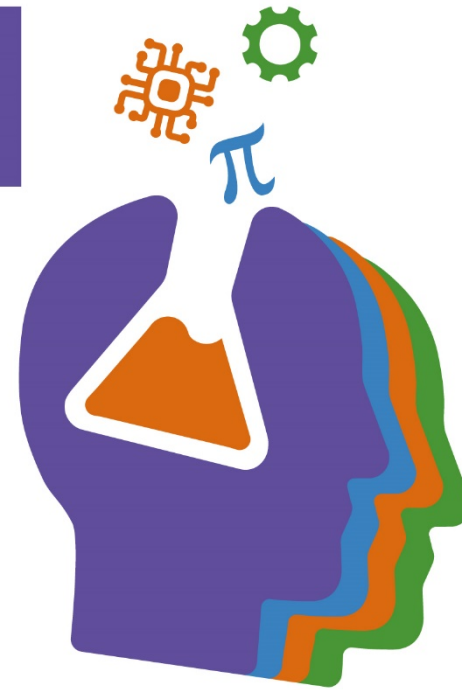


ThIN
KER
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Teacher's handbook

Guidelines to support the use of the content and tools to practice the learning projects on the THINKER LAB platform



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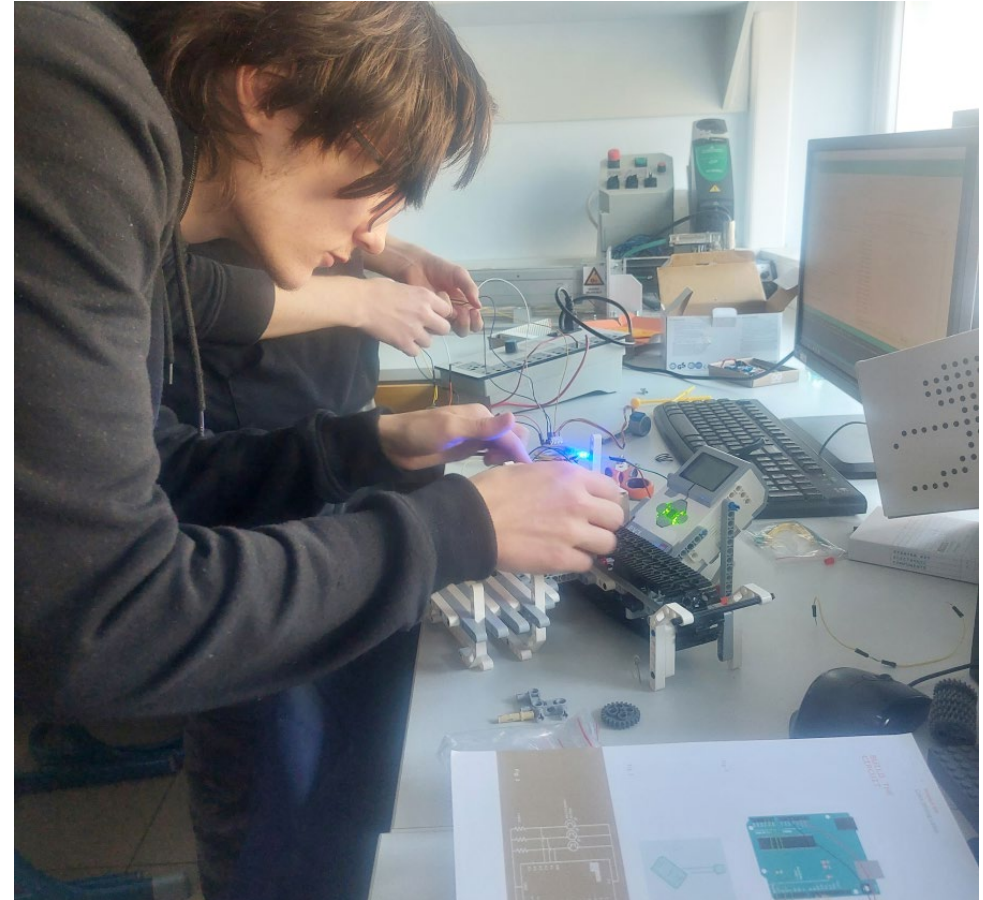


Introduction

THINKER LAB intends to broaden the educational offerings available to students weaving learning paths more connected to **co-construction learning processes** based on a **laboratory-based approach**.

The Thinker Lab platform has been made by a European-funded project aiming at improving STEM skills of students and **inclusive learning**.

This **guide** is addressed to teachers who are interested in **applying the methodology** in their **school**.



