



Co-funded by the
Erasmus+ Programme
of the European Union

**Development of opportunities
in the field of design for technical
careers through innovation-laboratories**

Grant agreement n. 2020-1-IT02-KA203-079775

IO1 Learning Module

Table of contents

<u>IO1 Learning Module</u>	1
1.1 What do we mean when we talk about Innovation in Education?	6
1.2 Innovative tools VS. Innovative methodologies	7
1.3 When does innovation happen? What are its distinctive features?	10
<u>2. DEFINITION OF THE COURSE OBJECTIVE</u>	12
2.1 Value Proposition	12
2.2 Benefits and needs	13
2.3 Learning offer	15
2.4 Training gaps	16
2.5 Key elements of the course objective:	17
<u>3. Topics and Learning Outcomes</u>	18
3.1 Definition of Learning Outcome (LO)	18

<u>3.2 Learning Outcomes for the Train the Trainers</u>	19
<u>3.3 Learning Outcomes for the INNO-TEC-LAB Courses</u>	20
<u>4. Profile of participants and selection criteria</u>	21
<u>4.1 Profile of participants</u>	21
<u>4.2 Selection criteria</u>	22
<u>4.3 Selection questionnaire</u>	24
<u>5. Methodology and Communication Procedures</u>	26
<u>6. Activities and Resources</u>	28
<u>7. Learning Assessment</u>	29
<u>7.1 Types of learning assessment</u>	29
<u>7.2 Assessment methods and activities</u>	30
<u>8. Conclusions</u>	32
<u>References and resources</u>	33

1. INTRODUCTION TO INNOVATION IN EDUCATION

1.1 What do we mean when we talk about Innovation in Education?

In education, innovation is poorly or inconsistently defined (Dahlander et al, 2021), which undermines our ability to benefit from it, whether you can achieve better results in learning without an innovative standard, or whether nothing qualifies for common understanding by means of common definitions of language and means that allow us to describe the characteristics of innovation in science, the trajectories of its adoption and the ways in which it spreads from one group to another to liars in our place in the educational system.

Innovation in learning solves problems and brings added value by providing new solutions or by removing traditional barriers to existing teaching and learning challenges and brings added value by building implementation capacity. Elements of innovation:

- (a) provide fresh solutions or remove traditional barriers to existing actions for teaching and learning (and added value through building implementation capacity)
- (b) identify a previously undetected need or barrier and subsequently strengthen teaching and learning through innovative approaches (and adding value through under-utilisation) new consideration of the limiting factor and appropriate response
- (c) introduce new opportunities to improve teaching and learning (and to increase added value by providing new and more effective opportunities) in order to achieve better results; and
- (d) enable the education system to adapt to new pathways by which students learn (and add value by using and directing student use of technology).

In conclusion, innovation = improvement, but not improvement by mere achievement proficiency in standard practice. (Redding, Twyman, Murphy 2013)

1.2 Innovative tools VS. Innovative methodologies

In order to ensure that the training is based on a student's skills and preferences, students are tested to see where their strengths have been identified and, therefore, where they will be learning better and faster. In achieving that goal, the theory of 7 forms of intelligence (+1) (Sternberg, 2000) and different learning styles that learners may prefer is used.

- 1) Linguistic and verbal intelligence - students acquire knowledge by reading, writing and playing verbal games.
- 2) logical and mathematical reasoning focuses more on systems and figures, the student likes to experiment and ask questions
- 3) Natural wisdom - students are good at organizing and classifying the world around them and finding patterns and contexts. Identification and organization.
- 4) Spatial/visual intelligence of people likes art, they read maps and charts and think with images.
- 5) Physical intelligence - students process knowledge through physical sensations and use their bodies in many different ways.
- 6) Music units are sound sensitive in their surroundings and prefer to listen to music while learning or reading.
- 7) The personal intelligence of individuals is self-confident, independent and highly disfigured.
- 8) The social intelligence of individuals enjoys contact with other people, has many friends and takes part in social activities. They develop and learn better in a group.

This division, combined with learning styles, makes the use of appropriate techniques lead to faster learning and success for the student.

We can all agree that learning styles are different and that it is more beneficial to focus on the learning style that suits the person who is learning. The theory of different learning styles is useful because learners know their strengths and the best ways to learn from the beginning. The theory of different ways of learning is useful because learners know their strengths and best ways to learn from the beginning, so they can choose the methods and tools that will allow them to use their learning time most effectively.

To be more specific, a student's learning style profile indicates possible strengths and tendencies or habits that could lead to difficulties in academic and educational settings. It does not reflect a student's suitability or unsuitability for a particular subject, discipline, or profession: students and learners in general with any preference have achieved brilliant success in any field.

