).

Espécies Invasoras no Rio Tejo



Figure 11. Structure of the online page about invasive species (Group 3).

Orientation

As one of the most relevant characteristics of the PBL approach is the activity to organise itself around a real problem that must be solved (Navy et al., 2021), the students were instructed to identify a relevant environmental problem in working groups. Thus, in the orientation phase, after having researched in different resources on the problem they identified, clarified the main concepts (Figure 2) and framed it in an SDG.



Figure 12. Contextualization of the problem about invasive species (Group 3).

The GreenComp' competence of critical thinking was definitively mobilised at this moment because the students assess information and arguments about invasive species, identified assumptions of their impact on the ecosystem in which they are native, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions, namely by exploring the role of pets who are invasive species and are abandoned in nature.

Conceptualization

After the orientation phase, the environmental education students clearly defined their research question and

discussed it with their teachers. The students were informed that a good research question must respect the principles of viability, clarity, meaning and ethics (Fraenkel et al., 2012), whose characteristics were discussed between the teachers and the students.

At this moment, the Green Comp competence of problem framing was mobilised, because the environmental education students formulated a sustainability question, stating it in a way that suitable approaches to anticipate, reduce and prevent problems could be found through the investigation phase.

One question that one group of students raised is related to SDG7 – Renewable Energy – and explores the theme of sustainable cities and clean energy. Another question is about food waste and it is related to SDG2 – Eradicating hunger. Two research questions fall under SDG15 – Protecting terrestrial life – and are related to the problematic of invasive species (Figure 10) and the impact of humans on ecosystems (Figure 11). It should be noted that the students did not know at first the answer to the problem before the investigation was carried out, as suggested by Navy et al. (2021).



Figure 13. Conceptualization of the problem on the impact of the human being on ecosystems: How to reduce human impact on terrestrial ecosystems?

Investigation

At this moment, the teachers explained to the environmental education students that, at first, they should present in detail the methodology to be used to address the research question, i.e. they should present what they are going to do to address the research question, namely what type of data collection tools are going to be used (interviews, questionnaires, experimental activities, etc.) and how they are going to analyse data (Figure 12).



Figure 14. Data collection instruments (Online inquiry and interviews to stakeholders) used by the group who addressed the impact of humans on ecosystems.

After applying the data collection instruments, the students presented the results through graphs, diagrams, tables, text, or other means, such as videos, according to the most appropriate way to present their data (Figure



Figure 15. Videos created by the group who addressed the theme of food waste.

At this moment, the GreenComp competence of systems thinking was clearly mobilized because the environmental education students add to approach a sustainability problem from all sides in order to understand how the elements of the sustainability problem interact within and between systems.

Conclusion

Subsequently, at the conclusion phase, the students analyzed the data and presented the results, trying to clearly explain what the data show, and present the answer to the research question (Figure 14).



Figure 16. Conclusion of the group who addressed the theme of food waste.

At this moment, the GreenComp competence of systems thinking was mobilised again because the environmental education students add to create an answer to the research question considering the

interactions between the data collected.

Discussion

In this moment, the GreenComp competencies of individual initiative and collective action were mobilized because students were asked to present ideas for individual and collective action in a perspective of social activism (Figure 15).



Figure 17. Proposal of collective action by the students which addressed the theme of the impact of the human being on ecosystems.

An online moment of the discussion of each work was also performed by the teachers through the Zoom[®] platform. Each group presented the content of their work in 15 minutes, using as support the online page created, whose content was discussed with their peers and teachers. This moment of feedback returned insights to the students for improvement. These suggestions have been appropriated by them through the necessary changes to the content of the online pages.

One way of assessing sustainability competencies is to use rubrics such as the one presented in the professional competencies in education for sustainability from the perspective of the complexity (CESC) framework created by Garcia et al. (2017). The CESC framework' rubric is organised in six categories of complexity (connections, dialogue, creativity, innovation, critical thinking and uncertainty), four domains of competency (learning to know, learning to live together, learning to be and learning to do) and 24 professional competencies in education for sustainability from the perspective of complexity to be assessed. The rubric has four performance levels for each competency: novice, beginner, advanced and expert (Garcia et al., 2017). Using this rubric proved to be very valuable to assess sustainability competencies under problem-based learning approaches (Cavadas & Linhares, 2022).

ICT TOOLS AND NON-FORMAL TECHNIQUES APPLICABLE IN VET EDUCATION

The aim of this session is to introduce the ICT tools and non-formal education methods that can be used to boost the learning environment while letting the participants gain the necessary skills for the labour market.

Technology has a vital part in people's lives. Nowadays, the labour market looks for candidates who can use ICT tools efficiently. While technology is conquering the world, we still need skills to be improved like communication, cooperation, teamwork, entrepreneurship, etc. which are the basics of human life. Non-formal education methods give us the enormous opportunity to improve such skills. To adapt to the changing world and lead a successful life and career, it is a must to create a learning environment that serves the needs of the learners and the labour market. With this presentation, we aim to introduce you to some ICT and non-formal education tools that can help you create such an environment.

The ICT Tools which can be used in face to face and online teaching & non-formal education techniques that can be adapted to formal teaching.

As ICT Tools we will present:

- Canva as a design tool.
- Zoom as an online meeting and webinar tool.
- Kahoot! as an interactive presentation tool.
- Google Classroom as a teamwork and communication tool.
- Google Jamboard as an online board.
- Augmented Reality.
- Virtual Reality.

As Non-Formal Education Techniques we will present some ice breakers, energizers and warm-up activities. Also, we will suggest some websites and e-books and how to use and adapt them to reach the objectives of this project.

The main objectives of these subjects are creating the beneficial environment to equip the learners with the necessary skills, tools and experiences to prepare them for the current labor market, enhance their job opportunities as well as enable them to be the right candidate for the employers and companies.

To reach these objectives we will form a network using different tools and methods which will include the learners, the educators, the labour market representatives and the youth workers.

With the presentation of the ICT tools, you will be able to strengthen your learning environment both face-to-face and online, which will serve the technological needs and keep you updated with 21st-century skills.

Non-formal education techniques will help you to find and adapt the activities to your formal setting, enabling the learners to develop their soft skills.

Non – Formal Education Method to Create the Necessary Learning Environment (The theoretical notion for educators)

Non-formal education refers to planned, structured programmes and processes of personal and social education for young people designed to improve a range of skills and competences, outside the formal educational curriculum. Non-formal education is what happens in places such as youth organisations, sports clubs and drama and community groups where young people meet, for example, to undertake projects together, play games, discuss, go camping, or make music and drama. Non-formal education achievements are usually difficult to certify, even if their social recognition is increasing. Non-formal education should

also be:

- Voluntary.
- Accessible to everyone (ideally).
- An organised process with educational objectives.
- Participatory.
- Learner-centred.
- About learning life skills and preparing for active citizenship.
- Based on involving both individual and group learning with a collective approach.
- Holistic and process-oriented.
- Based on experience and action.
- Organised on the basis of the needs of the participants.

How can we adapt it to our formal teaching environment?

In today's globalised world, where knowledge explosion is taking place continuously, linear expansion of non-formal education is both desirable and inevitable.

When formal education is not able to catch up with the current needs of the changing world, we can always search for some tools and activities to complement our formal education with NFE. As NFE is flexible, you can adapt the activities according to your objectives, the needs of your learners, age, gender, preferences, etc. It is useful to create a friendly atmosphere when you use the appropriate icebreakers, warm ups or energizers.

As there are no marks or grades for evaluation in NFE, the learners do not feel pressured. It is learner centred, so it gives freedom of movement and speech to the learners.

Before you decide what kind of activities, workshops, projects or events you would like to implement with your group, it is essential to know more about their world views, what they know and feel about things, what they would like to learn, what are their communication styles, notions of equality, notions of acceptable risk, and self fulfilment, are they familiar with non-formal education methods and what their level of the host language is.

If you understand the cultural backgrounds and expectations of participants, you will be able to deliver more effective workshops. Show respect for their experiences and address their concerns, hopes and wishes. Observe behaviours and react to these by asking questions during activities. Keep in mind that you will be working with young people coming from very different places, experiences and expectations.

Make sure that every activity (including energizers) includes a debriefing and evaluation session. This is essential for those participants, who have little or no experience with non-formal education methods. Be patient, it will take time for them to get used

to this kind of learning. Focus on getting to know each other and team-building activities before you start with educational workshops on different topics. Work with smaller groups, allowing you to be able to give attention to every participant. Choose fun activities with simple instructions. Complicated instructions, complex vocabulary and too much talking might scare away your target group. Keep it simple!

Include members of your group already in the planning phase of all your activities in order to make sure you meet their needs. Do not develop activities (projects, events, workshops) for the target group, but WITH the target group.

How can teachers activate those skills?

- Identify digital educational resources that can be used to engage and develop the skills with the youngsters.
- Identify flexible learning approaches that can be used to activate those skills and challenge students.
- Present some professional contexts in which the young people can activate and apply those skills.
- Identify some formative evaluation methods that can be used to give feedback to the youngsters about their skills' achievement.

- Present at least one best practice of how teachers can promote the previous skills of young people.

Soft Skills Self - Assessment Online Tool

This tool is taken from a best practice called VET GPS <https://www.vetgps.eu/resources.php>

ICT tools and non-formal techniques applicable in VET education

Here are some tools and applications which can be used in order to prepare microlessons, lesson plans, as well as attractive games for students.

www.kialo-edu.com

Kialo is a public discussion platform which encourages critical thinking through on-line planned debates. Teachers can choose topics of discussion, varying in complexity, while students are provided with the necessary space to ask questions, discuss, and assess the proposed ideas.

Kialo-edu's mission is to 'make the world a more thoughtful place', offering easy to use navigation tools, thus helping students master critical thinking and reasoning skills.

Micro Lesson topic: Is Human activity responsible for climate change?¹⁴

Stages: The teacher creates a complex topic of discussion (a thesis) on the kialo-edu.com platform, providing students with some brief information; this is a pros/cons debate:

We can all agree that during the past couple of centuries the climate on our planet has changed dramatically. This transformation seems to be linked to the Greenhouse Effect. Overpopulation and intensive human activity, since the beginning of the Industrial Revolution, has led to the release of harmful gas (CO₂) in the atmosphere. Is this a coincidence, are we too arrogant to believe that we have the power to influence natural phenomena, or are we directly responsible for what is going on?

- ✓ The teacher modifies the settings of the conversation so that students are able to add their thoughts, opinions, ideas, facts and scientific findings underneath the main topic, organising the debate on two columns: arguments for and against the proposed topics
- ✓ Students have time to do their own research until the topic is discussed in the classroom; they can access the discussion and add their findings, as well as submit answers to ideas and opinions written by their own classmates
- ✓ During the class, the teacher can display the thesis on the board, together with all the expressed opinions, and organise the debate as they consider suitable.

¹⁴Is Human Activity Responsible for Climate Change? 13 Pros and Cons (procon.org)

Here are the steps I followed in order to create this debate using kialo-edu.com:

Discussion details

Name  [Browse Topics](#)

Is Human Activity Responsible for Climate Change?

71

Thesis 

We can all agree that during the past couple of centuries the climate on our planet has changed dramatically. This transformation seems to be linked to the Greenhouse Effect. Overpopulation and intensive human activity, since the beginning of the Industrial Revolution, has led to the release of harmful gas (CO₂) in the atmosphere. Is this a coincidence, are we too arrogant to believe that we have the power to influence natural phenomena, or are we directly responsible for what is going on?

6

Language

English

Participation type

☒ Standard Participation

Account names will be used in the discussion.

☐ Anonymous Participation

Users will be assigned anonymous names in the discussion. Only admins can see the de-anonymized names.

You cannot change back to Standard Participation later.



[Skip rest and create](#)

Additional details

Image (Optional)

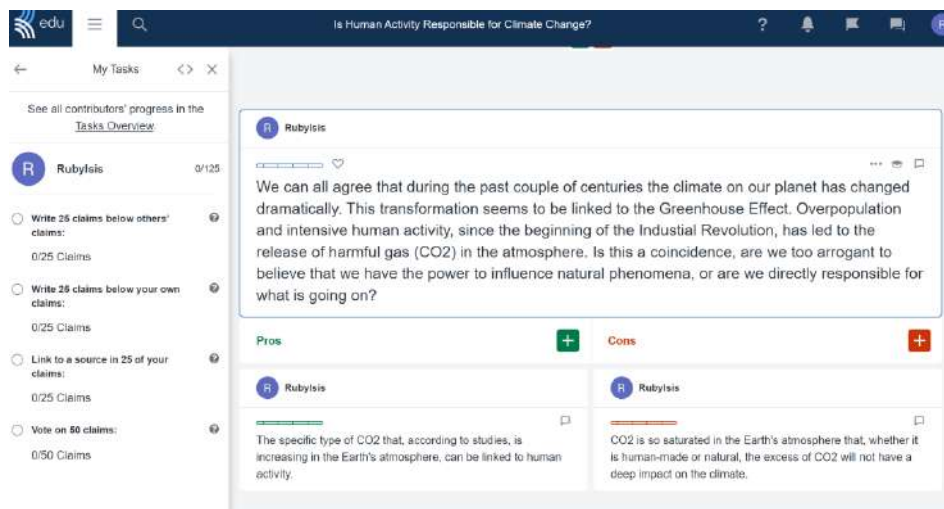


Background Info (Optional) 

Key points: scientific consensus, peer-reviewed studies, the concept of greenhouse effect, connection to human activity, natural changes in the sun's activity, concepts: deforestation, fumes, draught, ocean acidity levels, dead zones (feel free to add to the list)

[Skip rest and create](#)

15



[Online Puzzlemaker](#) | [Create Your Own Puzzle](#) | [Discovery Education Puzzlemaker](#)

This is a puzzle-generating tool suitable for teachers, parents, and students.

Through the diversity of word games it offers (word search puzzle, criss-cross puzzle, double puzzles, fallen phrase, maze, build letter, build cryptogram, and so on), it guarantees that whenever one has 10 minutes to spare, one can hand out the printed puzzle game to the students and remind them of key concepts they have

¹⁵Global Warming vs. Climate Change | Facts – Climate Change: Vital Signs of the Planet (nasa.gov)

studied or refresh definitions and information through creative and fun activities.

All the teacher has to do is to input the key words and their definitions, and choose the type of game they want to play during the classroom.