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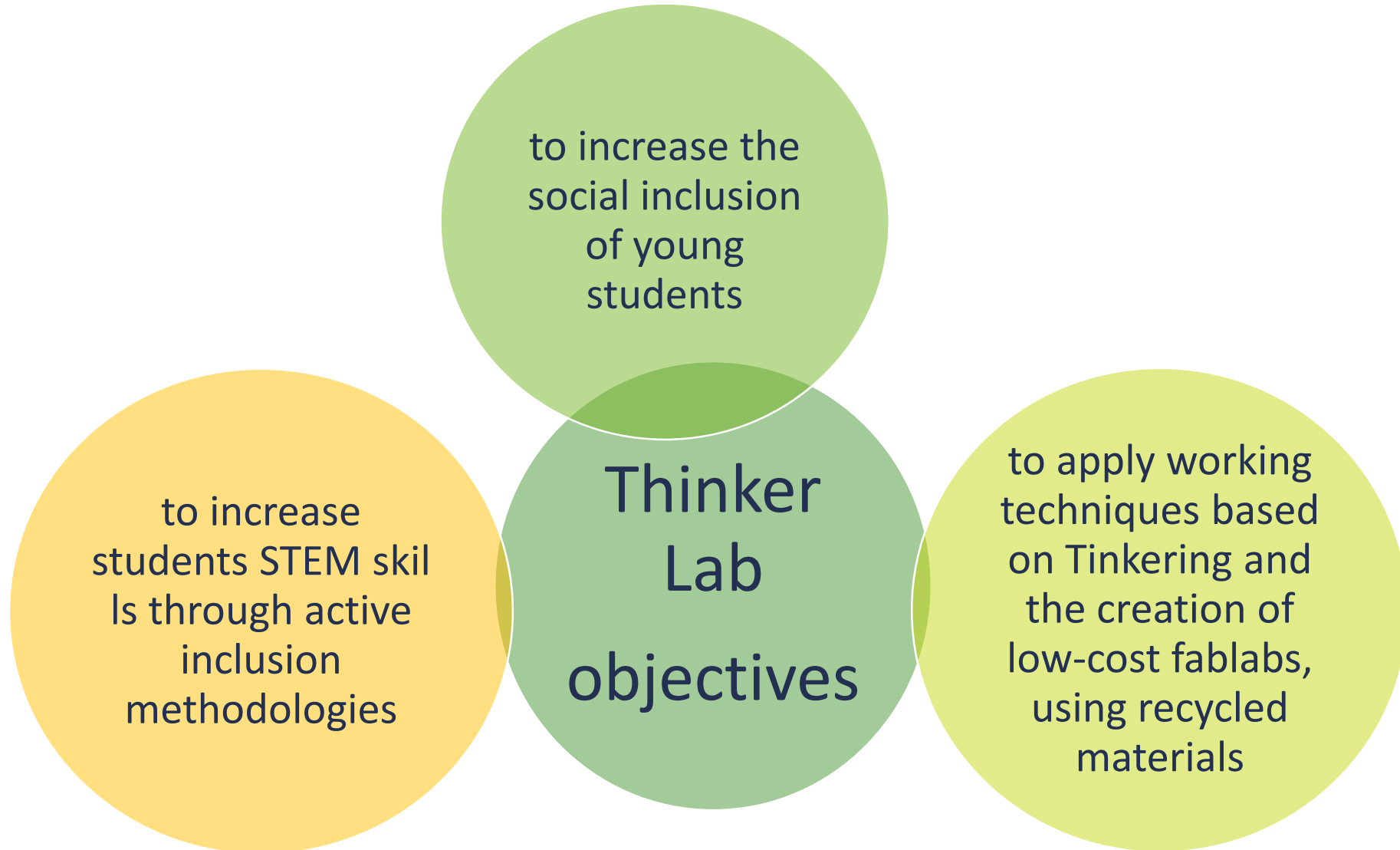