Active and reflective learners

- Active learners tend to retain and understand information best when they are actively working with it - discussing it, applying it, or explaining it to others. Thoughtful learners prefer to think about it quietly first.
- "Let us try it and see how it works" is the phrase of an active learner; "Let us think about it first" is the response of the thoughtful learner.
- Active learners tend to like group work more than reflective learners who prefer to work alone.
- Sitting in lectures with nothing to do but take notes is hard for both types of learners, but it is especially hard for active learners.

Sensing and intuitive learners

- Sensitive learners tend to like to learn facts; intuitive learners often prefer to discover possibilities and relationships.
- Sensors often like to solve problems with proven methods and dislike complications and surprises, while intuitives like innovation and dislike repetition.
- Sensors are more likely than Intuitives to resent being tested on material not explicitly covered in class.

- Sensors tend to be patient with details and are good at memorizing facts and doing hands-on (lab) work. Intuitives are better at grasping new concepts and are often more comfortable with abstractions and mathematical formulations than Sensors.
- Sensors tend to be more practical and cautious than intuitors; intuitors tend to work faster and be more innovative than sensors.
- Sensors do not like courses that have no obvious connection to the real world;
- Intuitives do not like "plug-and-chug" courses that involve a lot of memorization and rote calculations.

Visual and verbal learners

- Visual learners remember best what they see-pictures, diagrams, flowcharts, timelines, movies, and demonstrations. Verbal learners are better at remembering words - written and oral explanations. Everyone learns more when information is presented visually as well as verbally.
- In most Higher Education Institutions or colleges courses, very little visual information is presented: Students mainly listen to lectures and read material written on blackboards, in textbooks, and handouts. Unfortunately, most people are visual learners, which means that most students do not understand nearly as much as they could if more visuals were used in the classroom. Good learners are able to process information that is presented either visually or verbally.

Sequential and global learners

- Sequential learners tend to learn in linear steps, with each step logically following the previous one. Global learners tend to learn in leaps and bounds, absorbing material almost randomly without making connections and then suddenly "grasping" it.
- Sequential learners tend to follow logical steps in their search for solutions; Global learners may be able to solve complex problems quickly or put things

- together in novel ways once they grasp the big picture, but they may have difficulty explaining how they did it.

1.3 When does innovation happen? What are its distinctive features?

Innovation in education, unlike the traditional educational settings, should transform students from “knowledge consumers” into “knowledge manufacturers” by placing them at the center of innovative educational settings. [P. Sahlberg. Creativity and innovation for lifelong learning, Lifelong Learning in Europe Journal, Vol.14, 56-60, 2009.]

This implies a notable paradigm shift into the system, moving from an old-fashioned teaching-centred approach to a learner-centred one, where learners shall take their primary role back and make the whole educational action gravitate around their specific needs. Passive transfer of knowledge and information from teachers to students are to be replaced by new learning models based on peer relationships, where learners are called to take a proactive role in the acquisition of skills and competences, while teachers shall gradually assimilate features of ‘coaches’ or ‘mentors’, facilitating the educational growth of their mentee.

Knowledge -building, problem-solving, critical thinking, collaboration, self-regulation and the use of technology for learning are the amongst the most relevant learning outcomes of the 21st century, where the need to place the student at the center of educational processes will be the key to ensure innovation (OECD, 2010)

Inspired by the OECD's definition of innovation, we can suggest the following dimensions for measuring innovation:



designed by Freepik

Output Innovation

this involves a good or service that is new or significantly improved. In the education sector, a product innovation can be a new or significantly improved curriculum, a new educational software, etc

Process innovation

this involves a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. In education, this can for example be a new or significantly improved pedagogy.

Organisational innovation

this involves introducing a new organisational method in the institution's internal practices or external relationships. In education, this can mean for example a new way to organise the work between teachers, or organisational changes in the administrative area (OECD, 2007).

Therefore, innovation triggers in education can result from the interaction of multiple factors. In particular, the following sources can be listed, organized around different categories:

1. STRATEGY & METHODOLOGY: adoption of new pedagogies, learning delivery methods and objectives, even adapting them from different fields or contexts.

2. **LEARNERS**: stimulate creative and innovative thinking from your learners, actively engaging them into "learning challenges" that will efficiently enable them to put in practice the acquired knowledge.
3. **INFORMATION TECHNOLOGY (IT)**: Technology shall only serve true educational purposes, facilitating the teacher-learner and learner-learner interactions while opening new solutions to knowledge transfer.
4. **INTERDISCIPLINARITY**: Break the walls between different disciplines, fostering cross-fertilisation between various fields through the transfer of specific methods and/or tools.
5. **IMPACT & ASSESSMENT**: Define new metrics to track learners' performance towards their goals and the impact of every activity planned.