Micro Lesson topic: Environmental education – concepts related to steps taken in order to diminish pollution and create a sustainable system

Stages: The teacher chooses the key concepts they want to include in the game and provides short definitions, as follows:

Biodegradable – capable of decomposing

Energy-efficient – use only as much energy as necessary

Compost – decayed organic material, fertiliser

Car-pooling – sharing vehicle

Redistribute – sharing something in a fairer way

Landfill – disposal of material by burying it

Renewable – a natural resource which is not depleted when used

Biomimicry – design and production of materials modelled on biological entities

Reprocessing – process again or differently, in order to reuse it

Design – decide upon the look or functioning of a product, making it eco-friendly

- The generated puzzles are printed in as many copies as necessary
- At the end of the class, in order to refresh the presented concepts, or at the beginning of the next lesson, the teacher hands out the puzzles and the activity can be organised in various ways: individual work / work in pairs or small teams to come up with the solutions / contest between teams – who will finish the puzzle first?
- The answers are checked in front of the classroom, under the teacher's supervision.

Here are some examples of puzzles for this particular lesson:



PuzzleMaker
CREATE YOUR OWN PUZZLES

Puzzlemaker is a puzzle generation tool for teachers, students and parents. Create and print customized word search, criss-cross, math puzzles, and more using your own word lists.

Circular Economy

Show Answer
Print Puzzle
Copy Puzzle
Copy Answer
Rebuild Puzzle

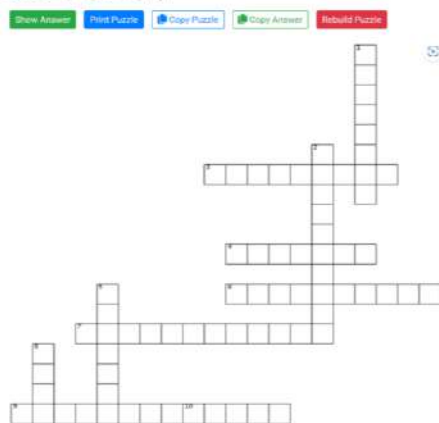
E	F	Q	H	P	O	A	T	T	S	Q	J	N	H	R	G	F	L		
W	L	K	I	E	A	E	Z	N	Z	J	R	Q	C	V	G	E	T	A	
F	A	B	L	B	Y	J	W	E	V	L	Z	A	H	F	Q	M	I	O	N
I	I	I	A	B	U	S	J	I	R	Q	F	L	C	E	W	D	Q	V	D
Z	N	E	V	D	T	Y	R	C	I	M	I	M	O	I	B	A	M	W	F
K	T	V	Q	Z	A	F	R	I	O	E	Q	R	U	E	F	N	H	O	I
D	N	I	Q	O	R	R	D	F	V	W	K	W	E	P	T	G	V	A	L
R	J	Z	G	Z	N	G	G	F	S	F	O	D	Q	S	V	V	O	C	L
R	T	U	T	H	G	O	H	E	B	K	L	T	O	S	R	Z	I	A	A
X	E	W	L	Q	I	G	S	Y	D	W	M	P	K	E	F	Q	E	S	V
P	K	D	S	H	S	S	E	G	L	O	M	Q	N	W	G	U	K	G	E
Q	G	B	I	R	E	Y	S	R	G	O	I	E	B	F	Q	C	C	S	Y
O	E	B	Y	S	D	I	L	E	C	Q	W	B	H	X	V	F	C	U	X
X	Q	C	Q	H	T	T	O	N	C	A	R	P	O	O	L	I	N	G	R
U	Z	V	Z	K	R	A	M	L	B	O	J	D	B	W	A	Y	U	U	P
C	P	L	H	T	R	I	L	O	R	S	V	O	F	P	A	T	N		
M	K	O	X	C	Q	E	E	R	M	T	L	P	E	I	P	I	F	E	R
W	X	S	T	H	A	I	Q	O	U	S	Z	K	E	Z	T	L	I	R	I
S	J	H	C	H	E	Y	O	V	P	T	Q	A	W	R	K	V	V	I	E
M	K	A	G	J	W	L	I	E	L	C	E	O	H	G	W	Z	W	Q	S

biodegradable
compost
landfill
reprocessing

biomimicry
design
redistribute

carpooling
energyefficient
renewable

Circular Economy



ACROSS

3. a natural resource which is not depleted by use
4. decayed organic material, fertiliser
6. design and production of materials modelled on biological entities
7. process again or differently in order to reuse the product
9. capable of decomposing

DOWN

1. disposal of material by buying it
2. sharing vehicle
5. use only as much energy as necessary
8. sharing something in a fairer way
10. decide upon the look or functioning of a product

Use the clues to fill in the words above.

Words can go across or down.
Letters are shared when the words intersect.

10 of 10 words placed.

www.quizlet.com

Quizlet is a great generator of virtual flashcards and study sets. The material can be organised and accessed either as a teaching (flashcards) or as an assessment tool (tests for students by choosing the level of difficulty, depending on the stage of the learning process).

Micro Lesson topic: Biomimicry¹⁶¹⁷¹⁸

Stages: The teacher creates virtual flashcards on the topic of biomimicry, including interesting information that could spark the attention of students, for example:

What is the goal of biomimicry?

To create products, processes or systems so as to live in a sustainable way and in solidarity with life on Earth

What are the main types of biomimicry?

Copying form and shape / copying a process (such as photosynthesis) / mimicking at an ecosystem level

What is an example of biomimicry?

Burr / Velcro – George de Mestral was hunting in the Swiss Alps when he noticed that burr stuck onto his clothes and his dog's fur

What is one of the oldest examples of biomimicry?

Silk – dated back to 6000 BC; the Chinese civilisation learnt the technique of manufacturing it from the silk worms

What are the benefits of copying sharkskin?

The texture of the sharkskin makes it resistant to bacteria – by copying it we can manufacture fabric that repels bacteria for hospitals and medical use.

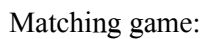
- After presenting the educational material on biomimicry along with some interesting facts and examples, the teacher displays the question flashcards on the screen, eliciting answers from students
- The teacher clicks on the flashcards, flipping them and revealing the correct answer

Here are the virtual flashcards that I have created:

¹⁶The Biomimicry Institute — Nature-Inspired Innovation

178 Amazing Examples of Biomimicry (treehugger.com)

¹⁸Biomimicry: A History | eHISTORY (osu.edu)



It is a platform for creating WebQuests, quizzes, pre-tests, tests, tables, rubrics, photo galleries, games, or Google maps galleries.

Teachers can organise their material and plan their activities in sections (introduction, tasks, process, evaluation, conclusion), as well as add fun activities such as games (hangman game) or a quiz.

Also, a variety of already made materials can be accessed and consulted.

Lesson: Stages of circular economy

Stages:

- The teacher fills in the sections of the WebQuests, establishing general aims, tasks, and the steps of the activity in the classroom.



20What is the Circular Economy? | Definition | Zero Waste Scotland



The students will be organised in 7 teams. Each team will be assigned a concept related to circular economy: design, manufacture, retail, consumer, reuse, repair, recycle.

Each team will have to fill in a worksheet about the assigned concept, for example:

DESIGN:

- Definition:
- Give a practical example of designing a product
- How can the concept of design be adapted in order to fit a greener economy
- Design a product which is eco-friendly (draw your invention)

When all teams are ready, they will come in front of the classroom, present their findings and their personal input, and organise themselves in a logical chain which creates the complete process of Circular Economy.

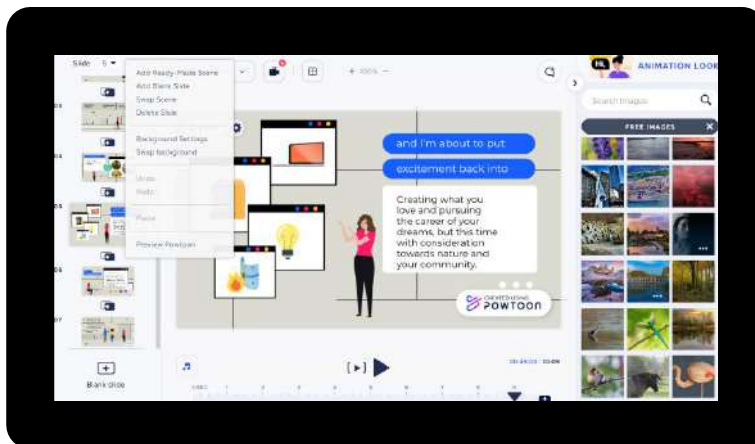
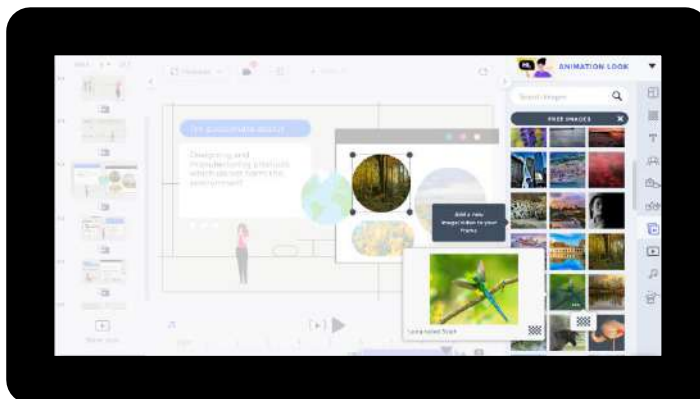
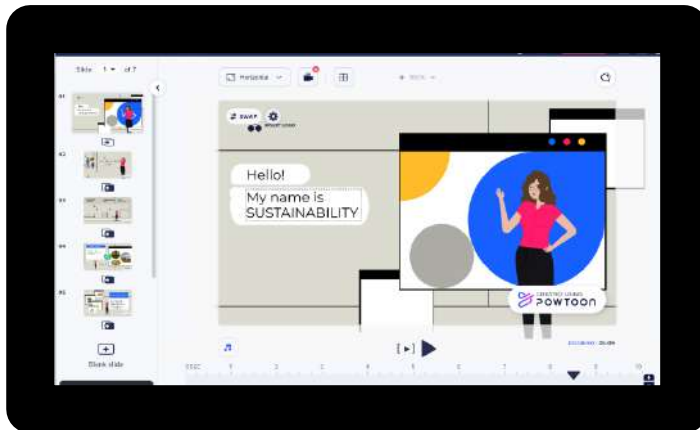
If there is free time at the end, the teacher can organise a fun game which can be created in the MODULES section, such as HANGMAN:



www.powtoon.com

It is a very useful platform to create a range of educational and professional videos, often in a fun and engaging way for the students.

I have chosen the concept of SUSTAINABILITY for my short presentation film, editing an already given template frame by frame.



KNOWLEDGE AREAS FOR A GREENER AND SUSTAINABLE VET SYSTEM

The 21st century educator must be aware that the rapid changes of this century require a whole new approach to teaching and learning. The development of information technology and the accessibility of knowledge open a lot of possibilities. Both the next generation students and the adult students demand changes in educational methods from passive classroom courses towards an interactive collaborative learning model responding to the students' needs. This is causing an increasing shift away from the instructional and traditional approach toward new innovative learning approaches.

Although there are differences across national values, cultures, and socio-economic character—which mould country economic and education policy—there is a common drive for individuals who are literate and numerate, with knowledge of global societies, who understand the scientific principles that underlie how the physical world operates, and who have the competencies and skills to function adaptively and effectively within their immediate environments, globally, and virtually.

The Organization for Economic Co-operation and Development (OECD) (2015), employer-relevant organisations such as the World Economic Forum (2016), and national education systems (Care, 2018a), have made statements to this effect in response to employer concerns about the competencies and characteristics that individuals bring to the workplace, to national concerns about the socio-economic issues facing societies and the economy, and to community concerns about youth preparedness to contribute to society. The consequence is a growing emphasis on the need for students to emerge from education with competencies beyond the knowledge accumulation.

Beyond the core knowledge and concepts that a basic education provides, or that technical and vocational education within a formal education system provides, society demands that education systems equip students with the ability to use and apply core knowledge and concepts. This would manifest through young people solving problems, communicating clearly, making evidence-based decisions, working together, and thinking creatively—all within the socio-cultural context of their societies. These competencies, combined with the attitudes, values, and ethics of their societies, have now become explicit aspirations of the formal education sector (Care et al., 2018).

Entrepreneurial Mindset

Having an entrepreneurial mindset means having the ability to develop one's own green start-up or initiative, to promote independence in order to provide green solutions that will eventually become dominant in the business sector. An entrepreneurial mindset is a set of beliefs, thought processes, and ways of viewing the world that drives entrepreneurial behaviour. Typically, entrepreneurs firmly believe it's possible to improve their life situation and live life on their own terms. They also believe in their ability to learn, grow, adapt, and succeed.

Those with an entrepreneurial mindset tend to:

- believe in their ability to succeed and influence their own outcomes, empowering them to ***take ownership*** of their lives;
- have compelling goals that keep them future-focused and intrinsically motivated, driving them to be ***self-directed, action-oriented, and highly engaged***;
- have an optimistic interpretation of adverse events and see problems as potential opportunities, becoming ***highly resilient, resourceful, and solution-oriented*** even within highly uncertain, resource-constrained environments;
- be lifelong knowledge seekers with a focus on micro-experiments as learning opportunities to test ideas, cultivating ***curiosity, creativity, and critical thinking***;

- display a high level of reliability, understanding that *following through* on simple solutions can lead to unforeseen opportunities;
- have a humanistic outlook, being other-focused and understanding that one *creates value* by looking to solve problems for others.

The entrepreneurial mindset is most often acquired implicitly without conscious effort or awareness, which may explain why it often appears to be a dispositional trait, even though it is not.²¹

Entrepreneurship education programmes are slowly adapting to the circularity and sustainability movement. Business education lacks experience in introducing sustainability and environmentally-friendly business topics into entrepreneurship study programmes.

One of the entrepreneurship education purposes in the light of the EU strategy towards sustainable and green entrepreneurship is promoting a sustainable mindset in students who are then able to develop new green business ideas that are feasible and financially viable.

In the current context, the following skills are needed not only in entrepreneurship study programs, but also in ecological entrepreneurship programs: sustainable thinking, system analysis, identifying consumer needs, initiating a commitment to change, stakeholder analysis and mapping, decision making both strategic as well as operational, building openness and trust, sharing goals, and balancing interests. There is a common set of skills required for starting a business and growing a green business, where environmental concerns and related knowledge play a key role in shaping the green business mindset.²²

In recent years, the topicality of the green and circular economy include the promotion of students' green entrepreneurial mindset, which has to become a multi-disciplinary issue included not just in the specific specialised study course Green Entrepreneurship, but horizontally applied.

The problem associated with green business development can be investigated from two discourses. One is more generally related to the ability of entrepreneurs to start a business. The second, closely linked to the first, is the competence and ability to develop green business ideas and adopt green practices into the business model of a company.²³

The notion of green business mentality is a complex concept, but it will become more and more important in everyday decisions at all business levels, and even at the simplest level - households, so the demand for education on green and circular economy will develop appropriate competencies and skills will increase.

