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

Needs Analysis Report of Teachers and Students

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

Contents

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

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

CHAPTER 1

INTRODUCTION

The 'DESIGN FUTURES' Project

The DESIGN FUTURES project was initiated with the goal to empower the students of today to contribute to the design of a better future. Design Futures partners from four countries Greece, Italy, Netherlands, and Romania, respectively Aristoteleio College, STIMMULI for Social Change, PACO Design Collaborative, Designathon Works, Eindhoven University of Technology and All Grow, believe that we can support students' imagination, self-esteem, and making abilities by letting them experience Design Thinking and Maker Education activities at a young age. Our consortium aims to create materials that support teachers with implementing Design Thinking and Maker Education practices in their school curricula, methodologies which offer an interactive, open-ended student-driven process, multidisciplinary experiences that enhances the development of diverse skills, knowledge, and way of thinking. The two main target groups of the project are teachers (directly) and students (indirectly).

Through 'DESIGN FUTURES', we aim to support and strengthen the capabilities of teachers and educators to apply innovative practices related to Design Thinking and Maker Education in their teaching. In this way we hope to further enrich their educational practices and boost learning outcomes for their students. We envision that through the implementation of these practices in their teaching, educators will become able to support students to develop the skills, knowledge, and attitudes they need to actively engage with the world in their professional and personal futures. We, therefore, focus on engaging teachers, students, school-staff, parents, and policymakers in co-creating an ecosystem, in which students will be introduced to Design Thinking and Maker Education approaches from an early age. As a result, students will gain self-confidence through making, they will become better at collaboration and, also, develop new and creative ways of solving problems. Hence, through DESIGN FUTURES we aim to contribute to the development of students' 21st-century skills, such as creative thinking, problem-solving, teamwork, communication, and basic ICT competencies.

Shaping these skills and behaviors at an early age is important for students to later thrive in their everyday life as they allow them to become more self-confident and empowered to contribute to their communities through their knowledge and abilities. In order to succeed in harnessing these skills in students, the DESIGN FUTURES project will, through user-centered design methods, develop, test, and reflect upon a creative **Student Curriculum** that incorporates Design Thinking and Maker Education activities, a **Teacher Training** package that enables teachers to implement the activities in their curriculum, and an **Assessment methodology** that supports the teacher into assessing the students' learning outcomes and allows us to validate learning outcomes of the curriculum.

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

An overview of this report

The aim of this report is to provide contextual and cross-country insights about the training needs of the two main target groups: schools staff and students. The report includes a part for each four partner countries Greece, Italy, Netherlands, and Romania and a fifth comparative part of all four national cases as well as Introductory and Conclusions chapters including an overview of this report, data collection and analysis process as well as recommendations and lessons learned. This report provides a piece of original research with new data collected in four participating countries, with added comparative analysis between different national context. It offers a detailed and comprehensive report of participants' needs in terms of both subject content and pedagogy due to its highly participative nature, hence the capacity to involve participants in the co-design of the project, more specifically student curriculum and teachers training.

The needs assessment process started in January 2020 and included four parts. First part was the design of the methodological guide, followed by Data collection, then Data analysis, and lastly, creation of this report. It is important to emphasize that during the data collection stage the project witnessed the unprecedented outbreak of COVID-19 pandemic which impacted the work across all countries leading to indefinite school closure and widespread uncertainty. However, this unexpected turn of event provided an opportunity for the team to pivot towards an adaptable approach with innovative and flexible tools and techniques given the circumstances. The results and observations presented in this output are impacted by this event.

In Chapter 2 this report will present the needs assessment process including details about how the data were collected and analyzed. Next, in Chapters 3,4,5 and 6 an individual country analysis will be presented divided in two separate sections between School Staff and Students, which will include the results of the interview with school staff, focus groups and students workshop as well as the results of the SWOT and root cause analysis. Chapter 7 will focus mainly on a cross country analysis focusing on similarities and differences between the four countries analyzed. In the last Chapter 8 the key recommendation and design constrains for designing teachers training and student materials will be presented together with some of the key lessons learned and conclusions. Finally, the description of the questionnaires and activities that took place for both Teachers Focus Group and Students Workshop are being attached in the Annex section of this report.