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Introduction

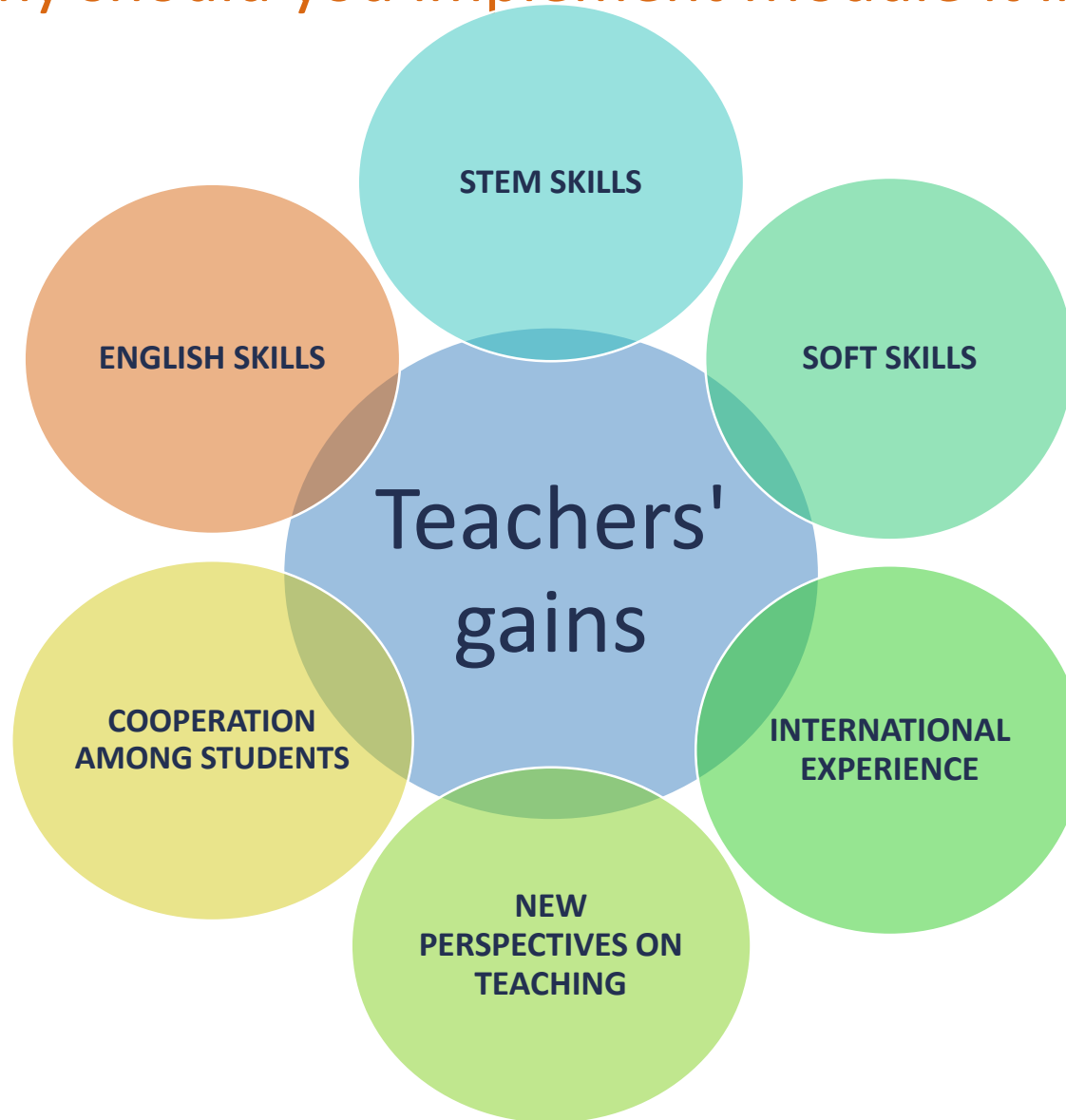




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1. Why should you implement Module it in your class?



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Teachers' skills

Teachers can help students **improve** various **STEM skills** during the implementation of the activities; at the same time, teachers can improve various skills, such as:

- Teaching inclusively, promoting the active participation of students;
- Use of online free tools;
- Improving digital skills;
- Set up and moderation of an online platform for shared projects;
- Students engagement in cooperative learning.