Green Entrepreneurship

A sustainable business strives to balance the economic (financial), social (people), and environmental (biodiversity, ecosystems) benefits of the business as part of its core business objective. A number of words such as green sustainability, ecological, compostable, recyclable, renewable, natural, organic and the like can all be applied to the concept of green business.

The main distinction between green entrepreneurs and traditional entrepreneurs is given by the fact that green entrepreneurs aim to create a business model that is economically profitable, which is attentive to its impact on the environment and which creates social value by offering new employment opportunities, development of an area, identification of another perspective on the surrounding world, and cultural and relational development.

Green entrepreneurship concerns both the conscious approach to environmental and social problems and the

²¹<https://elimindset.com/entrepreneurial-learning/what-is-mindset/>

²²Green Entrepreneur Handbook, Eric Koester, CRC Press, 2017

²³<https://iopscience.iop.org/article/10.1088/1755-1315/628/1/012034/pdf>

identification of innovative entrepreneurial solutions with positive effects on the environment, applicable worldwide and maintaining economic sustainability. Likewise, a green entrepreneur is a person who starts an entrepreneurial business that is green both in design and in all the products and processes that result from that venture.

Conservation of energy and green, recycling, promotion of reusability and development of the economy are some of the targets of the circular economy that green entrepreneurship pursues. Many countries are talking about the important role that entrepreneurship has in stimulating economic activity and governments are allocating large sums to support entrepreneurs, in the form of loan guarantees or tax incentives, which encourage the opening of a business, the creation of new jobs and innovation.

Furthermore, green investments on increasing energy efficiency or developing and using sustainable and environmentally friendly transport get the highest score in entrepreneurial development projects and an extra chance for government funding.²⁴ However, to become green entrepreneurs, you have to learn about the problems as well as the current technologies that contribute to solving them in the long term.

They can contribute significantly to the elimination of unemployment, poverty and environmental problems.²⁵ An ecological business will fulfil the following:

- Incorporating the principles of sustainability
- Paying a fair wage for the work they do to the staff employed
- Maximising the social benefits of the business (for example, employing marginalised groups).
- Providing green and/or local products and services that replace the demand for non-green products or imported products and services.
- Helping the community become more sustainable (for example, by reducing energy or water consumption or by reducing waste and pollution).
- Taking actions to supplement, improve or replace the environmental resource that is used by the enterprise (e.g., replanting trees, increasing soil fertility, using renewable energy).²⁶

Green entrepreneurship is usually favoured in areas where customer lifestyles, health and safety aspects are considered to be very important:

- ✓ *Ecotourism*: ecotourism projects where the goal is for the local environment and communities to benefit from tourism businesses by conserving habitats and threatened natural species;
- ✓ *Green construction*: green building includes the use of green materials to minimize waste production and greenhouse gas emissions;
- ✓ *Green Retail*: refers to the retail sale of products with environmental benefits;
- ✓ *Car industry*: battery electric vehicles (EVs) offer the option of Zero-Carbon, Zero-Emission Transportation;
- ✓ *Green food*: markets for green or sustainable food have grown globally since the 1990s, and now in many countries supermarkets play a central role as resellers of sustainable organic food. They buy from global distributors as well as local farms and producers.²⁷

The way of looking at green entrepreneurship from the perspective of developed countries is very different from that of developing countries, as developed countries and international organisations such as the World Bank, UNCTAD, OECD, UNIDO, WTO and FAO - support the special importance that offers market opportunities on the "green" market principle, while developing countries tend to put more emphasis on market needs, without putting too much value on sustainability and avoiding negative environmental impact. As the global evolution towards a green economy is just beginning, it is very difficult to maintain a healthy environment. Industrialization, global population growth and economic development will continue in the coming decades, thus making green entrepreneurship the only way to provide environmentally and socially

²⁴https://www.oecd-ilibrary.org/industry-and-services/entrepreneurship-at-a-glance-2010/measuring-green-entrepreneurship_9789264097711-4-en

²⁵<https://eudi.eu/what-is-green-entrepreneurship-and-why-is-it-important/>

²⁶<https://gggi.org/wp-content/uploads/2019/04/GGGI-Guide-to-Green-Entrepreneurship-in-Kiribati-Chapter-2-What-is-Green-Entrepreneurship-1.pdf>

²⁷https://www.researchgate.net/publication/340274392_Green_Entrepreneurship

efficient and safe operations.

Sustainable entrepreneurship and green skills

From the 17th to 19th of May 2021, an important event took place – The UNESCO Conference on Education for Sustainable Development, during which the participants (ministers, vice ministers, education, and training stakeholders) agreed on taking the necessary steps to transform learning so as to address present ecological issues. They adopted the Berlin Declaration on Education for Sustainable Development. Some of the key points stipulated in this document are as follows²⁸:

- ✓ The need to take urgent action to address the climate crisis, the mass loss of biodiversity, pollution, pandemic diseases, and other environmental crises
- ✓ The role of education in tackling major environmental issues to achieve the well-being of all within planetary boundaries
- ✓ The need to provide everyone with knowledge, skills, values, and attitudes to become change agents for sustainable development
- ✓ To make sure that ESD is an essential element of educational systems, and it is integrated into all levels of education and training from early childhood to tertiary and adult education, including technical and vocational education
- ✓ To set emphasis on cognitive skills, social and emotional learning
- ✓ To acknowledge the power of ESD to redesign our society
- ✓ To promote a whole-institution approach to bring together school and communities
- ✓ To recognise climate change as a priority area of ESD
- ✓ To be aware that teachers play a key role in the promotion of ESD
- ✓ To support the alignment at global, regional, and national levels of the education, environment, climate, and sustainable economy
- ✓ To make sure that enough funding is granted to ESD

Why is Green Entrepreneurship important?

Increasing environmental awareness day by day increases the needs of societies for ecology friendly entrepreneurs. The limited natural resources, the increase in the world population and the decrease in biodiversity play an important role in the formation of concerns about ecology. While the tendency to consume more products creates environmental damage, many businesses try to raise awareness of the consumption of natural resources. The main purpose of all this is to ensure sustainable growth. Green entrepreneurs are entrepreneurs who have such a perspective.

The main difference that distinguishes green entrepreneurs from traditional entrepreneurs is that green entrepreneurs want to create a business model that is economically profitable, environmentally conscious and creates social value.

A green industry business is one that uses sustainable materials to make its products. Green industry businesses aim to use as little water, energy, and raw materials as possible while cutting carbon emissions, or find methods to utilise these materials in renewable and eco-friendly ways. This business approach minimises the company's strain on natural resources and contributions to climate change. In some cases, if waste is generated, it is reused as energy or raw material.

In the case of the traditional business model, a company thinks about raw material budgets, design processes and methods of service delivery or product distribution. A green business model, trying to ensure high profits, puts in the first place the minimization of the company's impact on the environment instead of maximising its profit. Such a company involved the limited use of fossil fuels, emphasising the power provided by solar

²⁸ Adapted from esdfor2030-berlin-declaration-en.pdf (unesco.org)

panels and other approaches to drastically reduce energy consumption.

Where does sustainability fit in?

Sustainable development (and sustainable business development) has been defined in many ways. A frequently quoted definition is: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” In the past, development of businesses, and the economic growth they drive, have generally been unsustainable from an environmental perspective. Fossil fuels, including oil, diesel, kerosene, and natural gas, which the current economic system depends on, are finite. Burning them for energy damages the environment and contributes to climate change. Extractive industries, such as logging and mining, remove resources that took hundreds of millions of years to form in just minutes. Almost everything we buy is packaged in plastics that do not decompose, but will stay in landfills, or worse, in oceans, long after the person who used them is gone.

Businesses must be part of the solution to these problems. A sustainable business strives to balance the economic (financial), social (people), and environmental (biodiversity, ecosystems) benefits of the business as part of its core business objective. For a business to be sustainable, it must not exploit resources or people to improve profit margins. A sustainable business knows that if it depletes the resources that it is using faster than they can be generated, it cannot go on indefinitely. Similarly, viewing itself as part of the broader community, it ensures that its staff are paid fairly and have a good quality of life.

There is no single definition of a green business, but generally, it’s a business whose core model addresses an environmental or social issue – that is, it improves energy or resource efficiency, reduces greenhouse gas emissions, decreases waste or pollution, protects or restores ecosystems, promotes local culture, or supports communities.

A typical Green Business will do all or any of the following:

- ✓ Incorporate principles of sustainability into its business decisions and actively monitor them.
- ✓ Pay staff a fair wage for the work they do and ensure that they can maintain a good work-life balance.
- ✓ Distribute benefits equitably across the value chain.
- ✓ Maximise the social benefits of the business (e.g., by employing marginalized groups). Some businesses set up foundations to assist with this – but a sustainable business doesn’t confine its social activities just to charitable donations – it looks for every opportunity to increase the social benefits of the business in its day-to-day operations.
- ✓ Supply environmentally friendly and/or local products and services that replace demand for non-green or imported products and services.
- ✓ Make the community become more sustainable (e.g., by reducing energy use or water use, or reducing waste or pollution).
- ✓ Make efforts to use less resources (energy, water, materials), and replenish, enhance, or substitute an environmental resource that is used by the business (e.g., replanting trees, enhancing soil fertility, using renewable energy).
- ✓ Make an enduring commitment to environmental principles in its business operations. These will often be detailed in a publicly available and regularly updated Sustainability or Environmental Policy.

As consumers have come to care about the environment, a greater number of green businesses have emerged, but the problems that climate change poses require many solutions. Thus, to start a green business, first identify an eco-friendly service that nobody in your market currently offers. Then think of similarly eco-minded people you know whom you could ask to join your team. As you launch your green business, change your lifestyle to reflect the values and services of your business.

Sustainability Competences

Competences go beyond understanding particular issues, such as the global water cycle, consumption trends,

or unequal distribution of wealth in underdeveloped nations. The definition of competencies allows for the inclusion of all subject-specific knowledge necessary for effective problem-solving in a given situation. The knowledge, skills, and attitudes that enable successful task performance and problem-solving in relation to current sustainability issues, challenges, and opportunities are referred to as sustainability competencies.

The term "competency," which has its roots in the USA²⁹, refers to excellent performance and high drive and focuses on behaviour, motives, and other personal attributes. This characterization is attribute-based because it is based on the individual's personal characteristics. The British phrase competence, which has a connection to job performance, refers to practical abilities, knowledge, and a grasp of the workplace. Competency-based education focuses on helping people interact effectively in various circumstances and places so they can help reform their institutions, which makes it outcome-focused.

Despite the conceptual difference between sustainability and sustainable development, the terms are frequently used synonymously. According to the UNESCO definitions³⁰, sustainability is best described as a long-term objective, such as creating a more sustainable world, while sustainable development, as the name suggests, refers to the various processes and avenues for achieving progress or development in sustainable ways, such as through sustainable forestry and agriculture, production and consumption, appropriate government actions, research and technology transfer, education, and training.

Wiek et al. (2011) synthesised *sustainability competences* as “complexes of knowledge, skills, and attitudes that enable successful task performance and problem solving with respect to real-world sustainability problems, challenges, and opportunities” (p. 204). Eleven years later, developing the previous work, Bianchi et al. (2022) published the European sustainability competence framework – *GreenComp* -, which is organised in four main areas (Figure 5).

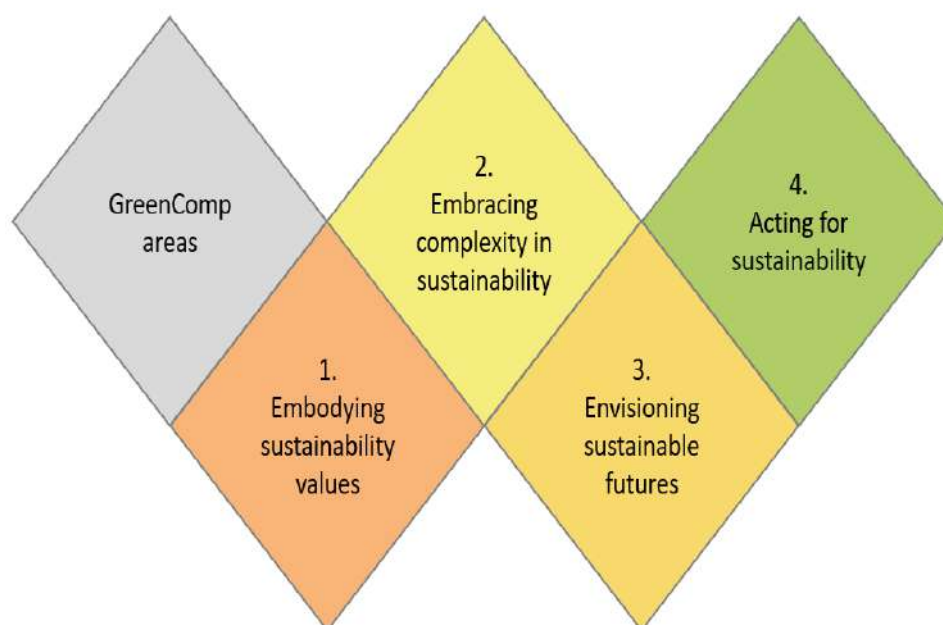


Figure 5. Areas of the GreenComp(Bianchi et al., 2022)

The four main areas are divided into three competences each (Table 2). The GreenComp’ authors alert that, although the competences are presented sequentially, that does not imply a sequence of acquisition nor a

²⁹ Barth, M., Michelsen, G., Rieckmann, M., Thomas, I. (Eds.). Handbook of Higher Education for Sustainable Development (Routledge)

³⁰<https://www.unesco.org/en/education/sustainable-development>

hierarchy: all competences are equally important and all learners should develop them (Bianchi et al., 2022). A descriptor is presented for each competence, representing its main aspects.

The next visual is a representation of the GreenComp (Bianchi et al., 2022) (Figure 6).



Figure 6. Visual representation of GreenComp (Bianchi et al., 2022; 2CC BY 4.0).

The strong beehive, which protects and sustains the bees, supports the competences whose aim is to develop values, such as *valuing sustainability*, *supporting fairness* and *promoting nature*. These competences belong to the area “Embodying sustainable values”.

The moving pollen and nectar represent the dynamic competences related with *systems thinking*, *critical thinking* and *problem framing*. These competences belong to the area “Embracing complexity in sustainability”.

The flowers represent the future of life achieved and assured by the development of competences of *adaptability*, *exploratory thinking*, and *future literacy*. These competences belong to the area “Envisioning sustainable futures”.