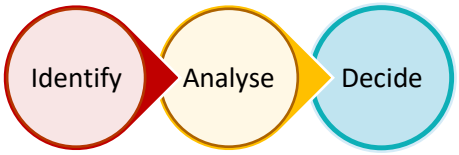
The findings of this report are imperative for the development of the project since they will be used in the design of different DESIGN FUTURES teaching training and support materials to ensure that all target groups' needs are adequately addressed. Most importantly, as part of the research all materials will be co-constructed with the groups they intend to support, increasing their agency and sense of personal interest, as well as the validity of the implemented action. The impact of the national context and participating groups of this project is expected to be significant, as the design of the intervention will be highly tailored to fit local context. Also, the voice of those participating will be heard and incorporated in the design. This embracing strategy of co-construction ensures the agency and empowerment of participants and increasing their interest by inspiring a sense of co-ownership of the initiative.

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

CHAPTER 2

NEEDS ASSESMENT PROCESS

The Needs Assessment Process included three main phases as depicted in following figure: **Identify, Analyze and Decide.**



In the **Identify** phase, the following elements were taken onboard:

- Stakeholders map and identification of key participants
- Determining what information, we need to collect to correctly determine the existing gaps
- Create the outreach strategy to collect the information from school staff and students
- Translate to local language and test the data gathering documents
- Collect information

The **Analyze** phase included:

- Analyze the prioritized needs using qualitative tools
- Conduct root cause analysis
- Analyze and synthesize the information for each country

The **Decide** phase included:

- Determine favorable factors and design constrains for teachers training and students curriculum
- Determine recommendations, conclusions and lessons learned

Purpose, goals, and assumptions

Purpose

The purpose of the need's assessment process was to engage with relevant stakeholders' school staff and students across all four participating countries to identify key needs relevant in the design of Teachers training and Student curriculum. The highly participative nature of our processes ensured that participants could become part of the co-construction of 'DESIGN FUTURES" project as they will be engaged throughout the project. With this purpose we designed data collection tools and activities that create a participative environment while capturing key needs relevant for a wider group of teachers and students.

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

Goals

The goal of teachers' interviews is to have a clear understanding of teachers' professional development and training gaps, as well as teachers experience, knowledge and interest regarding Maker Education and Design Thinking. More specifically we will assess their motivation, preferences, skills, knowledge, and behavior. Moreover, to broaden the knowledge-pool we established within our State-of-the-Art report, we based several questions in our interviews on the elements of the curricular spiderweb (van den Akker, 2003) to gain more insights in current learning activities, content, the teacher's role, materials and resources, and assessment activities. Based on the stakeholders' map, interviews with school leadership were also conducted to learn even more about the environmental and decision factors regarding the integration and adoption of Maker Education and Design Thinking methodologies.

For school staff, the focus will be on the identification of issues such as:

a) their current level of awareness and interest in Maker Education and Design Thinking and innovative teaching and learning methods,
b) knowledge gaps related to practices and applications of these pedagogies,
c) preferred methods of teacher's training, and
d) school-specific, community-specific, or cultural factors that may affect the implementation of DESIGN FUTURES and the necessity of further support.

With the purpose of designing responsive students' curriculum we design a practical workshop for **students** to identify:

a) their current state of understanding teaching methods and level of satisfaction,
b) preferences of different teaching and learning methods,
c) degree of prior experiences with Making and Designing inside and outside of school

Assumption

- School staff and students across all four countries will be available to participate in the data collection activities
- In Person workshops, interviews and focus groups will be used to collect rich qualitative data as oppose to surveys
- Partners across all countries will be dedicated and collaborative in collecting, analyzing, and interpreting the data
- The data collected will offer key insights for designing teachers training and students curriculum

Data Collection Guidelines

The 'DESIGN FUTURES' team has decided during the first transnational meeting that collecting rich qualitative data would be more appropriate for our project needs as opposed to extensive surveys. For these reasons semi structured interviews and focus groups for school staff and practical workshops for students were designed.