2. DEFINITION OF THE COURSE OBJECTIVE

2.1 Value Proposition

With new solutions produced in innovative learning ecosystems we build well-being and a sustainable future for people and our living environment.

Innovation does not happen in isolation, but it comes from sharing and the circulation of methods. To ensure innovation doesn't happen in a vacuum and is applicable in different local contexts, we need to work across borders and cultures as well. Innovation needs discussion and interaction.

Value proposition

The INNO-TEC-LAB courses offer a possibility to orientate to the professional field and studies with a possibility to solve real life problems. Real life problems can be local or global, concerning innovative product and service concepts, developing urban/rural environment to increase the well-being of inhabitants or innovative marketing campaings etc. It prepares the

learners for the continuing changing working life. It motivates to create and maintain a sustainable future by teaching new competencies needed in the future labour market and society; especially competences to innovate which are needed in every discipline: critical thinking, systems thinking, creativity, initiative, teamwork and networking. After the course, learners can pitch their competences and skills in multi and interdisciplinary digital learning with graphics and design programs.

With critical thinking we mean the ability to think clearly and rationally, and understand the logical connection between ideas. Critical thinking requires you to use your ability to reason. Critical thinkers are active learners rather than passive recipients of information.¹

Systems thinking is a method to analyse the relationships between the system's parts to understand the potential for better decision-making. The system isn't just a collection of things, it consists of elements, interconnections and a purpose. A group of students studying in a team is a system, with elements such as designers, visualists, group manager, trainer, challenge, learning environment. Interconnections are group rules, strategies and communications. The purpose is to solve a problem, have fun, and increase various competences. We are all members of numerous systems and subsystems.²

To address current global challenges, we need multidisciplinary collaboration, both with students but maybe even more so among the teachers and coaches that support them. The culture of sharing between different institutions, places and industries that the set-up of this module facilitates, provides hands on experience to learn across cultures and borders. It gives global team working competencies in the field of one's own.

¹ <https://www.skillsyouneed.com/learn/critical-thinking.html>

² <https://gofore.com/what-is-systems-thinking-and-how-should-i-use-it/>

2.2 Benefits and needs

Which benefits will we provide to participants, and how are they related to their training/professional needs?

Participants (both students and trainers) learn to bring their expertise to solve society-based problems both in local and global context, in multidisciplinary multinational teams. They learn to receive feedback and critic from peers and working life. Self-assessment, peer review and feedback sessions with working groups are essential parts of the innovation process.

Peer-to-peer assessment is good for involving learners to take responsibility for assessing the work of their peers against set assessment criteria. Peer assessment is useful in increasing the learners' judgement skills, critiquing abilities and self-awareness. Peer-to-peer assessment can be used both for individual and group assessment.³ All of us need a space to reflect, stand still, slow down, disconnect from an all connected world occasionally. This should be offered as well to enhance the innovation process. There are two core target groups involved in the INNO-TECH-LAB learning model, the trainers and the students.



designed by Freepik



designed by Freepik

³ <https://www.reading.ac.uk/engageinassessment/peer-and-self-assessment/peer-assessment/eia-peer-assessment.aspx>

1) Trainers' needs and benefits



designed by Freepik

The trainers need and learn to adopt a new multifaceted role in working with the learners and a shift from teacher-centered methods to learner-centeredness. Anybody can be in the center of the teaching/learning process, anybody can be a teacher and a learner. The teachers also need to learn how to master new digital tools for teaching/learning in their new role. The trainers also need to understand the theoretical aspects of the subject of their teaching practice and be able to tutor/mentor the students with the needed research process. Applied research is needed to develop the operations, products and services in real life-based assignments. By facilitating this diverse learning environment for the learners (in the sense of disciplines as well as tools), the teacher also directly learns how to orchestrate projects with multiple stakeholders, and how to connect education, research and practical application in the industry.

2) Students' needs and benefits



designed by Freepik

The INNO-TEC-LAB studies supplement students' competencies in their own field and target of interest. The students can distinguish their own role in a multidisciplinary professional field. They can get motivated towards their own orientation and possibilities. Concrete networking with professionals and

students from different disciplines gives the students a new insight also from the viewpoint of the future professions. Through working on practical cases connected to their local context, they already acquire real life experience while still having the space to fail, reflect, and learn consciously. This will also shape their mindset for their later professional life, instigating a mindset of life-long learning, experimenting and spotting opportunities.

3) Community needs and benefits



designed by Freepik

The community learning skills for innovation increase. The community needs a formal innovation group or center to lead the learning process and studies, and also a digital platform for informal communication and chat around innovation process and learning or "semiformal morning coffee" with a leader from the formal innovation group.