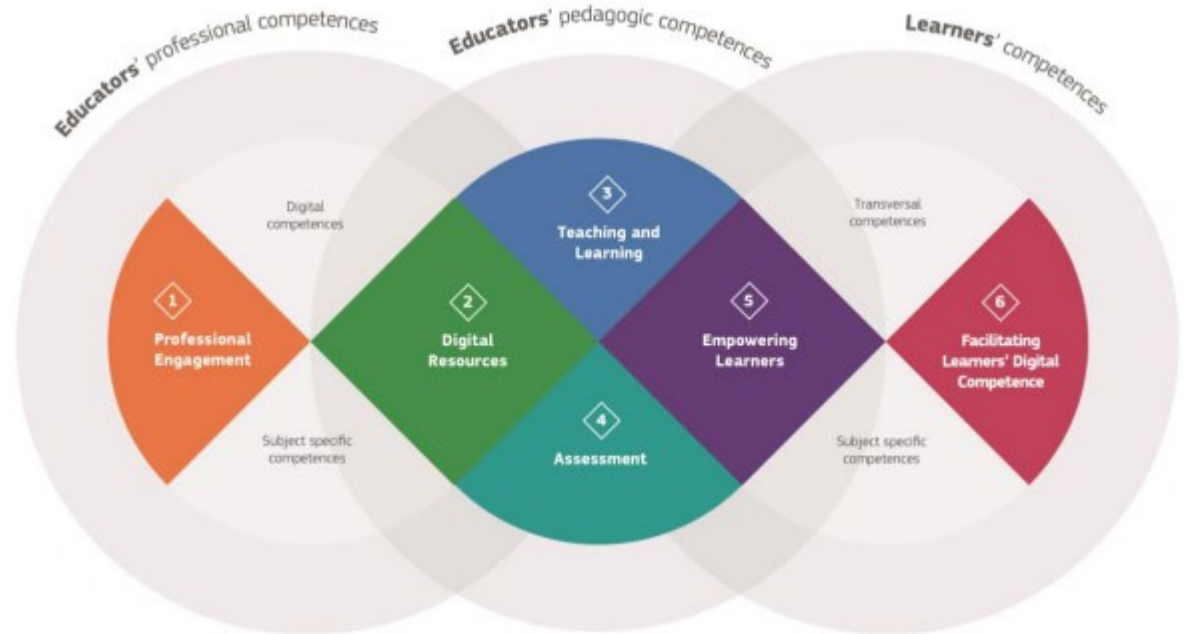


Figure 2: Conceptual approach

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Teachers' Soft skills

Teachers' **soft skills** are improved thanks to the **interaction with new colleagues**, in an **intercultural environment**, where communication with other cultures is needed, as much as adaptability and flexibility in teaching - be ready to adapt your language and your didactical rhythm!



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International experience

By implementing the project, teachers access to an **international opportunity** and cooperate with their peers abroad, experimenting didactical activities in an **intercultural and English-speaking context**.



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Participating to an international experience allows teachers to **practice and improve** their **English** language skills.



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New perspectives on teaching

By implementing Thinker Lab approach, teachers **merge** their **experience** in teaching **with European colleagues**, using **TINKERING** and **LABORATORY** approach.

Teachers learn from each other and together get to **develop new practices** and **new perspectives on their teaching**.



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Transferability and Evaluation

For teachers to ensure that their performance is effective for their students' development, **clear evaluation criteria** should be carried out, to ensure the success of both students and teachers. This evaluation criteria should be **specific, measurable, and aligned with educational standards and goals**.



Thanks to **evaluation**, teachers can understand how well teaching and learning strategies are working for students and modify their methods of instruction accordingly.





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Having clear evaluation criteria



Alignment with Learning Objectives

Teachers should clearly **define learning objectives** and align their evaluation criteria with these objectives. This ensures that assessments measure what students are expected to learn.



Consistency

Ensure consistency in evaluation criteria across different assessments and among different teachers or instructors.



Transparency

It is essential to **clearly communicate evaluation criteria** to students at the beginning of each learning module or program. Transparency fosters trust and helps students understand how their performance will be assessed.



Fairness

The criteria should be fair and unbiased, treating all students **equally**. Avoid any form of discrimination or favoritism.



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A rubric

A **rubric**, is a useful assessment tool which will help teachers to create clear evaluation criteria, which lists all of the specific criteria that students work should demonstrate, and describes the quality level for each criterion.



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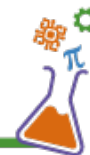


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Example of a rubric

TEACHER RUBRIC FOR SELF-ASSESSMENT OF CHALLENGE DESIGN				
	EXCELLENT LEVEL	ADEQUATE LEVEL	BASIC LEVEL	LOW LEVEL
	4	3	2	1
1.1: The learner is at the center of the challenge	Situations are provided for students to conduct research and express their knowledge and doubts: being responsible for the whole investigation, drawing conclusions that allow generalization, reflecting and taking into account students' concerns.	Contexts are provided for students to express their knowledge and doubts: being responsible for part of the research, reflecting and taking into account students' concerns.	Students are given a topic to explore in depth. Reflection and learning is taken into account.	Students are helped to progress gradually in the contents chosen by the teachers.
1.2: It is associated with a problem or a day-to-day situation.	As a starting point, students take a situation or problem from their daily life and go deeper into it. At the end of the process, some conclusions are drawn to apply to that situation.	Students apply what they have learned in their daily lives and draw some conclusions.	Students carry out activities related to their day-to-day situations.	The activities carried out have no connection with their day-to-day life.
1.3: Cooperative work is encouraged	In order for students to work cooperatively, the following aspects are developed: positive interdependence, individual responsibility, group cohesion and effective communication.	Students work in teams and collectively make decisions that affect the final production of the project.	Students work in teams.	Each student does his or her own work.
1.4: Active methodologies used	Active learning methodologies are followed: students search for information, analyze it critically, ask questions about the content and draw conclusions.	Some active learning strategies are followed: students receive information, analyze it, ask questions and draw conclusions.	The students carry out some active activities to acquire knowledge.	Students receive information.