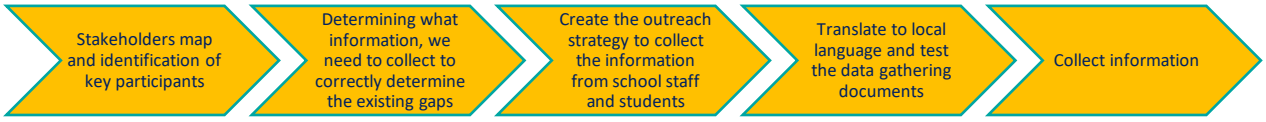
Co-funded by the
Erasmus+ Programme
of the European Union

Initially all activities were planned to take place in person, however due to COVID-19, these activities would not have been possible, and the team decided to adjust and conduct the interviews, focus groups and workshops online and via phone. This change limited our ability to collect some data in certain countries such as the student's workshops, school directors' interviews and focus groups in Italy and focus group in Netherlands, however the large majority of the data was collected and the targets for this outputs have been met.

All participants in the need's assessment have been informed and agreed to participate in the needs assessment and the data were collected and processed in accordance with the GDPR and 'DESIGN FUTURES' quality and risk protocols.

Process

The first step in the data collection process was to **determine key stakeholders** to include in the need's assessment. Next our team investigated **what information we need to collect** to correctly determine the gaps in accordance with the project goals. This process happened in multiple iterations and collaborative conversations took place between all partners. **Data collection guidelines and protocols have been created first in English and next translated** to Greek, Italian, Dutch and Romanian by each country partner. Each partner was also responsible to **create the outreach strategy** and coordinate communication with school staff and student. Lastly, each partner was responsible for adjusting the translations and collecting the data. In countries such as Greece and Netherlands where we have more than one partner the two partners divided the tasks among themselves.



Due to the COVID-19 some of the tools initially created such as the focus group and workshop activities were adapted to be conducted in an online setting.

Stakeholders map

If our students target group was clearly identified, when it came to schools' staff, we had to determine who else besides teachers we would need to include in our need's assessment.

To do so a stakeholder map across all countries was created, as it can be seen below, stakeholders were analyzed based on their impact and influence on our project. Based on the analysis and conversation among all partners it was determined that beside teachers we would like to also interview school directors because of their higher influence and impact on our project.

High

Influence	*Satisfy Stakeholder*	*Work with Stakeholder (Manage closely)*
	Country educational board (Policy makers)	*Teachers*

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

Teachers professional associations	*Principal (School Director)* *School board*
Monitor Stakeholder	*Inform Stakeholder*
NGOs *Community members* *External learning spaces (Museums, libraries, parks, camps, etc.)*	*School Administrative staff* *Parents/Legal guardian*

Low **Impact**

School Staff

For school staff we used three different tools to collect information:

- **Semi structured interviews for teachers**
- **Semi structured interviews for school decision makers**
- **Focus group**

The semi structured interviews were used for capturing in-depth context, stories, and discussions in relation to teachers' knowledge on innovative teaching and learning methods, experience with Maker Education and Design Thinking as well as Learning materials and Curriculum preferences, Teacher role and motivation and Professional development and training preferences.

Semi structured interviews with school decision makers were conducted to learn more about their preference, motivations, and capacity to influence the implementation and adoption of DESIGN FUTURES project. We investigated their knowledge regarding Maker Education and Design Thinking, School Environment, Teachers professional development, and training.

The focus group was organized with the goal to tap into the depth of knowledge our teachers have and co-design this project with them. This activity was designed with the purpose to dive deeper into the topics of Design Thinking and Maker Education and capture teachers' perspectives and preferences regarding teachers training and student curriculum. During the focus group we used a brainstorming technique to quickly generate new ideas and to identity opportunities for adapting and incorporating Design Thinking and Maker Education into student's curriculum. Since, teachers in different countries have different levels of familiarity with Design thinking and Maker Education, we had design them in an inclusive manner to ensure that all participants can make valuable contributions.