2.3 Learning offer

What will be our learning offer to the target groups?

1) Trainers

INNO-TEC-LAB offers challenging and interesting pedagogical situations and environments, opportunity to use your own innovation and creative competencies, exit from the traditional everyday routines, networking with working life and teachers from other degree programmes, cross-fertilization in teaching methods, wide dissemination possibilities of the learning module and the results. It increases project management and team leading skills, while emphasising cross-national exchange.

2) Students

INNO-TEC-LAB offers contemporary real-life interesting and challenging problems to solve, creative and innovative way of thinking, new social contacts and networks, free student-centered learning opportunities, contact with working life, new multidisciplinary contents to e-portfolios, project management, self management and teamwork skills. It teaches bringing one's own competence to the multidisciplinary group as a specialist. Learning (e.g. service design) research methods in earlier stage of studies (before Thesis) gives a new tool to implement the study plan.

2.4 Training gaps

What is the training gap(s) that we are addressing?

1) Trainers

- Learning to use and develop new digital learning environments (Moodle, Zoom, Google, Microsoft etc.), also in community formation.
- Using and developing new pedagogical approaches like innovation pedagogics⁴, flipped classroom, ePortfolio, augmented reality and gamification, blended learning, cloud services in teaching, etc.
- Combining theory and practice in a new way, using service design based learning including user research.
- Producing significant learning experiences and impressive learning.
- Forecasting the future trends and weak signals with forecasting tools.
- Using Innovation Process model with 7 main stages: 1. Challenge Presentation and Free Brainstorming 2. Screening and Coding of Ideas 3. Research 4. Analyzing the Research and Defining the Requirements for the Product or Service (Design Drivers) 5. Design Phases 6. Implementation and Prototyping 7. Presentation, poster and feedback (Metropolia´s model) or a modified INNOTECH-LAB-version.
- Effectively connecting research, education, and industry.
- Finding a new joy of teaching.

⁴ <https://innopeda.turkuamk.fi/language/en/home/>

2) Students

- creative and innovative way of thinking in problem solving,
- LBD (learning by doing), PBL(problem based learning) in multidisciplinary, even international, networking situations, co-design,
- space to experiment and explore, while at the same time working on real life challenges.
- multidisciplinary researching skills.
- learning to handle unexpected conflicts.
- seeing the future with hope and possibilities, empowerment, bigger confidence in their own skills and role in their future professional career.

2.5 Key elements of the course objective:

The INNOTECH-LAB Learning Module is connected interactively with the real life problems and situations and it is based on sustainability. The outcome of the challenge is not pre-determined but open for creative outcomes. It is driven in well-managed multidisciplinary and sometimes even international study groups with online or hybrid implementations. It advances skills in creativity, innovativeness, client- and user-based research, systems and critical thinking, self-management, teamworking, co-designing and new technology with business and added value orientation, content-creating and reporting. After the course the learner is able to sell his/her ideas (pitching). The learner is empowered and sees the future with bigger confidence and understanding.

3. Topics and Learning Outcomes

3.1 Definition of Learning Outcome (LO)

The 2008 Recommendation of the European Parliament and the Council on the establishment of the European Qualifications Framework for lifelong learning (EQF) defines learning outcomes as '*[...]statements of what an individual should know, understand and/or be able to do at the end of a learning process.*'⁵

The learning outcomes approach strengthens the focus on the individual learner and the level of knowledge, skills and competence they are expected to achieve, collaboratively authored and accepted. We are defining the learning outcomes in terms of knowledge, skills, and competence:

- **Knowledge:** the outcome of the assimilation of information through learning.
- **Skills:** the ability to apply knowledge and use know-how to complete tasks and solve problems.
- **Competence:** the proven ability to use knowledge, skills, and personal, social and/or methodological abilities in work or study situations and professional and personal development.

⁵ The full text of the Recommendation in English and other European languages is available at <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32008H0506%2801%29>

3.2 Learning Outcomes for the Train the Trainers

The 'Train the Trainers' programme will be addressed to staff of members of the consortium and rectors, professors, teachers, trainers involved. It will be aimed at delivering the following Learning Outcomes

LO1: The Trainer can apply a 'coaching' approach to instructional design, enhancing students' confidence in learning oriented to professional consciousness and continuous development.

Knowledge	Skills	Competences
The Trainer knows the basics of coaching and counselling techniques, including theoretical framework, rationale and application strategies within Higher Education.	The Trainer is able to apply coaching strategies with his/her students, aimed at developing their professional consciousness and profiling against the current labour market.	The Trainer can develop a training model on self-coaching, enhancing students' autonomy in learning to unlock their potential and talent.