At last, if the bees are assumed as learners, they must develop all previous competences, have *individual initiative*, be an agent of *political agency* and collaborate in *collective action*. The bees represent the competences related with the area “Acting for sustainability”.

VET learners should be encouraged to develop all the 12 competences but, as suggested by Bianchi et al. (2022), the student does not need to achieve the highest level of proficiency in all of them. The sustainability competence development in each VET learner should be framed by the main goals of the course that the student is attending, but also allow them to envision sustainable futures that are not closely related to their contexts.

Sustainable Development and Sustainable Development Goals

The concept of sustainable development (or sustainability) is widely used, without being adapted to each field. Society develops through the application of sustainable development, education must become sustainable, industry, agriculture, research, resources must become sustainable through various ways, solutions, following known objectives and applied with the consent of the population.

A strong and healthy economy that takes into account social welfare in a healthy environment will ensure a sustainable society as in the figure³¹ below:

³¹DENEȘ, Călin; RADU, Sorin Managementul Resurselor și sustenabilitate, Editura Universității „Lucian Blaga” Sibiu, 2011



Within the EU, since 2006³², the concept of sustainable development has been integrated into the Wider Europe Strategy as part of a single and coherent strategic vision, with the overall objective of continuously improving the quality of life for present and future generations, to create sustainable communities that are able to manage and use resources efficiently and harness the economy's potential for environmental and social innovation to ensure prosperity, environmental protection and social cohesion.

In 2010, as a continuation of the EU's sustainable development, the Europe 2020³³ strategy was adopted to promote smart (based on: education, research, innovation), sustainable (based on carbon reduction, energy efficiency, renewable resources) and inclusive growth (creating new jobs, reducing poverty, etc.).

Together with the Member States and respecting the principle of subsidiarity, the EU is committed to taking the lead in the implementation of the 2030 Agenda and, by extension, the 17 Sustainable Development Goals.

The 2030 Agenda for Sustainable Development - Transforming our World, adopted on 25 September 2015 by the heads of state and government of 193 countries at the UN General Assembly, is a modified version of the conceptual framework for sustainable development, structured around a package of 17 Sustainable Development Goals, supported by 169 underlying targets.

As of 20 June 2017, "A Sustainable Future for Europe"³⁴ is the EU's response to the 2030 Agenda for Sustainable Development and is the policy document committed by EU Member States on the implementation of the 2030 Agenda for Sustainable Development.

Each EU country will therefore adopt a sustainable development strategy for sustainable development, taking into account the 17 goals of Agenda 30, a strategy built around the citizens and their future needs. In this way, the State will have every citizen at its side, if they will achieve their own objectives and support the State in its efforts, a fair society will be created, able to adapt to the current changes in climate, pandemics, wars, economic crisis, energy crisis, hunger, poverty. The state's concern for the citizen, its respect for the state, for the people next door, for moral values, for cultural and ethnic diversity will lead to a sustainable society.

The economy³⁵ must become sustainable and competitive and focus on innovation, optimism and resilience of citizens.

Society must benefit from improved education and health care, reduced gender, urban-rural inequalities, cultivated resilience, and citizens must feel valued and supported.

The environment is the third factor that engages citizens in their responsibility to protect nature because it can unite them for a noble purpose, ensuring the future of humanity through a clean and healthy natural heritage.

Sustainable development refers to the "many processes and pathways used to stimulate development, or

³²Strategia de Dezvoltare Durabilă a UE revizuită – Angajament pentru realizarea dezvoltării durabile, Consiliul UE, Bruxelles, 26 iunie 2006

³³https://www.mae.ro/sites/default/files/file/Europa2021/Strategia_Europa_2020.pdf

³⁴ <https://www.consilium.europa.eu/press/2017/06/20>

³⁵https://sgg.gov.ro/1/wp-content/uploads/2018/10/SNDD-2030_-_varianta-dup%C4%83-Comitet-interministerial-4-octombrie-2018.pdf

achieve progress, in sustainable ways” (Bianchi et al., 2022, p. 12).

This concept is closely related to the seventeen *sustainable development goals (SDGs)* (UN, 2015) (Figure 4). The SDGs and their targets are a call for action by all countries to promote prosperity while protecting the planet (UN, n.d.). The SDGs recognize that ending poverty must go together with strategies that build economic growth and address a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection (UN, n.d.).



Figure 4. Sustainable Development Goals (United Nations, 2015).

Tip | Watch this [video](#) (UN, 2018) to know more about the sustainable development goals.

VET learners must know each SDG and their targets so that they can mobilise their knowledge into individual initiatives and act in collective actions that support fairness and respect nature, to achieve a better world for the present and next generations. VET learners should also be aware of the processes and pathways used to stimulate development, or achieve progress, in sustainable ways, such as the pursuit of affordable and clean energy for all (SDG7) or the development of sustainable cities and communities (SDG11) through the access to safe, affordable, accessible, and sustainable houses and transport systems for all.

The Role of Individual Responsibility in the Transition to Environmental Sustainability³⁶

We are a long way from where we need to be: a circular economy where there is no waste and where all material outputs become inputs is well beyond our technological and organisational capacity today. But that does not mean we shouldn't think about how to get from here to there. Much of the work in building environmental sustainability requires the development of systems that enable us to live our lives as we wish while damaging the planet as little as possible.

Large-scale institutions are needed to manage sewage treatment and drinking water, to develop renewable energy and build a modern energy grid. Government policy is needed to ensure the conservation of forests, oceans, and biodiversity. Pandemic avoidance requires global, national and local systems of public health. Climate change mitigation and adaptation also require collective action. What then can individuals do? (Cohen, 2021).

As individuals, humans make choices about our own activities and inevitably, they involve choices about

³⁶ Section adapted from Cohen (2021).

resource consumption. Cohen (2021) sees little value in criticising people who fly on aeroplanes to travel to global climate conferences. However, Cohen (2021) sees great value in considering the importance of your attendance at the conference and asking if the trip is an indulgence or if you will have an important opportunity to learn and teach. Many times, you will judge that the financial and environmental cost of the trip is far outweighed by the benefits. Those are the times you should travel.

Cohen (2021) considers individual responsibility and the thought process and value shift that stimulates individual action as the foundation of the social learning process required for effective collective action. In other words, individual change and collective system-level change are interconnected. The fact is that on a planet of nearly 8 billion people, it is too late for many of us to get back to the land and live as one with nature. There are too many people on Earth and not enough nature. There is an absolute limit to humans ability as individuals to reduce our impact on the planet.

Therefore, system-level change is absolutely needed. But system change requires individuals to understand the need for change along with a well-understood definition of the problem.

How to increase students' green competencies (examples of activities)

Within the educational system, entrepreneurial skills are not developed enough in order for the student to have the abilities to create their own start-up and prove initiative to protect the environment.

Also, there is a need for non-repetitive, circular jobs, which will generate a high demand for the following skills: PRODUCT REPAIR, MAINTENANCE, DESIGN INNOVATION to improve longevity.³⁷

The 'Handbook for Sustainable Literacy' mentions competencies future employees should have so as to make a (green) change not only in their jobs, but also in their lifestyles:

1. Ecological literacy. Are you aware of how your actions affect the environment?
2. Systems thinking. Do you have a clear image in your mind about the lifecycle of a product, from manufacturing to its breaking up into smaller parts?
3. Design and technology understanding. Can you think of how to design a product so that it would have a lesser impact on the environment?
4. Cultural contexts. Are you aware that the area you live in has certain particularities that you must take into consideration when you adapt relevant solutions?

It is important to observe that green skills do not refer only to the 'world of work' but also to 'the world of life'.

UNESCO considers skills such as critical thinking, assessing, and developing ideas as being part of the 'world of life' domain; they help us make sustainable consumption and lifestyle decisions on a daily basis.³⁸

In order to develop entrepreneurial green skills and critical thinking abilities, a teacher or trainer needs to engage students in practical activities which emphasise initiative, creativity, careful planning, strategy, team work, such as:

- Create your own start-up and present it to your peers,
- Design a flyer for your green business,
- Prepare a presentation in order to convince your classmates to join your business plan or to persuade potential clients to buy your product,
- Explain how your product can help reduce pollution,
- Present your product or your creation in one or two foreign languages that you have learned,
- Have brainstorming sessions and choose the best ideas.

³⁷ Adapted from Skills for the circular economy (unesco.org)

³⁸ Adapted from YouthXchange: green skills and lifestyles guidebook; YouthXchange guidebook series; 2016 (ilo.org)

Examples of lessons and strategies for developing green skills and entrepreneurship

Develop your ecological start-up

This activity aims at encouraging students to create their own company or small business which would develop eco-friendly products and services.

Students can work in groups of four or five. Students need to follow the steps mentioned in the powerpoint presentation, namely:

- Choose an environmental topic to serve as a point of departure for their business idea and to keep them focused on one ecological issue that they want to tackle (excessive use of non-degradable materials, excessive waste, insufficient green spaces, the creation of eco-friendly products, etc.)
- Make a list of the qualities and skills that the business partners need to have in order to make their work efficient
- Name their start-up
- Create a logo and a catchy slogan for their business idea
- Draw up a work plan in order to establish all the steps they must follow so as to implement their business
- Design promotional materials like flyers, brochures, business cards, informative posters and even short recordings.

After following all the above-mentioned steps and creating the promotional materials, each team gets its own stand and they prepare themselves for the final presentation.

Each team will present their work to the other students and to the teachers in various forms:

- A frontal presentation so the panel of teachers and coordinators would get to know their work
- Simulation of a business fair where the teams prepare their stands and are ready to offer promotional material and discuss their business ideas with all the visitors (teachers or fellow students) who are interested in their work
- Brainstorming sessions

Feedback sessions that would enable idea exchanges and possibly improve their original work after receiving input from teachers, coordinators or fellow students.

In creating this activity, I was inspired by a Start-Up Fair organised in our schools where students had to present their creations in English as well.

I think that such a complex activity can prepare students for a sustainable future on various levels and also for developing a set of essential skills which are required on the labour market.

In order to prepare the necessary materials, one needs a computer laboratory, stationery which can be found in schools (paper, glue, scissors, colours, paints, DIY materials), and video projectors

Gallery Walks

Gallery walks convince students to leave their desks and engage in an active way with the content and each other.

When creating a gallery, students can display their computer tablet screen, a group-made poster, something they have written or a collage they have designed. Classmates browse and analyse each other's work, providing feedback or expressing their feelings and perception.

Irrespective of their age, students need time to share, discuss, grab new ideas, build on ones they already have, reflect, and interact with the others.

Gallery walks favour group work and communication, escaping the traditional setting of a classroom and mixing with your peers.

The activity coordinator starts the class by presenting a poster which comprises the main factors of pollution

and some keywords related to ecology and the environment. The poster is not complete and invites students to a game, namely to reconstruct the words on the poster – a few letters are given as clues.

Students are handed worksheets with questions. They are told that they are about to watch a documentary on climate change and they need to jot down the answers to the questions on the handout.

After watching the documentary and trying to answer the questions, students work in pairs to check their answers with a classmate's.

Students form groups of four and receive materials for making a poster which should include some of the discussed environmental factors. Their work should have a powerful impact on their classmates through drawings, pictures, slogans, and messages.

After students finish their work, they display the posters in a gallery and they walk around the classroom, observing and talking, interacting with each other.

At the end of the class, students express their opinion on the posters and exchange impressions, providing feedback.

Gallery walks disconnect students from the traditional way of teaching and favour peer communication.

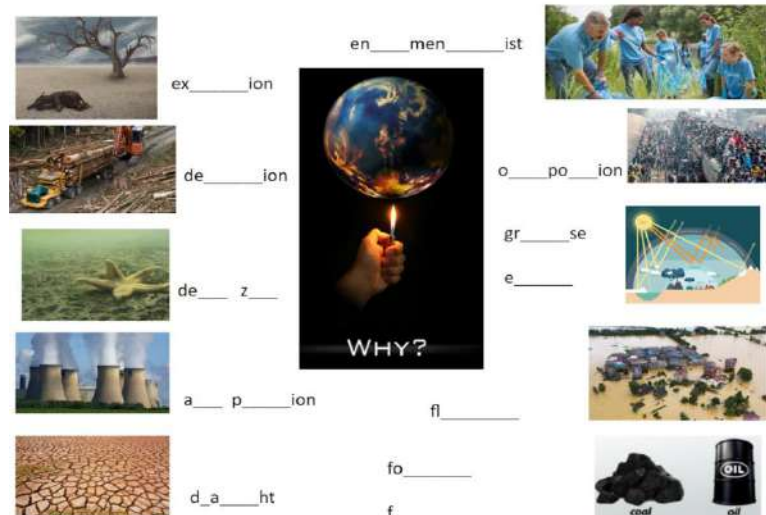
Students have the opportunity to express themselves in an artistic way and be congratulated for their work through positive feedback.

Students have a sense of achievement as a result of team collaboration.

Students get the chance to speak and exchange ideas in a discrete way, not in front of the classroom.

A complex range of materials are used – computers, tablets, handouts, colorful writing, projectors, thus developing a range of skills.

Such an activity builds self-confidence and enables classmates to know each other better.



Ecology Crosswords

Crosswords can be an excellent method of communicating and working in pairs / groups, drawing attention to key words and thus to environmental issues and to concepts with which we operate nowadays in order to make people aware of being green and sustainable.

Such games do not involve the use of a lot of materials, they favour peer interaction and communication.

Before applying the crossword and creative games, a material is presented in order to create the context and familiarise the students with the concepts and key words that they are going to use.

There are several methods to achieve teamwork and communication through a crossword:

Activity 1 – Mingle

The teacher divides the classroom in two. One group receives the questions or definitions for the crossword and the other group the solutions.

Students have to mingle and match the definition to the answer, thus creating pairs.

At the end of the activity, each pair needs to come in front of the classroom and read the definition and the answer. The teacher or activity coordinator displays the crossword on the board with the help of a video projector and fills it in.

Activity 2 – Work in groups

Students can work in groups of 3 or 4. Each group receives a handout with the crossword and the definitions, pens or pencils for writing the answers.

The activity coordinator can organise it as a contest – students need to compete and then see which team finishes the crossword first.

At the end of the activity, the teacher makes sure that everyone has the right answers.

Activity 3 – Design your own crossword

Students can work in groups of 4.

The activity coordinator presents a power-point material which focuses on environmental issues. At the end, several keywords are presented.

Each team needs to choose 5-6 words from the ones listed on the board and draw up a crossword based on them, including definitions.

An extra task could be inserting a mystery word which was not presented in the material but is known by the students.

After each team elaborates their crossword, they need to assume the role of the coordinator and present their crossword to the other teams.