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

Students

For students we organized a practical workshop, which included a series of interactive activities where they could express their current experiences and classes as well as their learning preferences. The activities also included the design of an ideal class. The workshops were organized outside school hours and encouraged student's participation, creativity, and communication.

Target groups

The target number of participants in the needs assessment research activities is over 80. Our team has decided to divide the minimum target group across all countries resulting in a minimum of 20 individuals recommended to be included in the needs assessment research activities in each country. Further considering that we have 2 target groups we had divided this further into a minimum of 12 school staff per country and minimum 8 students.

School Staff

For school staff the minimum 12 participants was divided among 10 teachers and 2 school decision makers interviews and a minimum of 5 participants in the focus group.

Our initial selection criteria for teacher were

- Has a minimum of 5 years teaching experience,
- Is currently a teacher teaching student age 9 to 12, AND

Since all partners are already working with teachers using at least one of the two methods, the project team has recommended a division between existing and new teachers in the sample, to ensure a diversity of opinions and that our data is not a reproduction of our organizational initiatives' approaches:

1. ***Existing teachers*** (40% of interviewed teachers) - This target group includes teachers who are within our network and have participated and contributed in any capacity to our individual initiatives using either Maker Education or Design Thinking methodology. The suggested number of this subset is 4.
2. ***New teachers*** (60% of interviewed teachers) This included teachers from outside Design Futures partner network, who may or may not have experienced Design Thinking and Maker Education. Teachers were recruited using the program brochure. The suggested number of this subset is 6.

Focus Group

We have determined that the participants in the focus group will need to have had some level of experience in either DT and/or ME or similar processes and approaches. As a result, the interview was also thought as a tool to select focus group participants. To keep the focus group impartial, the same distribution of 60/40 (new to existing teacher ratio) was kept. The suggested sample set was a minimum of 3 new teachers and 2 existing teachers, given the small sample size of the focus group, ensuring a diversity of opinions that is not a reproduction of our individual initiatives' developmental approaches.

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

Students

For students it was determined by project members that we would like to focus on students between 9 and 12 years old. Based on our project requirements we have proposed to organize 2 workshops with a minimum of 4 students each, however the recommended group size would be 6 to 8 students per facilitator.

Planned vs Actual

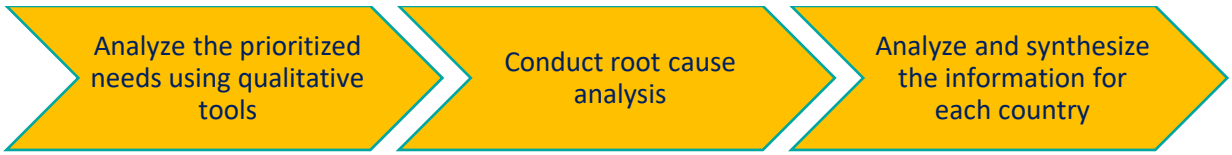
Our team has managed to meet our initial targets, showing our capacity to adapt. We could see that in Italy we had more challenges in collecting the data, since Italy was one of the most impacted area by the COVID-19 Pandemic.

	Teachers Interviewed		School Decision Makers Interviewed		Focus Groups Teacher Participants		Students Workshop Participants		Total	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Greece	10	10	2	2	5	5	8	8	20	25
Italy	10	10	2	-	5	-	8	-	20	10
Netherlands	10	11	2	2	5	-	8	8	20	21
Romania	10	10	2	2	5	5	8	18	20	35
DESIGN FUTURES	**40**	**41**	**8**	**6**	**20**	**10**	**32**	**34**	**80**	**91**

Data Analysis

Process

Once the data was collected, each partner translated it to English and entered it into our databases. Next, our team started the analysis phase when we prioritized the needs using qualitative tools as well as root cause analysis. Lastly, we conducted analysis and synthesized the information for each country as it can be seen in Chapters 3,4,5 and 6 of this report.