LO2: The Trainers are able to bring innovative elements into their learning programme through the application of interdisciplinarity and collaborative digital tools.

Knowledge	Skills	Competences
The Trainer knows the principles of collaborative and lateral thinking, including how they can affect the educational approach to generate innovation within different fields.	The Trainer can integrate collaborative and lateral thinking into his/her learning programme, identifying and exploiting suitable digital tools aimed at proficient collaboration.	The Trainer can lead a team for the design and implementation of an innovative and interdisciplinary learning project.

3.3 Learning Outcomes for the INNO-TEC-LAB Courses

The INNO-TEC-LAB Courses will be addressed to the students of technical careers and organised into the universities/entities participating to the project. They will be held by some of the Trainers participating to the previous Train-the-Trainer sessions.

<p>LO1: The learner is able to understand and analyse the elements composing a framework for innovation and how this is applied to a learning path, leveraging on the synergies between different disciplines (interdisciplinarity).</p>		
<p>Knowledge The learner knows the principles of innovation mindset, collaborative and lateral thinking, including how they can affect the learning approach to generate innovation within different fields.</p>	<p>Skills The learner is able to recognise and exploit innovative elements within the learning programme undertaken, using collaborative digital tools with proficiency.</p>	<p>Competences The learner can fully understand and apply the innovative tools and framework linked to his/her learning path, adopting a critical stance on his/her own performance through self-evaluation.</p>

4. Profile of participants and selection criteria

4.1 Profile of participants

Although the number of higher education graduates (according to Eurostat) continues to improve at 37.9% and good progress is being made towards the common headline goal of Europe 2020, the employability of graduates remains stagnant throughout the European Union. The value of an integrated framework encompassing flexibility and permeability between learning experiences has been confirmed and this requires coherent policies on higher education and skills development of favoring the development of curricula that are increasingly relevant to the labor market and social needs.

The conditions which the world is facing, interdependence, growing access and exposure to information, progress in technology and globalization, is transforming society by impacting all aspects of the world's ecosystem, and in particular human life: governmental, cultural and socio-economical. As the challenges and problems, we are faced with evolving, so does the need for advanced cognitive and socio-behavioral skills. Recognizing this is as much a priority for the labor market that has already started demanding new professional competences, as it is for Higher Education, needing support learners in gaining necessary skills to thrive in the workspace of the future.

The project has identified the main beneficiaries and target groups as follows:

- Higher Education institutions and Universities**

Academic staff, professors, teachers, lecturers, trainers and researchers of involved entities. The academic staff, teachers/instructors and researchers will benefit from the development of novel training and learning modules, methodologies and tools which will allow the partners to improve the response of their curricula to the complexity of the global society and market, while enhancing their overall teaching and research capacity.

- **Students**

Students will familiarize themselves with interdisciplinary approaches and tools through development of projects in multi-disciplinary teams at a local level (on-site within their home institution), and at transnational level (on-line through the project platform).

- **Public Authorities, policymakers and business sector**

Public authorities are fundamental for the project sustainability due to their influence on the application of policies at local, regional, national and European level. Policymakers constitute a group that influences innovation policy plans and implementation and also act as potential beneficiaries. The business sector can be considered as the end user, a community of diversified players that needs to be reached and invited to share and discuss its needs and perspectives concerning the current and future workspace.

4.2 Selection criteria

To select the participants to the INNOTEC-LAB learning module the participants will have to agree with certain selection criteria.

One of the most selection criteria is gender equality. According to Eurostat data, in European union, women accounted for slightly over half (53.3%) of tertiary education graduates in the natural sciences and mathematics and statistics but were only slightly over a quarter (27.7%) of engineering, manufacturing and construction tertiary education graduates in 2016. The gender gap is especially wide in information and communication technologies, where women were less than a fifth (18.8%) of tertiary education graduates. These data can also be found also in the Study and Work in the EU: set apart by gender by Eige. According to Eurostat, figures from the European Commission (2017) suggested there was a majority of female scientists and Engineers in Lithuania (57% female) and Poland (48%). Under the EU average (41%) Finland (29%), and the Netherlands (39%). In Italy, 35% of engineers and scientists are female. According to the latest statistics, about three-quarters of female graduates in science, technology, engineering, and mathematics find jobs in those sectors after their studies – 10 percentage points lower than the employment rate of men with the same qualification.

How shall we identify and select participants to the INNO-TEC-LAB courses?

Gender neutrality: equal representation of different genders shall always be guaranteed. To be more specific, INNOTEC-LAB gender-equality trainers have the relevant knowledge, skills and values that allow them to contribute to the effective implementation of the gender-mainstreaming strategy in their field, organisation, institution or country.