<p>1.5: Objectives are appropriate</p>	<p>The objectives are excellent for developing the basic competences of the stage, both disciplinary and metadisciplinary, and are completely related to the contents to be studied.</p>	<p>The objectives are adequate to develop the basic competencies of the stage and are related to a certain extent to the contents to be studied.</p>	<p>The objectives are somehow related to the basic competences and the content of the stage.</p>	<p>Objectives and content are too sparse</p>
<p>1.6: Creativity is encouraged</p>	<p>The activities require students to create and communicate a production based on the knowledge and skills they are acquiring.</p>	<p>The activities require students to analyze situations in depth in accordance with the knowledge acquired.</p>	<p>The activities require students to understand the contents and apply them in new situations.</p>	<p>The activities require students to recall and/or reproduce information.</p>
<p>1.7: A variety of evaluation tools are used</p>	<p>In addition to all of the above, a series of tools are used for students to self-assess and/or co-assess their own learning and performance</p>	<p>The final activities and/or productions of the challenge are evaluated by the teacher following evaluation criteria (with rubrics or evaluation scales) and providing oral or written feedback.</p>	<p>The final activities and/or productions of the challenge are evaluated following the evaluation criteria, but without evaluation tools.</p>	<p>The challenge is not evaluated or graded</p>
<p>1.8: Adapts to the school environment and student body</p>	<p>The design of the challenge has taken into account the school environment and the diversity of the students involved.</p>	<p>The design of the challenge has taken into account the school environment and the majority of the student body.</p>	<p>The designed challenge can be suitable for any school</p>	<p>The challenge designed is not suitable for the environment and students of the school where it will be implemented.</p>



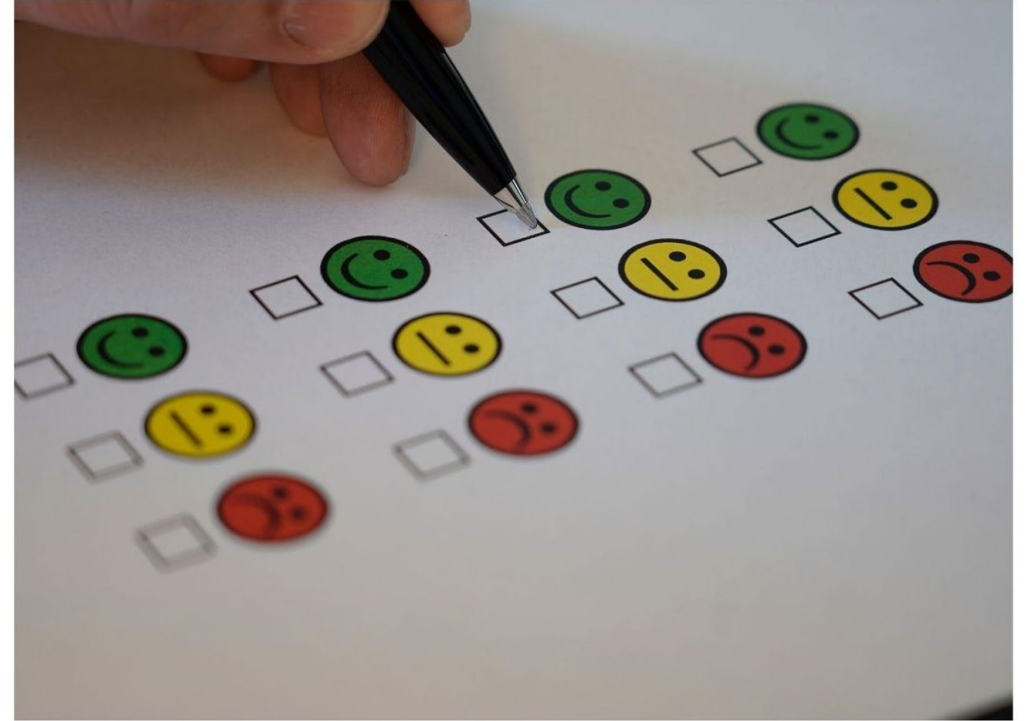


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Feedback

Student **surveys** are another great way to gather feedback on your teaching. Distribute surveys several times throughout the year, and try to incorporate a **mix of scale or number-based rating items** along with open response questions to give students a chance to provide more detailed feedback.