Due to the COVID-19 the transnational meeting took place virtually, however during this meeting each partner had the chance to share their findings in a facilitated workshop format. This activity was an opportunity to identify key opportunities, challenges, strengths and opportunities for both teachers training and student's curriculum, which will be presented in this report and will be used in the decision-making process.

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

For each country, was created a chapter where we investigated teacher's knowledge, practice and impact of Innovative teaching and learning methods as well as Design Thinking and Maker Education. Further we analyzed teachers learning plans and materials, motivation, role as well as professional development and training preferences. In this analysis we used both teacher's answers as well as decision makers perspective. Lastly the focus groups gave us even more insights into teachers' perspectives and opportunities for integrating Design Thinking and Maker Education into student's curriculum.

Lastly, we conducted a root cause analysis for integrating Design Thinking and Maker Education into student's curriculum which helped us identify key areas which are at the core of this process in each country.

To gain insight into the needs of the students we analyzed the data of the student workshops into two sections: their current experiences and a combination of their current positive experiences and preferred future scenario. Data regarding these two sections are coded through the themes: learning activities, content, teacher role, location, grouping, assessment, materials, and time. These themes are based on the elements of the curricular spiderweb by van den Akker (2003).

Needs assessment key areas

Process

Once we conducted the need analysis for each country, we investigated cross country analysis and determined multiple actions necessary to design the teachers training and students curriculum. In this part we investigate the favorable factors and design constrains for teachers training and students curriculum. The needs analysis process is ending with conclusions, recommendations and lessons learned.

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

CHAPTER 3

GREECE

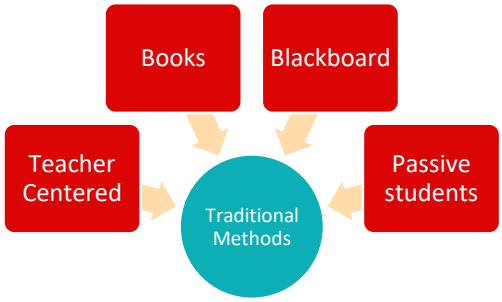
In Greece data was collected by our partners Stimmuli for Social Change and Aristotelio College. The team conducted interviews with 10 teachers (5 from private schools and 5 from public schools), 2 school directors and a focus group with 5 teachers. In Greece two school directors were interviewed from both private and public schools. Both directors have over 15 years of experience as teachers and 1 respectively 10 years of experience as directors. The directors interviewed manage large schools of 250 respectively 400 student and have under their leadership 27 and 35 teachers, respectively. Two student workshops were organized both in person with 6 students and remotely with 2 students. Below we will present the findings of the Schools Staff Needs Analysis as well as Students Needs Analysis.

School Staff needs analysis

Innovative Teaching and Learning Methods

Knowledge:

The teachers interviewed in Greece understand Innovative teaching and learning methods in distinction to traditional teaching, which are described as teacher centered using the books and the blackboard, as this ICT Secondary Teacher explains "*Ways of teaching that go beyond the traditional way (teacher - table - book) and introduce innovation, technology, inspiration, teamwork, creativity, connection to the real world, critical thinking, implementation of ideas and their application whenever possible*."



Innovative teaching and learning methods are understood by teachers in Greece as**: student centered, connecting the learning to the real world, focused on student's skills development, integrating technology, interactive, inclusive, project-based learning, experiential learning, and gamification.** An English teacher emphasized two aspects of innovative teaching and learning methods **on one hand the introduction of new tools such as technology** and on the other hand the new approach in education, specifically the **change in the role of the teacher and overall culture** "*Modern teaching-learning methods actively involve students in the learning process, so*

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

that a) there are learner-centered classrooms, there is interaction of learners with other learners and the teacher, there is collaboration, critical involvement and a sense of initiative on the part of the learner who is the main agent in the learning process, while the teacher is the facilitator, and b) innovative materials/ tools are used, like web tools, smart devices, tablets and computers, interactive whiteboards/ desks, 3D printers maybe, and why not robotics"