Activity 4 – Find the definition

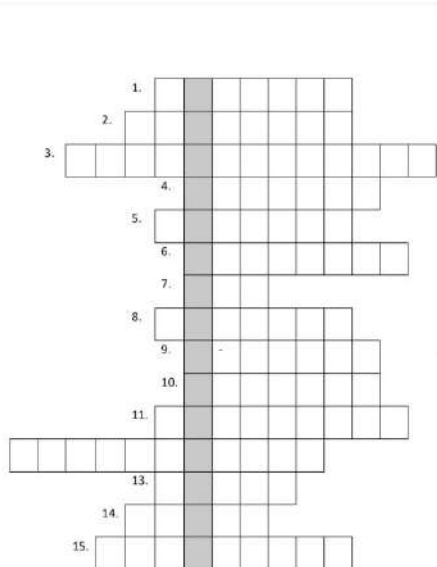
The crossword is displayed on the board with the help of a video projector.

Students draw pieces of paper on which the words from the crossword are written.

Students take turns coming in front of their classmates and saying the words. The classmates need to come up with definitions or explanations for each word said.

The activity coordinator writes down the ideas of the students, thus completing the crossword with the definitions as well.

The final work can be included in the school magazine as a creation of the students.





ECO-CROSSWORD → DEFINITIONS

1. The study of the relationships between living organisms and their physical environment
2. Construction dust is a well-known agent of pollution mainly on sites
3. The permanent removal of trees to make room for something else than forests
4. Powerful storms, drought, heavy snow, floods, heat waves are examples of change
5. Through the activity of waste, toxic smoke is released into the air
6. What do you call the site where waste materials are thrown? A
7. Toxic particles and smoke from burnt waste are some main causes of pollution
8. Heavy occurs when many cars move on a public street or motorway
9. Discarded electrical or electronic devices, such as televisions, computer monitors, printers, scanners
10. A way of travelling using bikes, an alternative to driving cars
11. The introduction of harmful materials into the environment
12. The natural world and the atmosphere that surround us
13. Romania is one of the top producers of this 'golden' super food in the European Union

Source: Inclusion through CLIL in Europe, Erasmus+ and Etwinning project, 2020-1-DE03-KA229-077100_6

D. The Vertical Garden

In this learning activity students will be provided with the opportunity to work in teams, develop their skills in communication, and collaborate while practising their manual skills.

Materials required

- Recycled planks of wood with screws and tools to assemble the final structure of the garden
- Recycled plastic bottles of water and a pair of scissors to cut them into flower pot sizes
- Paint (preferably organic to reduce pollution) and brushes
- Soil for the flowers and water

STEP 1 First, we do the measurements, draw the model on the paper, and design our garden so that we can use the minimal amount of ecologically unfriendly materials (spray paint, wood, etc). We start by looking for the products and calculating the prices in order to make it affordable. Then, we gather the materials that we need for building the vertical garden.

STEP 2 After purchasing everything that we need, we prepare everything to make sure that the activity is carried out smoothly and enjoyably for the participants. Before starting work, we build the main pillars because they are the essential element, and we prepare spray paints, planks, tools, screws, and dowels for the project.

STEP 3 Before the main activity, after we put everything in place, we organise a teambuilding game (human knot), so that everyone can work together and have a better understanding of each other.

After the game, we organise ourselves in mixed teams of 4 people each, every team gets a plank and the main activity begins. Students draw the plastic bottles that are used instead of pots in the same colours as the planks. Afterwards we wait for the paint to dry, we put soil in the pots, and we begin assembling the vertical garden. We build it using screwdrivers and screws and then we move it into the school garden.

This activity demonstrates the capacity students have to create a sustainable and healthy environment while at the same time learning about teamwork, communication and emotional intelligence.

The students are organised in teams and encouraged to practise their manual skills with the purpose of understanding the values of working together and in a healthy environment.

It is important to mention the practical use of the garden. Because it uses so little space it gives the owner the capacity to grow lots of plants even in the balcony of an apartment. With this in mind, it is easy to understand how helpful this can be for the environment when every person in a city could grow lots of green plants in the little space that they have.

[ERASMUS VERTICAL GARDEN - https://www.youtube.com/watch?v=adksOff5SiY](https://www.youtube.com/watch?v=adksOff5SiY)



Source: Erasmus+ K 201, I Love My School, 2018-1-TR01-KA201-058720

Teaching the importance of green skills and sustainability entrepreneurship to the next generations is one of the most important steps one can take to secure the safety of our planet. By passing knowledge about how we and everyone around us can do less damage to the world, we can assure a better, eco-friendly, future.

These are a few examples of best practices concerning VET education regarding green skills:

Cognitive competencies:

- Understanding of the environment and a desire to learn more about sustainable development
- Systems and risk analysis, skills to assess, interpret and understand both the need for change and the measures required
- The ability to think creatively to spot opportunities and develop fresh approaches to tackle environmental problems.

Interpersonal competencies:

- Consulting skills to advise consumers about green solutions and to spread the use of green technologies.

- Strategic and leadership skills to enable policymakers and business executives to create conditions conducive to cleaner production, cleaner transportation, etc.

Students are expected to:

- Recognize the impact of packaging, the amount of carbon emissions caused by logistical operations, and available remedies.
- Evaluate the implementation of these solutions from different perspectives.
- Look into how your province's logistics companies handle carbon emission issues and how they may do better.

The tasks will be done in small groups and the resources needed are the case study, paper, and a laptop.

Suggested sequences :

Before the class ask the students to read the study below:

https://www.e3s-conferences.org/articles/e3sconf/pdf/2020/25/e3sconf_caes2020_02011.pdf

and ask them to identify the key elements below:

- Carbon emissions caused by logistics centres
- Different solutions logistics enterprises adopt to reduce carbon emissions

Ask the students if they can find other solutions to these problems

During the class:

1. Warm-up activity

a. Show students the pictures that illustrate packaging problems



b. To identify the detrimental effects on the environment, have students discuss similar issues they have read about or encountered in daily life with their group.

2. Group discussion

Facilitate students' group discussions that focus on:

- What steps do businesses take to lessen the carbon emissions that packaging causes? Do they encounter any difficulties putting these measures into practice? What level of awareness exists among the company's employees?
- An evaluation regarding whether these measures are practical or effective across Europe.

Students must support their claims with facts and persuasive arguments to show whether they are successful or unsuccessful. In terms of practical application, they should take into account the diverse circumstances/challenges in various locations, such as the distinctions between large cities and rural places.

Ask students to do additional research if needed and list the arguments on both sides of an A4 paper and formulate a conclusion based on them.

- Consider how current solutions could be modified or find other potential solutions that could be used to reduce the carbon emissions caused by packaging based on the analysis of the conditions in the students' provinces.

3. Group presentation

Guide students to prepare a 5-10 min group presentation or speech that focuses on:

- An analysis of the available remedies for handling packaging problems. The three things that students should explicitly introduce are the metrics they are concentrating on, the conclusion drawn from the group debate, and an appraisal of the state of the province at the moment.
- Adjustment to current solutions, or suggestions of other possible solutions, based on the local context.

Green innovations for a healthier life

Cognitive competencies:

- Innovative abilities to recognize opportunities and develop fresh approaches to tackle environmental issues
- Ability to think about things differently - Interpersonal competencies
- To set the correct incentives and establish the conditions for cleaner production, cleaner transportation, etc., legislators and business executives need to possess strategic and leadership abilities.
- Marketing skills to promote greener products and services
- Consulting skills to advise consumers about green solutions and to spread the use of green technologies

Students are expected to:

- Recognize the potential contribution of green innovation to the solution of sustainability issues.
- Examine consumer adoption of environmentally friendly innovations.
- Based on the results of the survey, promote green innovation goods to pertinent stakeholders. This study should be made in small groups of students and the resources needed are paper pens and pencils

Before the class:

1. Ask students to read the case study <https://medium.com/technology-hits/green-technology-for-quality-of-life-33e1b627d70a> and think about:
 - a. What is green innovation?
 - b. How does green innovation help address sustainability issues and increase the quality of life of citizens?
 - c. Are there any other examples of local design that are based on green innovation?
2. Ask students to write down their ideas and prepare to share the findings with their group.

During the class:

1. Group sharing and presentation

- ✓ Organise students in groups.
- ✓ Facilitate students to share their answers about the pre-class questions in their group and summarise the group discussion as suggested:

- For question a., use a mind map to summarise the group's ideas.
 - For question b., list the sustainability issues that the green innovation products introduced in this case study can help to address, and explain how they increase the quality of life.
 - For question c., introduce the examples you find and clearly explain how they work.
- ✓ Invite 2-3 groups to share their group work with the class and summarise students' shared ideas using different graphs.

2. Design a survey to explore people's acceptance (60 mins)

- ✓ Ask students to choose one green innovation product from the case study to explore people's acceptance/interest. How would people like to use it, and would it encourage them to increase their exercise time? Facilitate students to discuss these ideas in their group.
- ✓ Encourage students to choose the location for their survey based on the product they choose and the people who will participate in it. Give students an example to serve as inspiration. For instance, if they decide to investigate the public's approval of the Eco Gym, they may need to decide which gyms to target and the ages of the members.
- ✓ Suggest students design the survey as a questionnaire, an interview, or a mixed method, so they can use both a questionnaire and an interview.
- ✓ Help students to formulate the questions for their survey with their group mates.
- ✓ Facilitate students to discuss how they can approach their target groups.

Below are the suggestions that may help students to design the survey. You can explain these to them and provide some examples.

- ✓ Ask more closed-ended questions than open-ended questions (particularly at the beginning)
- ✓ Make sure the survey questions are impartial, maintain a balanced range of response options, and avoid asking for two items at once.
- ✓ Conduct a test run by giving the survey to a separate group and asking them to respond to your questions
- ✓ Ensure that all of the survey questions are distinct from one another. Check to see if they understood what you meant and if their responses provided the necessary details.

Green cooling

Cognitive competencies:

- ✓ Knowledge of systems and risk analysis, as well as the ability to judge, decipher, and comprehend the need for change and the necessary actions
- ✓ Recognizing the complexity and interconnection of the problems and challenges facing sustainable development
- ✓ Interpersonal skills
- ✓ Leadership and strategic abilities to help business executives and policymakers set the proper incentives and establish the right conditions for cleaner production, cleaner transportation, etc.

Students are expected to:

- ✓ Understand how natural refrigerants help address global warming.
- ✓ Reflect on the potential and challenges of using natural refrigerants in addressing environmental issues relevant to cooling.
- ✓ Suggest approaches for encouraging the use of natural refrigerants for cooling, based on the local context.

The project will be carried out in small groups and will require paper, pens, and the case study

Before the class:

✓ Ask students to read the case study: https://energypedia.info/wiki/Green_Cooling_Initiative and watch the videos and articles related to natural refrigerants listed below:

- ✓ Naturally Cool – The History and Development of Natural Refrigerants
<https://www.youtube.com/watch?v=Lx5jCBQik7k>
- ✓ Smart Guide to Climate Change

<https://www.bbc.com/future/article/20201204-climate-change-how-chemicals-in-your-fridge-warm-the-planet#:~:text=These%20refrigerants%20break%20down%20ozone,to%2013%2C850%20times%2>

- ✓ What are Natural Refrigerants?

<https://www.gea.com/en/articles/natural-refrigerants/natural-refrigerants-climate-neutral.jsp>

- ✓ Consider the following questions:
 - What does the ozone layer mean?
 - How does the ozone layer react to refrigerants?
 - What kinds of refrigerants are there?
 - How effective are natural refrigerants in comparison to conventional ones?
 - In what situations are natural refrigerants used?

During the class:

1. Group discussion 1 (60 mins)

- ✓ Group students into groups of 5.
- ✓ Facilitate the group discussion by focusing on the pre-class questions listed above. Suggest each groupmate be responsible for summarising and presenting the ideas for at least one question, so all five questions should be covered within a group.
- ✓ Ask students to share their group discussion with the class (5 mins for each group) and organise their findings using different graphs. Suggest students use presentation materials they prefer (PowerPoint, drawing, video, etc.).

2. Group discussion 2 (60 mins)

- ✓ Instruct pupils to use the supermarket scorecard <https://www.climatefriendlysupermarkets.org/scorecard> and the global map <https://www.climatefriendlysupermarkets.org/map> to look up climate-friendly supermarkets. Ask them to name the international supermarkets that have utilized natural refrigerants for cooling (e.g. Aldi).
- ✓ Encourage students to research the technologies and solutions these supermarkets applied to use natural refrigerants.
- ✓ Instruct pupils to list the major supermarkets and food chains in their nation.
- ✓ Examine the advantages and disadvantages of using natural refrigerants for cooling in various supermarket/food chains.
- ✓ Propose strategies, laws, or regulations that might nudge these supermarkets and food chains toward using natural refrigerants for cooling, like financial bribes in the form of tax breaks and price breaks.

3. Group presentation and class discussion (60 min)

- ✓ Suggest students organise their group discussion in a mind map.
- ✓ Help students prepare a group presentation. Remind them that each groupmate should present part of it.
- ✓ Facilitate students' group presentations. After each group's presentation, invite students to ask questions and provide suggestions



Conclusions

The CE-E VET project offers innovative ways for VET schools and VET providers to boost VET learners' key competences using sustainable entrepreneurship and circular economy as activators of employability skills.

In the section “Tools for VET educators”, the products of the CE-E VET project were presented to VET educators. One product is this CE-E VET Educators manual, a valuable tool for VET Teachers. The manual presents scientific and pedagogical information about tools, skills, and pedagogical knowledge about microlearning, ICT tools and non-formal techniques for VET educators. The manual also has a focus on sustainability and presents content about circular economy, sustainable entrepreneurship, and green skills useful for VET educators to boost their students' green skills. Another product is a digital library with additional resources to support VET educators' classes when subjects such as sustainability and entrepreneurial skills are approached. The library is constituted by ready to use materials, such as micro-lessons, text, games, reading materials, exercises, presentations, and infographics, which are very useful for VET educators' teaching with different methodologies in classrooms.

The next section, “Skills for VET educators”, provides VET educators knowledge and pedagogical content knowledge about the 21st century skills and digital literacy. The development of 21st century skills and digital literacy in VET students is a subject of major importance in VET education, and this manual also has a strong focus on that issue. VET students should be equipped with a set of 21st century skills and be digitally literate to promote their engagement in classes, improve their academic performance and be prepared to face a job market with continuous change. Furthermore, the education of VET learners in the 21st century must also be focused on the development of competences for sustainable development and contribute to the achievement of the sustainable development goals. The manual presents content to VET educators promoting educational practices for their VET students to sustainability agents in VET schools and in the companies where they will work.