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Self-monitoring

When you keep thorough records of your own evaluations, it's easy to **compare your strategies** lesson-to-lesson and year-over-year. It also makes it easy to take a **comprehensive look** back at how your teaching practice and career have evolved—and that can be pretty rewarding. Teachers could use a set of questions in order to **self-evaluate themselves**.



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Self-evaluation questions

1. Teaching Approach and Methods:

- Am I effectively engaging students in the learning process?
- Are my teaching methods and materials relevant and up to date?
- Do I adapt my teaching style to different student needs and learning styles?

2. Classroom Management:

- How well do I maintain a positive and inclusive classroom environment?
- Do I address disruptive behavior and maintain discipline effectively?
- Am I promoting a safe and respectful learning space for all students?

3. Lesson Planning:

- Are my lesson plans clear, organized, and aligned with curriculum goals?
- Do I provide clear learning objectives and outcomes for each lesson?
- Am I using a variety of resources and teaching aids to enhance lessons?

4. Assessment and Feedback

- Do I provide timely and constructive feedback to students on their work?
- Are my assessments aligned with learning objectives and fair to all students?
- How do I use assessment data to adjust my teaching methods?

5. Communication and Collaboration:

- How well do I communicate with students, parents, and colleagues?
- Do I collaborate with other teachers and staff to improve the school environment?
- Am I open to feedback and suggestions from others?

6. Student-Centered Focus:

- Am I tailoring my teaching to meet the diverse needs and abilities of my students?
- Do I encourage critical thinking, problem-solving, and independent learning?
- How well do I support students' social and emotional development?

7. Time Management and Work-Life Balance:

- Am I effectively managing my time to balance teaching, grading, and personal life?
- Do I have a healthy work-life balance, avoiding burnout and stress?

8. Inclusivity and Equity:

- How inclusive and equitable is my teaching approach, considering diverse student backgrounds?
- Am I addressing issues of bias and discrimination in the classroom?
- What steps am I taking to ensure all students have equal opportunities for success?

9. Overall Satisfaction:

- How satisfied am I with my teaching performance and impact on students?
- What specific achievements am I proud of, and what areas do I want to improve?