Curiosity: Good learners are curious. Curiosity is the key to learning. In fact, studies show that learners are much more likely to remember information they have learned about a subject when they are curious

Understanding and Imbibing. They read, write, evaluate and analyze what is to be imbibed and learn accordingly. This process is repeated and done continuously with dedication to produce the desired result after learning.

Making Learning Fun. Good learners do not give up and instead find aids and ways to make learning fun. Learning isn't a one-off event. It requires repetition and dedication. If the experience is fun, learners will stay curious and keep coming back for more.

Successes and Failures. Good learners experience both successes and failures and appreciate both. These learners do not underestimate themselves, they celebrate both successes and failures, and they appreciate those who have helped them.

Innovating ideas. Learners do not stop at what is presented before them. They strive for newer and more innovative concepts and approaches. Innovative learners are self-directed learners, who are flexible with their knowledge and learn as they go, adapt to the situation, use their critical thinking and simply put – learn by exploring. This exploration comes in various forms – physical, technological, mental, etc.

Asking Questions. It is important to look for answers but at the same time, it is important to look for questions to the answers we have. Learners who ask questions tend to be more likable, but they also know how they can build intimacy between them and others.

Sharing what is learnt. What has been learnt when shared grows several folds and active learning is facilitated more rapidly. Thus, good learners don't just learn, they also teach

further and generate a network of learning around them. This is done through discussion and sharing of notes etc.⁶

4.3 Selection questionnaire

It could be Likert scale. For the strength of motivation - Likert scale Strength of Motivation (1 = completely disagree; 5 = completely agree).

For the type of motivation - Learning Self-Regulation Questionnaire (Likert scale with some open-ended questions.)

Sets of criteria should be laid down for both teachers and learners, including:

- Background
- English competences (B2 minimum)
- Motivation

Step 1: Profile - Determine the characteristics of the appropriate learners

What defines a good or even learner? How do you recognise talent? On the basis of an extensive learner profile, you can determine different criteria for selection.

Step 2: Selection criteria - Translate the learner profile to selection criteria

For example, we look for leadership skills, personal skills, passion for the transmission, cognitive skills, study skills and motivation.

For example, one of the criteria candidates are selected for are transmission qualities. We define this quality as the ability to lead and inspire people as well as employees. This quality

⁶ <https://www.edupsych.in/post/2017/06/20/7-important-characteristics-of-a-good-learner>

is measured by looking at the following skills: high self-discipline, structure in dealing with tasks, prepared to work and focus on completing tasks.

Step 3: Execution- Determine the way of selecting

- Hold a structured interview of 30 minutes with a trained interviewer and a learner (in alternative, a self-introduction video might be sent by the learner and checked for evaluation);
- a motivation test.

Step 4: Assessment - Assessing the results

After the selection, all learners will be informed. Just like an assessment in business, a selection day provides a valuable learning experience.

Teachers and professors

Gender equality	<input type="checkbox"/>
English proficiency	<input type="checkbox"/>
Teach laboratory classes	<input type="checkbox"/>
Motivation (in written)	<input type="checkbox"/>
How they would implement innovation in their own teaching	<input type="checkbox"/>
IT competences	<input type="checkbox"/>

Students

Gender equality	<input type="checkbox"/>
Recommended English proficiency	<input type="checkbox"/>
Being enrolled in a technical or designing career including lab activity	<input type="checkbox"/>
First year(s) of the course (i.e. not being at the end of the career)	<input type="checkbox"/>
Motivation (in written or short video presentation)	<input type="checkbox"/>
IT competences	<input type="checkbox"/>

Set minimum and maximum of participants for the 2 sessions.

5. Methodology and Communication Procedures

You'll transform your team of trainers when you embark on the Train the Trainer path. Here's a quick list of the best practices when it comes to the Train the Trainer approach:

- Be sure you select the best individuals to be trained. Think about the talents and skill sets of your workplace. Don't be afraid to think outside of the box. Obvious leaders aren't always the best trainers. Teaching will be a key component to successful training.
- Prepare everyone for mistakes. They will happen. Be encouraging. If someone is afraid to try something new, this will really hold your company back. Practice, practice, practice. Things will get smoother with time and revision.
- Constructive criticism can be tough on individuals. But close observation and honest feedback lie at the root of this project. It's all about maximizing efficiency. Explain early on that everyone is learning. Everyone is growing and getting better.
- You must track results. Your trainers will be excited to know how they performed and what they can do to improve. This will require time, homework assignments, and individual follow-up.

[Train the Trainer Approach Advantages](#)

Here, you'll learn the benefits of Train the Trainer program. You'll see trainers in your company learning practical skills. They'll also learn instructional skills, platform techniques, and confidence. Train the trainer skills include necessary critical thinking that will prove useful as trainers teach. They'll understand keys to retention.