Another focus of the section “Skills for VET educators” was coaching and mentoring. It is suggested that VET educators should act as coaches or mentors of their students to promote their skills and general development. Therefore, the manual approaches general characteristics of mentoring, the mentor role and benefits of mentoring to the organisation. The aim is to equip VET educators with knowledge about these strategies to promote the global development of VET students' competences. Furthermore, active learning methodologies, such as problem-based learning, were presented as effective approaches to VET educators develop VET learners' skills.

Chapter 4 „KNOWLEDGE FOR VET EDUCATORS” deals with the basic theoretical background any VET educator should possess in order to be able to teach their students about circular economy, sustainable entrepreneurship and green skills. Being an active and trendy field of research, the literature is continuously updating and the paradigms are rapidly changing, so keeping up with all the newly developed ideas and the latest concepts and terminology is a challenge for any educator. Therefore, this chapter is intended to provide the much needed helping hand by summarising the latest developments in this field and explaining the fundamental principles in play.

There is not only a definition of the pivotal concept of circular economy, but also an explanation of its birth, an account on how it came into being. The different angles from which it is viewed also help the educators build the whole complex image of what it is circular economy. It has emerged as a concept that will reshape the future working environment and will gradually replace the linear economy as environmental challenges become more and more critical at a global level. The manual presents the stark contrast between the disadvantages of the linear economy and the benefits of the circular economy, which stands out as the only viable alternative for the future. It is increasingly obvious that the conscientious eco-friendly behaviour we

adopt and the timid steps countries take towards saving natural resources and re-using materials is not enough. We need to go further without delay. That is why we are talking about the transition from eco-efficiency to eco-effectiveness and the era of D replacing the era of R. There seems to be widespread agreement between decision makers that the process of learning needs to transform so as to address present ecological issues. It is also made very clear that the essential skills and aptitudes that are needed on the labour market in this new context should be taught in schools and one need not rely on companies to provide complex training to employees.

VET educators should also teach in schools an entrepreneurial mindset together with team work, ethical and sustainable thinking, awareness of local ecological particularities, a sense of belonging to a community, a good understanding of design and technology, and maintenance skills. The entrepreneurial skills needed nowadays by youngsters should also be adapted to the reality of the circular economy in which their businesses will function. Every business they want to start has to be designed in terms of sustainability first and foremost. Hence, there is a need for the educators to create this type of mindset in their students.

To this purpose, VET educators should encourage practical activities that mainly rely on teamwork, CLIL (content and language integrated learning), product development that strengthens the bond between students and local community and provides immediate feedback, elaboration of projects and of presentations, and the extensive use of technology in order to recondition and reuse materials and objects.

Micro-learning is a version of simultaneous education used to teach the specific needs to students as quickly as possible. It is one of the most effective techniques if it is needed to consolidate knowledge and use it in practice. From Hug's point of view (2006), it is divided into seven dimensions of micro-learning. Time, content, curriculum, form, modality and learning type define the design aspect of micro-learning. Additionally, Hug (2006) states that the main three elements are content, pedagogy and technology.

Creating an effective microlearning environment involves three key elements: content, pedagogy, and technology. Content selection should align with curriculum areas, while technology integration should support microlearning activities. Pedagogy can be enhanced using a competence spiral model. Mobile devices play a vital role in microlearning, and adapting tools to students' pace and abilities is important.

Preparation of good microlearning courses in VET sector should be based on following best practices;

1. Define if it's a good fit
2. Rework or reuse existing courses
3. Use gamification methods
4. Use short videos and other interactive assets
5. Don't forget to add recurring content
6. Provide access any time, on any device
7. Encourage social and collaborative learning

Non-Formal Education Techniques were presented with some ice breakers, energizers and warm-up activities. Also, it was suggested some websites and e-books and how to use and adapt them to reach the objectives of this project. The main objectives of these subjects are creating the beneficial environment to equip the learners with the necessary skills, tools and experiences to prepare them for the current labour market, enhance their job opportunities as well as enable them to be the right candidate for the employers and companies. Also, Non-formal education should also be voluntary, accessible to everyone (ideally), an organised process with educational objectives, participatory, learner-centred, about learning life skills and preparing for active citizenship based on involving both individual and group learning with a collective

approach, holistic and process-oriented, based on experience and action and organised on the basis of the needs of the participants. Many educators are adopting Gamification as a useful tool to engage and motivate students. Gamification is the idea of adding game-like elements to a non-game environment, like leader boards, point systems, different levels, and badge awards. The aim of ICT tools and non-formal techniques here, is to introduce methods that can be used to boost the learning environment while letting the participants gain the necessary skills for the labour market. Presented ICT Tools that are Canva as a design tool, Zoom as an online meeting and webinar tool, Kahoot! as an interactive presentation tool, Google Classroom as a teamwork and communication tool, Google Jamboard as an online board, Augmented Reality and Virtual Reality.

There are some tools and applications which can be used in order to prepare microlessons, lesson plans, as well as attractive games for students. (www.kialo-edu.com, OnlinePuzzlemaker|Create Your Own Puzzle|Discovery Education Puzzlemaker, www.quizlet.com, www.zunal.com and www.powtoon.com)

Weaknesses of online and remote learning include:

- Lack of integration and consensus in using popular platforms internally, resulting in the use of external payment platforms with limited management capacity.
- Insufficient adoption of powerful and accessible platforms like Google Workspace at a general level.
- Non-personalized, static, and non-inclusive online training.
- Lack of global and inclusive perspective in the use of ICT in education.

Strengths of online and remote learning include:

- Availability of high-quality courses and resources for the educational community.
- Use of whiteboard editing software for tele training.
- Active participation, flexibility, and customization in creating, collaborating, and sharing.
- Integration and adaptation of digital tools to different environments and recipients.
- Ability to create highly personalised online training and analyse class data for effective instructional design.
- Availability of various tools and online spaces for dynamic techniques and collaboration.
- Creation of diverse rhythms and dynamics to increase motivation and interest.
- Stimulation of creativity, critical thinking, and problem-solving through diverse interpretations and solutions.
- Potential for network collaboration and connection with recipients' prior knowledge, emotions, and interests.
- Effective data analysis, predictive course offerings, and automation of processes for better management.

References

- Adesope, O., & Rud, A. G. (2019). *Contemporary Technologies in Education: Maximizing Student Engagement, Motivation, and Learning*. Springer International.
- Adobe (2017). 5 benefits of digital literacy. Adobe Systems Incorporated. <https://www.govconnection.com/~media/pdfs/brands/a/adobe/adobe-hied-5-benefits-digital-literacy.pdf?v=1&la=en#:~:text=When%20you%20foster%20creativity%20and,school%20and%20in%20their%20careers>
- Aitchanov, B., Satabaldiyev, A., & Latuta, K. (2013). Application of microlearning technique and Twitter for educational purposes. *Journal of Physics: Conference Series*, 423, 1-4. Doi: <https://doi.org/10.1088/1742-6596/423/1/012044>
- Alqurashi, E. (2016). Self-Efficacy In Online Learning Environments: A Literature Review. *Contemporary Issues In Education Research (CIER)*, 9(1), 45-52. <https://doi.org/10.19030/cier.v9i1.9549>
- Alqurashi, E. (2017). Self-Efficacy and The Interaction Model as Predictors of Student Satisfaction and Perceived Learning in Online Learning Environments (Unpublished doctoral dissertation). Duquesne University, Pittsburgh, PA, USA.
- Alqurashi, E., Gokbel, EN and Carbonara, D. (2016), Teachers' knowledge in content, pedagogy and technology integration: a comparative analysis between teachers in Saudi Arabia and United States. *British Journal of Educational Technology*. <https://doi.org/10.1111/bjet.12514>
- Barth, M., Michelsen, G., Rieckmann, M., Thomas, I. (Eds.). *Handbook of Higher Education for Sustainable Development* (Routledge)
- BattelleforKids (2019). P21 Partnership for 21st century learning. Framework for 21st century learning. https://static.battelleforkids.org/documents/p21/P21_Framework_Brief.pdf
- Baumgartner, P. (2013). Educational dimensions of microlearning—towards a taxonomy for microlearning. In *Designing Microlearning Experiences—Building up Knowledge in Organizations and Companies*. Innsbruck University Press.
- Besong, F., & Charlotte, H. (2015). The Dispositions, Abilities and Behaviours (DAB) framework for profiling learners' sustainability competencies in higher education. *Journal of Teacher Education for Sustainability*, 17(1), 5–22.
- Bessant, S., Bailey, P., Robinson, Z., Tomkinson, C. B., Tomkinson, R., Ormerod, R. M., & Boast, R. (2013). *Problem-Based Learning: A case study of sustainability education. A toolkit for university educators*. The Higher Education Academy.
- Bianchi, G. (2020). *Sustainability competences*. EUR 30555 EN. Publications Office of the European Union. doi:10.2760/200956, JRC123624.
- Bianchi, G., Pisiotis, U., Cabrera Giraldez, M. (2022). *GreenComp – The European sustainability competence framework*. Bacigalupo, M., Punie, Y (Eds.). EUR 30955 EN. Publications Office of the European Union. doi:10.2760/13286, JRC128040.
- Bocken, N.M.P., de Pauw, I.C., & Bakker, C.A., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308-320. <https://doi.org/10.1080/21681015.2016.1172124>
- Brânzei D., Dan Zaharia, Maria Zaharia. "Mate 2000+8/9, sixth grade" Paralela 45 Publishing House, Part I
- Brears, L., MacIntyre, W. R., & O'Sullivan, G. (2011). Preparing teachers for the 21st century using PBL as an integrating strategy in science and technology education. *Design and Technology Education: An International Journal*, 16(1), 36–46.
- Bruck, P. A., Motiwalla, L., & Foerster, F. (2012). Mobile learning with micro-content: a framework and evaluation. 25th Bled eConference. <https://bledconference.org>
- Brundiers, K., & Wiek, A. (2013). Do we teach what we preach? An international comparison of problem- and project-based learning courses in sustainability. *Sustainability*, 5, 1725-1746. <https://doi.org/10.3390/su5041725>
- Care, E., Kim, H., Vista, A., & Anderson, K. (2018). *Education system alignment for 21st century skills. Focus on assessment*. Brookings. <https://www.brookings.edu/wp-content/uploads/2018/11/Education-system-alignment-or-21st-century-skills-012819.pdf>
- Carmigniani, J., & Furht, B. (2011). *Handbook of Augmented Reality*. Springer-Verlag.
- Cavadas, B., & Linhares, E. (2022). Using a Problem-Based Learning Approach to Develop Sustainability Competencies in Higher Education Students. In W. Leal Filho, A. M. Azul, F. Doni & A. L. Salvia. (Eds.), *Handbook of Sustainability Science in the Future* (pp. 1-28). Springer. https://doi.org/10.1007/978-3-030-68074-9_86-1
- Cifrian, E., Andres, A., & Viguri, J.R. (2013). Estimating Monitoring Indicators and the Carbon Footprint of Municipal Solid Waste Management in the Region of Cantabria, Northern Spain. *Waste and Biomass Valorization*, 4, 271–285. <https://doi.org/10.1007/s12649-012-9150-6>
- Cohen, S. (2021, May 10). *The Role of Individual Responsibility in the Transition to Environmental Sustainability*. Columbia Climate School. Climate, Earth, and Society. State of the planet. Sustainability. <https://news.climate.columbia.edu/2021/05/10/the-role-of-individual-responsibility-in-the-transition-to-environmental-sustainability/>
- Cörvers R., Wiek A., de Kraker J., Lang D.J., & Martens P. (2016) Problem-Based and Project-Based Learning for Sustainable Development. In H. Heinrichs, P. Martens, G. Michelsen, & A. Wiek (Eds.), *Sustainability Science* (pp. 349-358). Springer. https://doi.org/10.1007/978-94-017-7242-6_29
- Costa, A. (2011). *Teachers as continuous learners*. Near East South Asia Council of Overseas Schools. <https://www.nesacenter.org/uploaded/conferences/FLC/2011/handouts/Watts/Teachers as Continuous Learners.pdf>
- Courses (2017). <https://coursmos.com>
- Danciu, V. (2013). Economieteoretică aplicată, Volumul XX, n.º 9 (586), p.5. Academia de Studii Economice din Bucureşti.
- Daniela, L. (2020). *New Perspectives on Virtual and Augmented Reality: Finding New Ways to Teach in a Transformed Learning Environment*. Routledge.
- Denes, C., & Radu, S. (2011). *Managementul Resurselor si sustenabilitate*. Editura Universitatii Lucian Blaga Sibiu.
- Desplaces, D. E., Wergeles, F., & McGuigan P. (2009). Economic Gardening through Entrepreneurship Education: A Service-Learning Approach. *Industry and Higher Education*, 23(6), 473-484. <https://doi.org/10.5367/000000009790156436>
- Di Maio, F., Rem, P. C., Baldé, K., & Polder, M. (2017). Measuring resource efficiency and circular economy: A market value approach. *Resources, Conservation and Recycling*, 122, 163-171. <https://doi.org/10.1016/j.resconrec.2017.02.009>
- Diegoli, R. B., Gutierrez, H. S. M., Salmones, M. del M. G.D. los (2018). Teachers as Entrepreneurial Role Models: The Impact of a Teachers Entrepreneurial Experience and Student Learning Styles in Entrepreneurial Intentions. *Journal of Entrepreneurship Education*, 21(1). <https://www.abacademies.org/articles/teachers-as-entrepreneurial-role-models-the-impact-of-a-teachers-entrepreneurial-experience-and-student-learning-styles-in-entrepr-6991.html>
- Dieck, M. C., & Jung, T. (2019). *Augmented Reality and Virtual Reality: The Power of AR and VR for Business*. Springer International.
- Du, X., Su, L., & Liu, J. (2013). Developing sustainability curricula using the PBL method in a Chinese context. *Journal of Cleaner Production*, 61, 80-88. <https://doi.org/10.1016/j.jclepro.2013.01.012>
- Eastern Washington University (2018, October 11). *Why good educators are lifelong learners*. <https://online.ewu.edu/degrees/education/med/adult-education/good-educators-lifelong-learners/>
- Ellen MacArthur Foundation (n.d.). *Circular economy introduction*. Ellen MacArthur Foundation <https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>
- Entreprise pour l'Environnement (2005). *Organiser la contribution de l'entreprise au developpement durable*. Entreprise pour l'Environnement.
- Farrington, C. A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T. S., Johnson, D. W. & Beechum, N. O. (2012). Teaching Adolescents to Become Learners: The Role of Noncognitive Factors in Shaping School Performance. A Critical Literature Review. The University of Chicago