Teachers learn about innovative teaching and learning methods through various channels from **formal university education to participation to various projects and seminars, peer to peer learning and self-taught activities** as this Projects teacher explains *"I learned about them either by being informed by other colleagues or by speaking with professionals that deal with these methods in their own fields. I participated in training activities that were organized by various sectors, either state educational sectors or private ones."*

Practice:

Integration of innovative teaching and learning is extensively used when teaching a broad range of subjects such as **Literature, Languages, Religious studies, Math, Environmental studies, History, and Information Technology.** However, the specific method used varies. Some teachers are more inclined towards **integration of technology**, as this teacher shares "*I have been using hardware like, computers and interactive whiteboards, as for software, I've been using e-books and educational web pages, e-learning platforms where the students are in charge of their learning, lots of different webtools 2.0, which give students the chance to collaborate and be creative, to make up their own story, which can later publicize and make it known to a wide audience. Technology is evolving, students have a natural inclination to ICT practices, therefore using digital media they feel at home! They love using them and therefore learning becomes fun!".* Other teachers share more about their **teaching approach and integration of collaborative methods, performing arts, project based learning, self and group evaluation and service learning** as this Secondary teacher shares *"Some innovative and learning practices I am using during my classes have to do with connecting the topics I teach with everyday life and way of thinking. Whenever this is possible and when there is no pressure to deal with exams or tests and conventional course material, I explore my lesson with my students by encouraging brainstorming of ideas, working in teams , putting ideas into practice, self and peer assessment and co-operation with other colleagues if we want to propose something that would benefit the whole school community."*

Innovative teaching methods, especially integration of technology, e-learning and team work, are widely used, but the main challenge comes from the fact that it takes longer and the activities are not always aligned with national exam requirements as this Literature and History teacher shares "*In Greece, especially at the grade of Lyceum, our education system is oriented at the national exams and a teacher isn't encouraged to test different teaching styles/activities. That is the reason I use innovative activities twice a month to the exams "important" lessons, but frequently at cross curricular program or during my Theaterology class (optional)*". The integration of new innovative methods also depends on the **school infrastructure and facilities** as this English Elementary teacher shares *"Quite often when time and school or classroom infrastructure allow for such activities."*

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

The frequency of using innovative teaching and learning methods really depends on the teacher but varies from every day to twice a month as this 5th grade teacher shares *"We use ICT every day, but not in such a way that critical skills are developed. We just focus on developing skills, due to the luck of time."* Overall it seems that **some innovative methods are more appropriate for certain learning units and teachers are able to adapt and integrate them into their teaching as they see fit**, as this Projects Secondary Teacher shares "*They are integrated quite often, especially when there is no need to teach grammar, vocabulary or exam material in the sense I am asked to do at a secondary state school. I mostly use them when the topic is convenient (e.g. human rights, environmental issues, cultural matters etc.) and requires communication and practical creative ideas."*

Impact:

Integration of innovative teaching and learning is perceived as an interactive and creative way to learning recognized for their **benefits by both students and teachers** *"Students love participating in activities that are student centered and they really become more open-minded."* (English teacher) as well as teachers "*In this way, students' knowledge of the historical facts is consolidated in their memory*." However, they also recognize that it **takes time and it is not aligned with the syllabus** as this elementary teacher shares "*it is nearly impossible to teach the whole syllabus or any subject in such depth. Too time consuming!"*

Innovative methods have a **positive effect on students who enjoy experiencing them and teachers have noticed that it changes their perception of learning and of the school.** It is also a way *"students that let themselves free from constraints and want to show some aspects of their personality which are sometimes hidden due to the requirements that the everyday school programme poses on them."* (English Teacher). **Teachers are also positively impacted** from the integration of innovative teaching and learning methods as this Projects teacher shares "*The same thing [make learning more pleasant and make their ideas known to the public] is true for the teacher as well. He/she has the chance to modify the lesson and make it more challenging and interesting or easier to design."*

When asked if such practices cultivate 21st century skills, teachers agreed that such methods do and some of the skills they often mentioned are**: creativity, critical thinking, collaboration, teamwork, problem solving, empathy, communication, being responsible, negotiation, digital skills.**