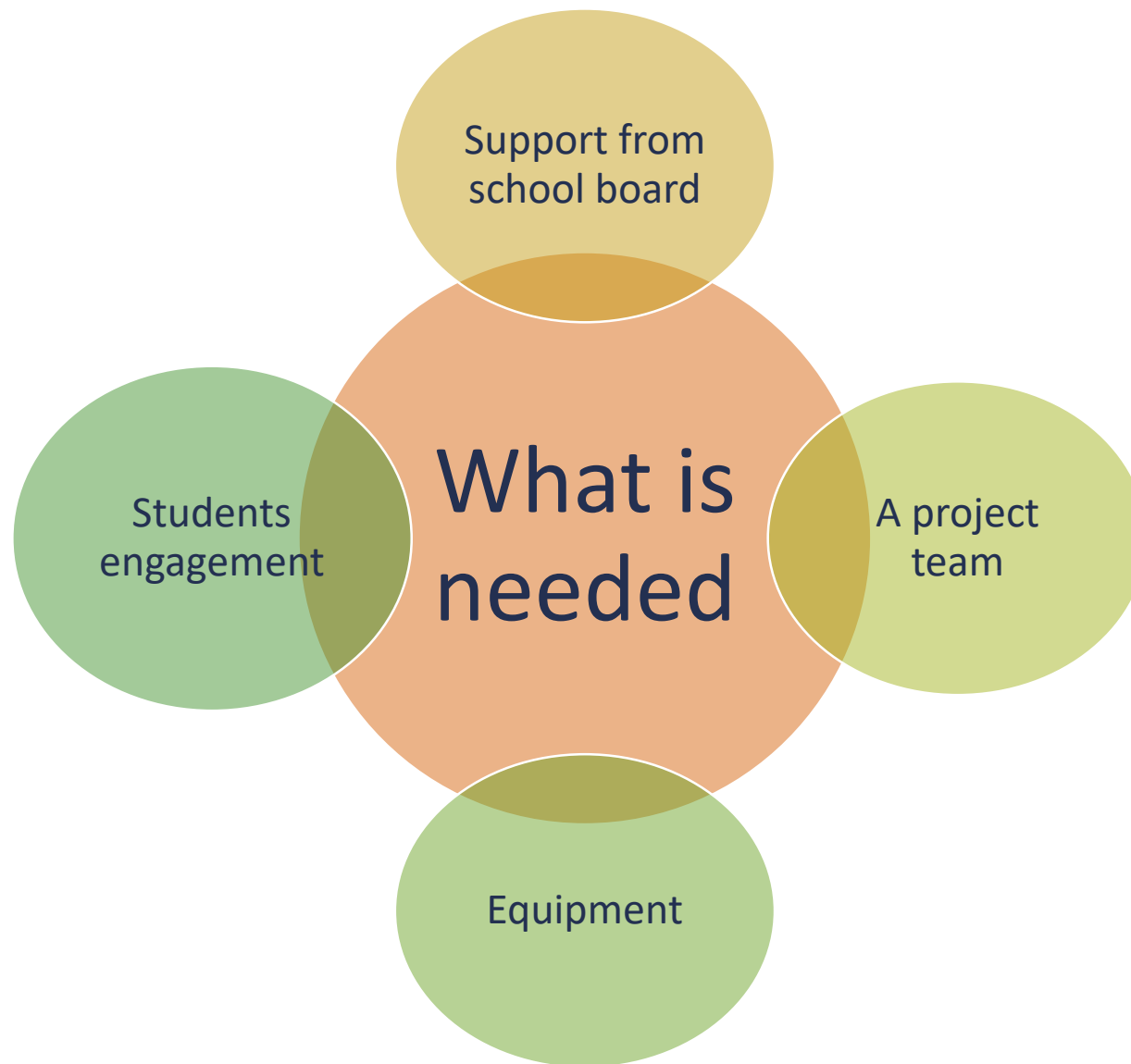




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What do you need to implement the Module?



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Support from school board and educational manager

The support from the school board and the educational manager is fundamental as they appoint a project team dedicated to the activity. Without their support, the project is likely to face difficulties and not get to the expected results.



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A project team : project manager, teachers

For a good implementation of the activities, it is important to involve and engage the teachers of all the **STEM subjects**. At the same time, it is fundamental to have a **project manager** or a member of the project team who is in charge of coordination of the activities.

The figures work together at school level and international level.

Project manager

- Coordinates the project team at school and international level. Monitors that all the activities are due on time.

Teachers

- Develop the projects in their subjects





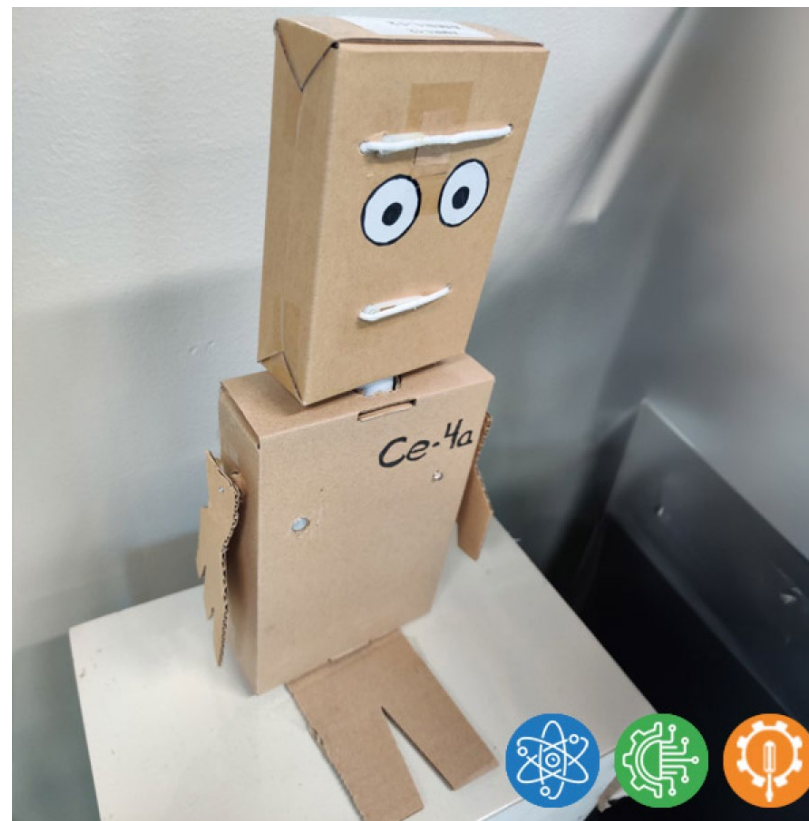
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Student's engagement

Try to engage students **from the very beginning**. Involve them in the European activity, stimulate their **curiosity** and **interest** in learning actively and in teams.

Bring them all together in **national and international skills competitions**, where they get to know each other, at least virtually.