You'll notice with this program that trainers become more authoritative and engaging. They'll spark questions and encourage healthy discussion. Trainers in the Train the Trainer method will be exposed to the subject matter. But they'll also collide with learning theory along with

human psychology. They'll understand that everyone learns differently. They'll know how to appeal to a diverse crowd.

Train the Trainer qualification and certification deems these trainers as competent. It also ensures that they have the required skills to yield results in the classroom, workshops, and training courses. Rest assured that your trainers will be effective subject matter experts.

Train the Trainer Approach Disadvantages

There are really no disadvantages in a well-planned and executed Train the Trainer program. The only disadvantage you may face comes when you attempt to organize the method on your own.

Here's a list of considerations surrounding a successful Train the Trainer approach:

- Your trainers will need to feel as if they are experiencing real-life situations.
- You'll need to assess their knowledge early on. Thoroughly examine what they know in subject matter and instruction.
- Build confidence as you target trainers' weaknesses, problems, and issues.
- You need to see trainers in action and provide individual feedback if you want each trainer to improve.
- Teach your trainers foundational elements but also encourage creativity, freedom, and flexibility when appropriate.
- You may be feeling overwhelmed. And for good reason. It's a huge responsibility to be sure the people training others are trained properly themselves.

6. Activities and Resources

The learning module will promote the organization of online courses, only or in addition to in situ courses. A Moodle platform will promote the implementation of online courses. In the platform, trainees could access to:

- live sessions (recorded for further accesses)
- papers and reports
- videos and podcasts
- forum
- self-evaluation tools
- project works

To take part in the online courses, people need:

- an email address and an account to access to the platform (provided by the Coordinator)
- a computer, a tablet or a smartphone
- internet connection (wifi or LAN)
- a camera

What type of activities will be put in practice?

One way to facilitate learning by doing/experiential learning would be to shape a learning cycle of 1. Action (concrete experience), 2. Reflection, 3. Abstraction of learnings, 4. Implementation of learnings through experimentation (see Kolb's model of experiential learning⁷) Depending on the specific set-up of the learning module, it could be valuable to balance both synchronous and asynchronous work activities.

⁷ https://en.wikipedia.org/wiki/Kolb%27s_experiential_learning

Suggested synchronous activities (in live sessions)

- Project-work in small teams, in the form of online co-creation (learning and testing certain (design) methods, brainstorming, visualising, possibly online prototyping)
- Q&A with course leader / facilitator
- Peer-to-peer discussions and reflection in small groups

Suggested asynchronous activities (individually and/or in-between live sessions)

- Personal introductions and some team activities (can also be synchronous, but it might save time to either revert this to the forum or another place where it can be shared and checked asynchronously)
- Exploration of theory (papers, reports, videos, podcasts) with a reflective assignment attached (this could be a short quiz, a short write up of certain questions, or working out a particular method, which serves as input for the live session)
- Providing peer-to-peer feedback on work of other trainees
- Testing of experiments: since much of the work will be online, it would be recommended to send participants also out "into the real world" - this could be through (user/ethnographic) research, designing and testing prototypes etc.

To keep in mind; evaluation - not for a grade, but indeed related to certain competences. Think of ways to evaluate this properly (via self-assessment, peer-to-peer etc).

7. Learning Assessment

7.1 Types of learning assessment

With "Learning Assessment", we refer to the methods and tools adopted to assess learning progress and results, measuring them against a set of indicators previously defined. Before performing any assessment it is important to ask ourselves three questions:

- What is the assessment for?
- Who is it for?
- What is the context?

Assessment can be used for formative or summative purposes, thus impacting on the choice for the methods and tools to be used.

Formative Approach: "*Provide feedback to the learning process or learning career, indicating strengths and weaknesses and providing a basis for personal or organisational improvement*". (Validation of non-formal and informal learning in Europe – a snapshot 2007. Cedefop, 2008).

Summative Approach: "*Generate a concluding statement about learning achieved to date. It is explicitly about the formalisation and certification of learning outcomes*." (Validation of non-formal and informal learning in Europe – a snapshot 2007. Cedefop, 2008). It is linked to and integrated into institutions and bodies authorised to award certifications.

Even though there is a difference between these approaches, in many cases tools can be used for both purposes. Within formative and summative approaches, there are methods to extract evidence (i.e. tests and examinations, conversational methods, observation, simulations and evidences extracted from work) and methods for documenting and presenting evidence (i.e. CV's, third party declarations and portfolios).