- Consortium on Chicago School Research. <https://files.eric.ed.gov/fulltext/ED542543.pdf>
- Fellner, J., Ledere, J., Sachrff, C., & Laner, D. (2017). Present potentials and limitations of a circular economy with respect to primary raw material demand. *Journal of Industry Ecology*, 21(3), 494-496. <https://doi.org/10.1111/jiec.12582>
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. (2012). *How to design and evaluate research in education* (8th ed.). McGraw Hill.
- García, M. R., Junyent, M., & Fonolleda, M. (2017). How to assess professional competencies in Education for Sustainability? An approach from a perspective of complexity. *International Journal of Sustainability in Higher Education*, 18(5), 772-797. <https://doi.org/10.1108/IJSHE-03-2016-0055>
- Geroimenko, V. (2020). *Augmented Reality in Education: A New Technology for Teaching and Learning*. Springer.
- Giurgiu Luminița. (2017). Microlearning an Evolving Elearning Trend. *Buletinul Științific Al Academiei Trupelor De Uscat*, 22(1), 18-23. <https://doi.org/10.1515/bsafe-2017-0003>
- Goleman, D., Bennett, L., & Barlow, Z (2012). *Ecoliterate: How educators are cultivating emotional social and ecological intelligence* (1st ed.). Jossey-Bass.
- Göschlberger B. (2016) A Platform for Social Microlearning. In: Verbert K., Sharples M., Klobučar T. (eds) *Adaptive and Adaptable Learning-EC-TEL 2016*, (9891), pp. 513-516. Springer, Cham. https://doi.org/10.1007/978-3-319-45153-4_52
- Grovo. (2017). <https://www.grovo.com>
- Günter, T., Akkuzu, N., & Alpat, Ş. (2017). Understanding 'green chemistry' and 'sustainability': an example of problem-based learning (PBL). *Research in Science & Technological Education*, 35(4), 500-520. <https://doi.org/10.1080/02635143.2017.1353964>
- Hague, C., & Payton, S. (2010). *Digital literacy across the curriculum*. FutureLab. <https://www.nfer.ac.uk/media/1770/futl06.pdf>
- Harris, J. (1995). The Ferret's Path: Finding and Using Education
- Hemmer, A. (s.d). *Gamification in e-learning: What is it? Examples and benefits*. <https://www.easygenerator.com/en/blog/e-learning/gamification-in-elearning/>
- Het GroneBrein (n.d.). *Circular economy. How is a circular economy different from a linear economy?* <https://kenniskaarten.hetgroenebrein.nl/en/knowledge-map-circular-economy/how-is-a-circular-economy-different-from-a-linear-economy/>
- Het GroneBrein (n.d.). *Circular economy. What are the economic benefits of the circular economy?* <https://kenniskaarten.hetgroenebrein.nl/en/knowledge-map-circular-economy/ce-economic-advantages/>
- Hieronymi, K., Kahhat, R., & Williams, E. (2012). *Waste management. From waste to resource*. Routledge
- Hierdeis, H. (2007). From Meno to Microlearning: A Historical Survey. In Hug, Th. (Ed.), *Didactics of Microlearning. Concepts, Discourses and Examples* (pp. 35–52). Waxmann.
- Hug, T. (2005). Micro learning and narration: exploring the possibilities of utilization of narrations and storytelling for the design of "micro units" and didactical micro-learning arrangements. In: *Proceedings of Media in Transition*, MIT, Cambridge, MA.
- Hug, T. (2006). Microlearning: A New Pedagogical Challenge (Introductory Note). In: Hug, Theo; Lindner, Martin; Bruck, Peter A. (eds) *Microlearning: Emerging Concepts, Practices and Technologies after e-Learning. Proceedings of Microlearning 2005*. Innsbruck University Press.
- Hug, T. (2010). Mobile Learning as 'Microlearning'. *International Journal of Mobile and Blended Learning*, 2(4), 47-57. <https://doi.org/10.4018/jmbi.2010100104>
- Intel Corporation and the Institute of Computer Technology, "Intel Teach – Training in the Knowledge Society", version 10, 2009
- IT Professionalism Europe (n.d.). *E-Competence framework*. IT Professionalism Europe <https://itprofessionalism.org/about-it-professionalism/competences/the-e-competence-framework/>
- Jones, C., & English, J. (2004). A contemporary approach to entrepreneurship education. *Education + Training*, 46(8/9), 416-423. <https://doi.org/10.1108/00400910410569533>
- Jones, G. & Harris, J. (1995). Electronic emissary: initial design and tests. *Technology and teacher training annually* 1995. 672-676
- Jones, G. (2017). *Profits and sustainability – A History of Green Entrepreneurship*. Oxford University Press Oxford.
- Jun, P. (2014). Never Stop Learning: How Self-Education Creates a Bullet-Proof Career. 99U. <https://99u.adobe.com/articles/29995/never-stop-learning-how-self-education-creates-a-bullet-proof-career>
- Kapp, K. M., & Defelice, R. A. (2019). *Microlearning. Short and Sweet*. American Society for Training and Development.
- Kim, S. et al. (2018). Gamification in Learning and Education: Enjoy Learning Like Gaming. Springer.
- Kjaer, L.L., Pigosso, D.C.A., Niero, M., Bech, N.M., & McAloone, T.C. (2019). Product/Service-Systems for a Circular Economy: The Route to Decoupling Economic Growth from Resource Consumption? *Journal of Industrial Ecology*, 23, 22-35. <https://doi.org/10.1111/jiec.12747>
- Koester, E. (2011). *Green Entrepreneur. Handbook – the guide to building and growing a green and clean business*. CRC Press.
- Kovachev, D., Cao, Y., Klamma, R., & Jarke, M. (2011). Learn-as-you-go: new ways of cloud-based micro-learning for the mobile web. In *Advances in Web-Based Learning-ICWL 2011* (pp. 51-61). Springer Berlin Heidelberg.
- Kraaijenhagen, C., Van Oppen, C., & Bocken, N. (2016). *Circular business. Collaborate & circulate*. Amersfoort.
- Laal, M. (2011). Lifelong Learning: What does it Mean? *Procedia - Social and Behavioral Sciences*, 28, 470-474. <https://doi.org/10.1016/j.sbspro.2011.11.090>
- Lackeus, M. (2015). *Entrepreneurship in duction. What, Why, When, How*. OECD. https://www.oecd.org/cfe/leed/BGP_Entrepreneurship-in-Education.pdf
- Lacy, P., & Rutqvist, J., & Lamonica, B. (2016). *Circular economy: from waste to value*. EGEA.
- Leal Filho & P. Pace (Eds), *Teaching Education for Sustainable Development at University Level* (pp.1-6). Springer International Publishing.
- Lee, L-K. et al. (2020) *Technology in Education. Innovations for Online Teaching and Learning*. 5th International Conference, ICTE 2020, Macau, China, August 19-22, 2020, Revised Selected Papers. Springer.
- Lewandowski, M. (2016). Designing the business models for circular economy -Towards the conceptual framework. *Sustainability*, 8, 43.
- Liu, D. et al. (2017). Virtual, Augmented, and Mixed Realities in Education. Springer.
- Liu, Z., Wei, L., Gao, X. (2016). A Study on Self-regulated Micro-course Learning and Implicitly Layered Flipped Classroom. *Theory and Practice in Language Studies*, 6(4), 870-877. <https://doi.org/10.17507/tpls.0604.27>
- Longhurst, J. (2014). Education for Sustainable Development: Guidance for UK Higher Education Providers. The Quality Assurance Agency for Higher Education.
- Martin, A. (2009). Digital literacy for the third age: Sustaining identity in an uncertain world. *eLearning Papers*, 12, 1-15. <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1060.8780&rep=rep1&type=pdf>
- Matthew T. Hora with Ross J. Benbow and Amanda K. Oleson, *Beyond the skills gap – preparing college students for life and work*, Harvard Education Press, Cambridge, Massachusetts, 2016
- Mazzanti, M., Montini, A., & Zoboli, A. (2008). Municipal Waste Generation and Socioeconomic Drivers Evidence From Comparing Northern and Southern Italy. *Journal of Environment and Development*, 17(1), 51–69. <https://doi.org/10.1177/1070496507312575>
- McGee, P. & Boyd, V. (1995). Computer-mediated communication: Facilitating dialogues. *Technology and teacher education annually* 1995. 643
- Volunteer Vision
- Miron, D., Dima, A.M., & Vasilache, S. (2010). Models of the intra-regional trade influence on economic sustainable development in Romania. *Amfiteatru Economic Journal*, 12(27), 27–35. <https://ideas.repec.org/a/aes/amfeco/v12y2010i27p27-35.html>
- Moberg, K. (2014). *Assessing the impact of entrepreneurship education. From ABC to PhD*. Copenhagen Business School. <https://research.cbs.dk/en/publications/assessing-the-impact-of-entrepreneurship-education-from-abc-to-ph>

- Moberg, K. S. (2012). The impact of entrepreneurship education and project-based education on students' personal development and entrepreneurial intentions at the lower levels of the educational system: too much of two good things? *SSRN*. <https://ssrn.com/abstract=2147622> or <http://dx.doi.org/10.2139/ssrn.2147622>
- Moore, M., & Kearsley, G. (1996). *Distance education: A systems view*. Wadsworth.
- Morouchou, D. V. (2004). 21st Century Trends in Education: Implications for Learning and Teaching in Higher Education. In Proceedings of the Fifth International Conference on Information Technology Based Higher Education and Training, 2004. ITHET 2004. <https://doi.org/10.1109/ITHET.2004.1358213>
- Mulqueen (2022, January 11). *What is sustainable entrepreneurship, and why does it matter?* Entrepreneur. <https://www.entrepreneur.com/article/354955>
- Nachhaltige Entwicklung als Handlungsauftrag, Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit. Mai 2012/Accessed on April 4, 2013
- Navy, S. L., & Kaya, F. (2020). PBL as a pedagogical approach for integrated STEM: Evidence from prospective teachers. *School Science and Mathematics*, 120, 285-296.
- Navy, S. L., Maeng, J. L., Bell, E. L., & Kaya, F. (2021). Beginning secondary science teachers' implementation of process skills, inquiry, and problem-based learning during the induction years: a randomised controlled trial. *International Journal of Science Education*, 43(9), 1-21. <https://doi.org/10.1080/09500693.2021.1919334>
- Noordgraaf-Eelens, L., Kloeg, J., & Noordzij, G. (2019). PBL and sustainable education: addressing the problem of isolation. *Advances in Health Science Education*, 24, 971-979. <https://doi.org/10.1007/s10459-019-09927-z>
- Oguz-Unver, A., & Arabacıoglu, S. (2014). A comparison of inquiry-based learning (IBL), problem-based learning (PBL) and project-based learning (PBL) in science education. *Academia Journal of Educational Research* 2(7), 120-128. <http://dx.doi.org/10.15413/ajer.2014.0129>
- Oncică Sanislav, D., & Căndea, D. (2016). Business sustainability: is the learning organization one step ahead? Utprass, Cluj-Napoca.
- Panopto. (2017). <https://www.panopto.com>
- PBL Netherlands Environmental Assessment Agency (s.d.). *Opportunities for a circular economy*. PBL Netherlands Environmental Assessment Agency. <https://themasites.pbl.nl/o/circular-economy/>
- Pedaste, M., Mäeots, M., Siiman, L. A. Jong, T. de, Riesen, S. A. N. van, Kamp, E. T., Manoli, C. C., Zacharia, Z. C., & Tsourlidaki, E. (2015). Phases of inquiry-based learning: definitions and the inquiry cycle. *Educational Research Review*, 14, 47-61.
- Popa, M., Stănculescu, A. I., Matei, G. F., Tudor, A., Zgăvărdici, C., & Chiriacescu, R. (n.d.). *Dictionar Enciclopedic*, 1993-2009. Editura Enciclopedică.
- Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu*. Punie, Y. (ed.). EUR 28775 EN. Publications Office of the European Union., <https://data.europa.eu/doi/10.2760/159770>
- San Tan, S. and Ng, C. K. F. (2006). A problem-based learning approach to entrepreneurship education. *Education + Training*, 48(6), 416-428. <https://doi.org/10.1108/00400910610692606>
- Sampson, D. et al. (2019). *Learning Technologies for Transforming Large-Scale Teaching, Learning, and Assessment*. Springer.
- Sarasvathy, S. D. & Venkataraman S. (2011). Entrepreneurship as Method: Open Questions for an Entrepreneurial Future. *Entrepreneurship Theory and Practice*, 35(1), 113-135. <https://doi.org/10.1111/j.1540-6520.2010.00425.x>
- Shinde, G. R. et al. (2021). *Internet of Things Integrated Augmented Reality*. Springer.
- Siekierska, A. (2020). Microlearning - what's all the fuss about?
- Spector, J. M. et al. (2018). *Frontiers of Cyberlearning: Emerging Technologies for Teaching and Learning*. Springer.
- Stefanakis, A., Nikolaou, I. (2021). *Circular economy and sustainability*. Elsevier.
- Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., Biggs, R., Carpenter, S. R., de Vries, W., de Wit, C. A., Folke, C., Gerten, D., Heinke, J., Mace, G. M., Persson, L. M., Ramanathan, V., Rayers, B., & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223). <https://doi.org/10.1126/science.1259855>
- Strategia de Dezvoltare Durabilă a UE revizuită (2006). *Angajament pentru realizarea dezvoltării durabile*. Bruxelles.
- Stratos (s.d.). Sustainability - What it is and how all businesses can benefit from it! <https://stratos.ro/en/sustenabilitatea-ce-este-si-cum-pot-castiga-de-pe-urma-ei-toate-business-urile/>
- Tantau, A. D., Maassen, M. A., & Fratila, L. (2018). Models for Analyzing the Dependencies between Indicators for a Circular Economy in the European Union. *Sustainability*, 10, 2141. <https://doi.org/10.3390/su10072141>
- Tomus, A. (2022a). *Gamification* [Video]. YouTube. <https://youtu.be/9sYPEpncmc4>
- Tomus, A. (2022b). *Microlearning* [Video]. YouTube. <https://youtu.be/WGRBjH8GFyM>
- Turcitu G., Ioniță Rizea, Ion Chiriac, Constantin Basarab, Maria Duncea, Petre Ciunge. "Mathematics textbook for the sixth grade ". Radical Publishing House
- Turco, G. (2020, December 12). *Economia circolare: definizione e politiche europee*. Economia circolare: definizione e politiche europee - Ius in itinere
- United Nations (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. A/RES/70/1. United Nations. <https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981#>
- United Nations (2018, April 20). *Do you know all 17 SDGs?* [Video file]. YouTube. <https://youtu.be/0XTBYMfZyrM>
- United Nations (n.d.). *Sustainable Development Goals* <https://www.un.org/sustainabledevelopment/>
- United Nations Environment Program (UNEP) (2017). *Resource efficiency: Potential and economic implications. A report of the International Resource Panel*. UNESCO. https://www.resourcepanel.org/sites/default/files/documents/document/media/resource_efficiency_report_march_2017_web_res.pdf
- Varghese, N. V., & Mandal, S. (2021). *Teaching Learning and New Technologies in Higher Education*. Springer
- Wade, B. (2019, April 4). *Success is Good, But Don't Forget to Embrace Sustainability*. Entrepreneur. <https://www.entrepreneur.com/article/331743>
- Wang, Z., Luo, Y., & Qu, Y. (2017). Application of Micro-lecture For Engineering Mechanics Experimental Teaching. *International Journal of Innovation and Research in Educational Sciences*, 4(2), 130-132.
- Weetman, C. A. (2016). *Circular Economy Handbook for Business and Supply Chains*. Kogan Page.
- Wiek, A., Withycombe, L. & Redman, C. L. (2011). Key competencies in sustainability: a reference framework for academic program development. *Sustainability Science*, 6, 203-218. <https://doi.org/10.1007/s11625-011-0132-6>
- Williams, P. T. (2005). *Waste Treatment and Disposal*. John Wiley & Sons.
- Wingard, J., & Farrugia, C. (2021). *The great skills gap. Optimizing talent for the future of work*. Stanford University Press.
- World Academy (2015, October 1). *The importance of digital literacy in 21st century education*. World Academy <https://worldacademynh.com/the-academy/blog/importance-digital-literacy-21st-century-education#:~:text=Digital%20literacy%20plays%20a%20vital,pedagogy%20here%20at%20World%20Academy>
- World Economic Forum (2014). *Towards the circular economy: Accelerating the scale-up across global supply chains*. World Economic Forum. https://www3.weforum.org/docs/WEF_ENV_TowardsCircularEconomy_Report_2014.pdf
- Wyness, I., & Dalton, F. (2018). The value of problem-based learning in learning for sustainability: Undergraduate accounting student perspectives. *Journal of Accounting Education*, 45, 1-19. <https://doi.org/10.1016/j.jaccedu.2018.09.001>
- Youmatter (2020, 21th February). *Circular economy: Definition, principles, benefits and barriers*. <https://youmatter.world/en/definition/definitions-circular-economy-meaning-definition-benefits-barriers/>