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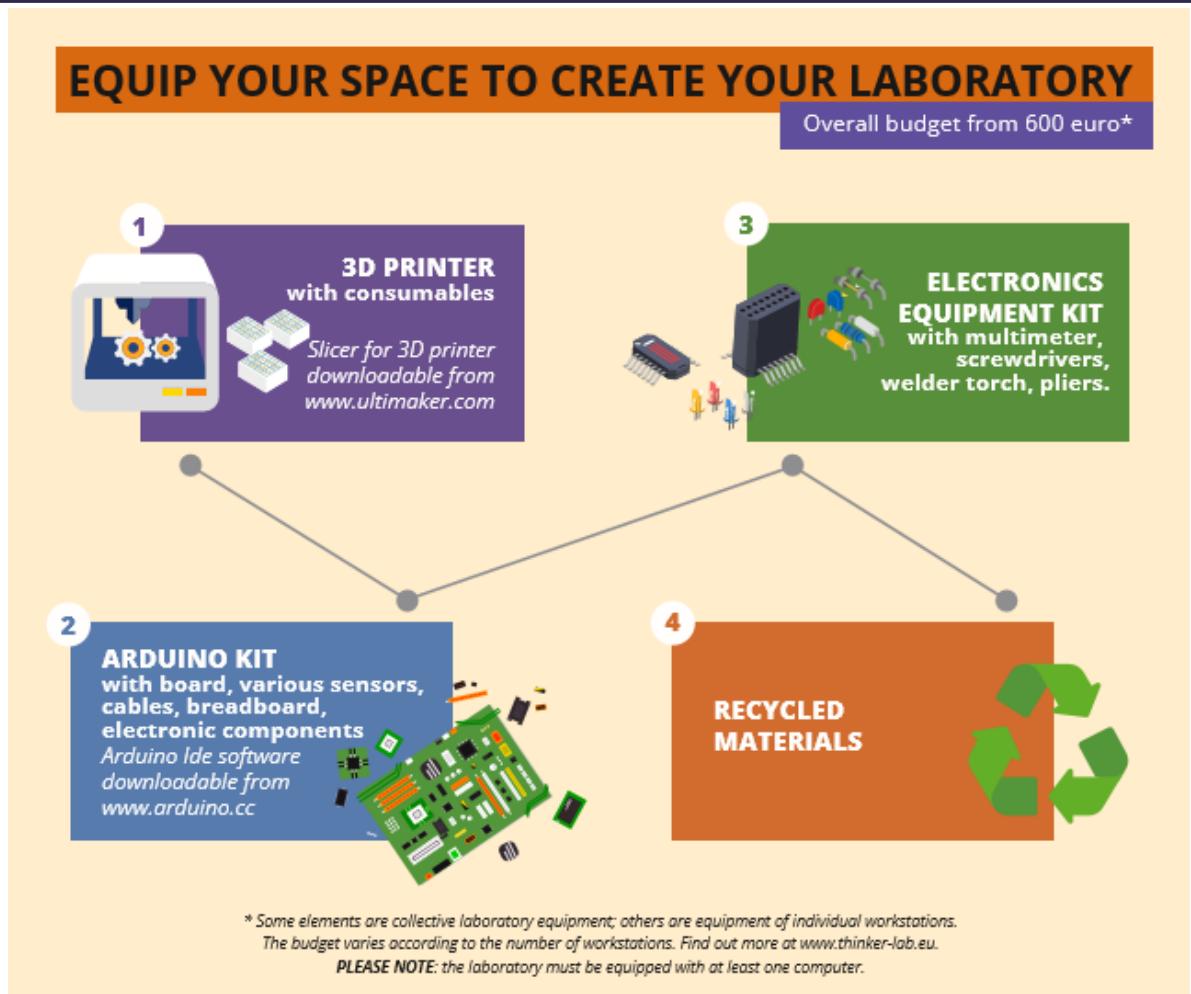
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Equipment

Some digital equipment and tools are needed to implement the activities.

Here's a short list to let you start thinking on this.





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Hackathon – how to organise the event

Organising a Hackathon is a way to stimulate **innovation** by solving a set task. The Hackathon can be organized in a variety of ways, but the goal is to run a **time-specific competitive or collaborative** event with the goal of **solving a previously defined problem** (or to create an innovation).

Hackathons promote collaboration, are inclusive, and have smaller innovation cycles. They can be online or on-site.



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Tips on how to organise a Hackaton

- Decide the **goal** of your hackaton – Is the goal to **create** a specific STEM technology or to **solve a problem**
The clearer the goal, the better to get results;
- Decide the **date** well in advance and invite participants;
- Set up clear and communicated **rules** well in advance;
- Choose the **prize**. One large or several smaller. Contact sponsors;
- Organise **training sessions** in order to increase the attractiveness of STEM and to raise the level of learning outcomes, both for teachers and students participating in the hackaton.