Within the context of the INNO-TEC-LAB project, summative and (mostly) formative methods will be adapted to implement "Assessment for Learning" (AFL), an approach to teaching and learning aimed to create feedback used to improve students' performance. Therefore, we want to push learners towards a proactive role in their learning process, starting to think like a teacher in order to understand where they are now (current level), what they want to achieve (learning objectives) and how to get there (methodology). For this purpose, the INNO-TEC-LAB courses will particularly rely on peer-assessment, self-assessment and, where needed, project works, thus becoming increasingly more independent in their learning.

7.2 Assessment methods and activities

Teachers/Trainers

Teachers and trainers participating to the INNO-TEC-LAB "Train the trainers" will undertake a peer-to-peer evaluation, where mutual review of their performances will be implemented through a forum. Peer assessment will help to boost confidence among participating trainers, creating a friendly and informal context that will favour a smooth feedback exchange aimed at increasing everyone's performance at the same time.

Students

Students evaluation will be based on delivering a presentation on:

- self-branding pitch of their professional profile
- Evaluation of pitches has to consider if they achieve:
- the brief indication
- the aims
- the target needs

How are we going to test and validate the competences acquired by the participants?

Through the presentation of a report that relates the skills acquired with the practical issues.

It would be nice through these reports to build a series of testimonials to better tell the course and encourage the participation of future editions

How are we going to analyse the results at the end of the learning process?

The self-assessment is perfect, essential to be included in the report that participants must prepare. People who make up a skills tracking committee for technical careers will use these materials as statistical measurement tools.

Learning evaluation: presenting a interdisciplinary model regarding:

- a course they are already coordinating
- a course they would like to implement
- a course for the students training session

Evaluation of models has to consider if they achieve:

- the brief indication
- the aims
- the target needs.

8. Conclusions

This document is an attempt by the INNO-TEC-LAB consortium to collectively analyze and develop a common approach to the topic of the Learning Modules. During the codesign process we tried to answer the following questions and issues:

- a) Specific contents and activities to be implemented among students;
- b) Communication process and methods (peer-to-peer, student-teacher, teacher-teacher, teacher-university);
- c) Resources needed to implement training activities;
- d) Evaluation methodology;
- e) Goals for students' learning outcomes, including skills and competences they will develop.

A Learning Module is an organized collection of content presented together for others who want to learn more about a specific tool. The learning module is an online/ offline learning tool based on the collection of visuals, films, notes and other important documentation collected and prepared by teachers. (Newby et al., 2011). The most important part of the creation of a learning module is the planning process in which all factors that are involved in the process of the creation of the learning module have to be taken into consideration thereby leading the effective use of the learning module (Butcher, 2008).

For any learning module to be effective in its purpose, it must be able to reflect the activities that the learners go through on a day to day basis and as such the students will be able to connect and interact with the learning module because they will be able to understand what is entailed of them (Newby et al., 2011). It's the way the consortium planned the learning process around course objectives, value proposition, benefit for learners, and learning outcomes and evaluation methods. The learning styles were taken into consideration. It's why the consortium of the INNOTECLAB project strongly believed that the course will be well designed and fit to the needs of nowaday learners.

References and resources

- Butcher, M. (2008). *Learning Drupal 6 Module Development*. Packt Publishing Ltd.
- Dahlander, L., Gann, D. M., & Wallin, M. W. (2021). How open is innovation? A retrospective and ideas forward. *Research Policy*, 50(4), 104218.
- OECD. (2007). *Innovation and Growth - Rationale for an Innovation Strategy*.
<http://www.oecd.org/science/inno/39374789.pdf>
- OECD. (2010). *Inspired by technology, driven by pedagogy. A systemic approach to technology-based school innovations*. Paris: OECD.
<https://www.oecd.org/education/ceri/inspiredbytechnologydrivenbypedagogysystemicapproachtotechnology-basedschoolinnovations.htm>
- Newby, T., Stepich, D., Lehman, J., Russell, J., & Ottenbreit-Leftwich, A. (2011). *Educational Technology for Teaching and Learning (4th Edition)*. New York, NY: Pearson Publishing.
- Sternberg, R. J. (Ed.). (2000). *Handbook of intelligence*. Cambridge University Press.
- Hero, L. M. (2019). *Learning to develop innovations. Individual competence, multidisciplinary activity systems and student experience*. [Doctoral thesis, University of Turku].
https://www.utupub.fi/bitstream/handle/10024/147038/Hero_PhD_dissertation_FIN_FIN.pdf?sequence=4&isAllowed=y
- Innovation project model from Metropolia University of Applied Sciences.
- The process know-how, study materials and quiet knowledge of the teachers in innovation projects in Metropolia UAS and Amsterdam University of Applied Sciences.



Co-funded by the
Erasmus+ Programme
of the European Union

The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.