Youngerman, E., & Culver, K. (2019). Problem-Based Learning (PBL): Real-world applications to foster (inter)disciplinary learning and integration. *New Directions for Higher Education*, 188, 23-32. <https://doi.org/10.1002/he.20342>

Zhamanov, A., & Zhamapor, M. (2013). Computer Networks teaching by microlearning principles. *Journal of Physics: Conference Series*, 423(1), 6. <https://doi.org/10.1088/1742-6596/423/1/012028>

Additional Sources

<https://www.schooleducationgateway.eu/en/pub/resources.htm>

<http://www.nzdl.org/cgi-bin/library?e=d-00000-00---off-0hdl--00-0---0-10-0---0---0direct-10---4-----0-0l--11-en-50--20-about---00-0-1-00-0--4---0-0-11-10-OutfZz-8-00&cl=CL1.12&d=HASH01892cac2d55b0cd522e7c12.7.7.3>=1>

https://www.researchgate.net/figure/Examples-of-the-activities-and-concepts-used-in-the-non-formal-environmental-education-in_tbl1_328879672

<http://www.pioneershiksha.com/news/3196-non-formal-environmental-educational.html>

https://link.springer.com/chapter/10.1007/978-3-030-20249-1_14

<https://www.youthpass.eu/downloads/13-62-32/Youthpass%20A2.pdf>

https://youthnetworks.net/wp-content/uploads/2022/01/Project-CORE_WELL-BEING-TOOLKIT.pdf

<https://youthnetworks.net/project-results-how-non-formal-learning-supports-education-policy-time-4-tea/>

<https://www.youtheuropa.org/non-formal-education/>

<https://asksource.info/topics/education/non-formal-education>

<https://www.coe.int/en/web/european-youth-foundation/non-formal-education>

<https://www.salto-youth.net/tools/toolbox/>

<https://www.icye.org/wp-content/uploads/2017/06/NFE-Handbook-May-2017.pdf>

<https://files.eric.ed.gov/fulltext/EJ1106082.pdf>

<https://inee.org/education-in-emergencies>

<https://inee.org/collections>

<https://inee.org/collections/technology>

<https://inee.org/resources/principles-digital-development>

<https://inee.org/resources/non-formal-education-adolescents-and-youth-crisis-and-conflict-proposed-taxonomy-and>

<https://childreninemergencies.org/>

<https://uil.unesco.org/library>

<https://blogs.umass.edu/onlinetools/community-centered-tools/google-classroom/>

<https://biblioteca.utcluj.ro/carti-online-cu-coperta.html>

<https://www.businessnewsdaily.com/5102-green-business-ideas.html>

<https://www.consilium.europa.eu › press › 2017/06/20https://circularlearningspace.eu/>

<https://www.circle-economy.com/>

<https://www.edu.ro/sites/default/files/Agenda%202030%20SDG.PDF>

<https://eudi.eu/what-is-green-entrepreneurship-and-why-is-it-important/>

<https://ied.eu/blog/green-entrepreneurship-sustainable-development-for-business/>

<http://gggi.org/site/assets/uploads/2019/04/GGGI-Guide-to-Green-Entrepreneurship-in-Kiribati-Chapter-2-What-is-Green-Entrepreneurship-1.pdf>

https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_250688.pdf

<https://iopscience.iop.org/article/10.1088/1755-1315/628/1/012034/pdf>

<https://www.globsyn.edu.in/blog/green-entrepreneurship-a-path-towards-sustainable-development>

<https://feps-europe.eu/wp>

<https://elimindset.com/entrepreneurial-learning/what-is-mindset/>

<https://www.futurelearn.com/info/blog/what-is-the-skills-gap>

<https://gofore.com/en/what-is-systems-thinking-and-how-should-i-use-it/>

https://www.greengrowthknowledge.org/sites/default/files/downloads/resource/GIZ_%20Green%20Entrepreneurs%20in%20Tunisia.pdf

<https://www.genevaenvironmentnetwork.org/>

<https://www.greenbiz.com/article/3-essential-elements-circular-jobs-future>

<https://www.ifixit.com/Right-to-Repair/E-waste>
https://www.mae.ro/sites/default/files/file/Europa2021/Strategia_Europa_2020.pdf
https://www.oecd-ilibrary.org/industry-and-services/entrepreneurship-at-a-glance-2010/measuring-green-entrepreneurship_9789264097711-4-en
<https://www.plymouth.ac.uk>
https://www.researchgate.net/publication/340274392_Green_Entrepreneurship
<https://sgg.gov.ro/1/wp-content/uploads/2018/10/SNDD-2030--varianta-dup%C4%83-Comitet-interministerial-4-octombrie-2018.pdf>
<https://www.snhu.edu/about-us/newsroom/business/what-is-systems-thinking>
<https://study.com/academy/lesson/systems-thinking-in-management-definition-theory-model.html>
<https://www.talentlyft.com/en/resources/what-is-skills-gap>
<https://thesystemsthinker.com/systems-thinking-what-why-when-where-and-how/>
<https://trainingindustry.com/glossary/skills-gap/>
<https://trainingindustry.com/magazine/issue/why-yesterdays-skills-arent-enough-to-survive-todays-digital-transformation/>
<https://trainingindustry.com/magazine/issue/why-yesterdays-skills-arent-enough-to-survive-todays-digital-transformation/>
<https://stratos.ro/en/sustenabilitatea-ce-este-si-cum-pot-castiga-de-pe-urma-ei-toate-business-urile/>
<https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>
https://www.researchgate.net/publication/271122119_Education_and_Society_The_Case_for_Ecoliteracy/link/5be0bb4e92851c6b27aa1670/download
<https://unevoc.unesco.org/home/Skills+for+the+circular+economy>
<https://www.unesco.org/en/education/sustainable-development>
<https://www.unesco.org/en/education/sustainable-development>
<https://unesdoc.unesco.org/ark:/48223/pf0000189062>
<https://xperienify.com/skill-gap/https://wedocs.unep.org/bitstream/handle/20.500.11822/37439/FB027.pdf>
<https://wedocs.unep.org/bitstream/handle/20.500.11822/37439/FB027.pdf>
<https://www.greenbiz.com/article/3-essential-elements-circular-jobs-future>
https://www.researchgate.net/publication/271122119_Education_and_Society_The_Case_for_Ecoliteracy/link/5be0bb4e92851c6b27aa1670/download
[Skills for the circular economy \(unesco.org\)](#)
[esdfor2030-berlin-declaration-en.pdf \(unesco.org\)](#)
[Closing the Skills Gap: Vocational education and training for the circular economy - Insights - Circle Economy \(circle-economy.com\)](#)
[608c0aa6fec4df0fa7bd78e4_20210422 - CJI VET Paper 2 - 297x210mm.pdf \(website-files.com\)](#)
[YouthXchange: green skills and lifestyles guidebook; YouthXchange guidebook series; 2016 \(ilo.org\)](#)
[scholarworks@wm.edu.](#)
<http://www.tapr.org/emissary/>
<https://www.mentorcloud.com/mentorship-and-dei>
<https://www.mentorcloud.com/mentor-platform>
https://www.csrwire.com/press_releases/718721-empowering-diverse-talent-online-mentoring-case-study-fujitsu-and-volunteerthey
<https://pwnbucharest.net/programs/mentoring.html>
<https://dascalidedicati.wixsite.com/website>
<https://www.dascalidedicati.ro/manualul-mentorului/>
<http://www.ctetc.ro/index.php/proiect-rose/20-proiecte/proiect-rose/59-activitati-din-cadrul-proiectului-rose>
<https://www.rose-edu.ro/reteaua-de-mentori/>
<http://www.ctetc.ro/index.php/proiecte-erasmus/digital-ambassadors-of-cultural-heritage/2-uncategorised/109-activitate-online-platforma-etwinning>

<https://www.digitoolmentors.com/en>

https://www.e3s-conferences.org/articles/e3sconf/pdf/2020/25/e3sconf_caes2020_02011.pdf

<https://www.cedefop.europa.eu/en/projects/skills-and-jobs-green-transition1>.

[https://epale.ec.europa.eu/pl/blog/darmowe-kursy-e-learningowe-ktore-moga-ci-sie-przydac1.](https://epale.ec.europa.eu/pl/blog/darmowe-kursy-e-learningowe-ktore-moga-ci-sie-przydac1)

<https://www.edapp.com/blog/10-microlearning-examples/>

[https://www.easygenerator.com/en/blog/learning-approach/how-to-create-](https://www.easygenerator.com/en/blog/learning-approach/how-to-create-microlearning/?utm_source=google&utm_medium=cpc&utm_campaign=g1_en-all_se_dsa-blogs&ut)
[microlearning/?utm_source=google&utm_medium=cpc&utm_campaign=g1_en-all_se_dsa-blogs&ut](#)

[https://www.europarl.europa.eu/news/ro/headlines/economy/20151201STO05603/economia-circulara-definitiv-](https://www.europarl.europa.eu/news/ro/headlines/economy/20151201STO05603/economia-circulara-definitiv-importanta-sibeneficii)
[importanta-sibeneficii](#)

[https://ec.europa.eu/environment/gpp/pdf/Public_procurement_circular_economy_brochure.pdfhttp://ec.europa.](https://ec.europa.eu/environment/gpp/pdf/Public_procurement_circular_economy_brochure.pdfhttp://ec.europa.eu/environment/gpp/pdf/news_alert/Issue47_Case_Study100_Turin.pdf)
[eu/environment/gpp/pdf/news_alert/Issue47_Case_Study100_Turin.pdf](#)

[https://cleanfleets.eu/fileadmin/files/documents/Publications/case_studies/Clean_Fleets_case_study -](https://cleanfleets.eu/fileadmin/files/documents/Publications/case_studies/Clean_Fleets_case_study_-_Bremen_Car-Sharing_integration.pdf)
[Bremen Car-Sharing integration.pdf](#)

[https://www.umweltbundesamt.de/themen/wirtschaft-konsum/umweltfreundliche-beschaffung/gute-](https://www.umweltbundesamt.de/themen/wirtschaft-konsum/umweltfreundliche-beschaffung/gute-praxisbeispiele/gebaeudeneubau/berlin-einsatz-von-recycling-beton-im-hochbau)
[praxisbeispiele/gebaeudeneubau/berlin-einsatz-von-recycling-beton-im-hochbau](#)

<https://norden.diva-portal.org/smash/get/diva2:1092366/FULLTEXT01.pdf>

[https://read.oecd-ilibrary.org/employment/boosting-skills-for-greener-jobs-in-flanders-belgium/green-skills-and-](https://read.oecd-ilibrary.org/employment/boosting-skills-for-greener-jobs-in-flanders-belgium/green-skills-and-the-transition-to-a-green-economy_9789264265264-3-en#page2)
[the-transition-to-a-green-economy_9789264265264-3-en#page2](#)

<https://greenskillsresources.com/category/guidelines-for-teachers>

<https://medium.com/technology-hits/green-technology-for-quality-of-life-33e1b627d70a>

https://energypedia.info/wiki/Green_Cooling_Initiative

https://www.iisd.org/sites/default/files/publications/specs_public_procurement.pdf

[https://www.bbc.com/future/article/20201204-climate-change-how-chemicals-in-your-fridge-warm-the-](https://www.bbc.com/future/article/20201204-climate-change-how-chemicals-in-your-fridge-warm-the-planet#:~:text=These%20refrigerants%20break%20down%20ozone,to%2013%2C850%20times%2)
[planet#:~:text=These%20refrigerants%20break%20down%20ozone,to%2013%2C850%20times%2](#)

<https://www.gea.com/en/articles/natural-refrigerants/natural-refrigerants-climate-neutral.jsp>

<https://www.climatefriendlysupermarkets.org/scorecard>

<https://www.climatefriendlysupermarkets.org/map>

<https://climate.nasa.gov/global-warming-vs-climate-change/>

<https://climatchange.procon.org/>

<https://biomimicry.org/>

<https://www.rti.org/insights/top-five-tips-ensure-effective-microlearning0000000000000>

<https://www.treehugger.com/amazing-examples-of-biomimicry-486933>

<https://ehistory.osu.edu/exhibitions/biomimicry-a-history>

<https://www.ucl.ac.uk/news/2020/nov/ucl-leads-research-circular-economy-three-uk-industries>

<https://vtex.com/ro/blog/trenduri/modelul-de-economie-circulara-cele-mai-bune-practici-pentru-ecommerce/>

<https://www.zerowastescotland.org.uk/circular-economy/about>



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