Skills development is often assessed through observation, surveys and self-reflection as this English teacher describes *"I sometimes let them assess themselves or let the other students assess them and give them feedback on what they have done. I have assessed students through competences or self-reflection by letting them think about what they have done, by observing their facial expressions and body language or by giving them rubrics to complete in order to see what they have achieved or what else they can do to put their ideas into practice.".* When it comes from observation grids many of the teachers interviewed are aware of their usage but is not widely used as this elementary teacher shares *"Unfortunately, I usually use traditional assessment methods. I have sometimes used self-reflection, but not an observation grid."*

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

Design Thinking and Maker Education

Knowledge:

Most of the teaches from Greece are not familiar with Design Thinking and those who are, rated their experience as intermediary. When asked what **Design Thinking is** most teachers understand it as a **problem solving process taking place in stages/steps and iterations** as this 3rd grade teacher summarize it as "*an innovative method of learning that is based on problem-solving and consists of stages" or "an educational approach whereby students try to give design solutions to a problem using an iterative process*.". One teacher associates it with **solving a real social issue** as this Projects teacher describes "*I understand a process through which we spot a social situation or problem (social in the broader sense), become engaged, think about what we can do about it, come up with an idea and put it into practice to see if and how it works for the society."*

School directors are also familiar with Design Thinking and they define it as *"a non-linear, iterative process which seeks to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test."* Or more broadly as a tool to solving global human problems *"It includes a lot of stages, whereby students try to solve global/ human problems by designing and redesigning, testing and prototyping, through a collaborative process."*

When it comes to **Maker Education**, **the same teachers who have knowledge about Design Thinking also know about Maker Education**. When asked to describe it they often refer to it as **the process of making artifacts and by doing so learning/acquiring skills** such as digital skills, problem solving, collaborative, presenting as this English teacher summarizes "*By Maker Education I understand an approach to education whereby students make/ create artifacts, in Makerspaces, from using cardboard and simple materials, to art, and finally to new technology tools, e.g. 3D printing, robotics, computing and smart tools, while at the same time they learn new skills through making (digital skills/ problem-solving/collaborative/ STEM)."*

School directors are also familiar with Maker education and define it as an approach that *"focusses more on the fabrication of real artifacts, whether physical or digital, but again through a collaborative process where decisions have to be made and problems solved."*

When it comes to skills acquisition, teachers had either **learned by participating in European projects such as Eureka! Project or driven by their curiosity while participating in professional development activities** as this teacher summarizes *"I had come across the term in some magazines and museums, but I learned more about it by attending interviews and presentations by experts, watching videos and by asking questions."*

Practice:

When it comes to practice all teachers, applied the models in steps. Some were simplified: 1. Ideation, 2.Brainstorming, 3.Sketching, 4.Making or more detailed: 1.Identify problem, 2."My problem", 3.Select one problem In groups, 4.Design Persona, 5.Idea time, 6.Prototypes, 7.Makes, 8.Presentation to first teacher and next to a larger audience or 1.Brainstorming, 2.Idea selection, 3.Implementation.

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

The **materials teachers use vary** from simpler such as paper, carboards, glue, pens, educational videos and such to more advances such as circuits, 3D printing, LEGO mind storm, programing, coding and Android apps, Engino, Melissa app as this English teacher shares "*We also used circuits, yes, which students have learnt to use in the science class. - We used programming for the robotics lab and coding for the Android app, online website-building tools for the creation of websites. We used 3D animation. - Most of them we leant to use on our own, considering our students have a good level at the ICT class of the school, so some were able to make up our blog/ site."*

Impact:

Opportunities when applying Design Thinking and or Maker Education:

- **Reduces Stress and Improves communication between teachers and students** as this Projects teacher summarizes *"The most important advantage of using DT and/or ME in my classroom (when I finally manage to implement them to the utmost degree) is the creation of an atmosphere where students do not feel pressed to express their opinion in a specific way or let themselves free to voice what they believe and want to put into practice. This benefits for the school and the wider community are that in a way both approaches enable everyone involved to see life from a more creative, relaxing, and pleasant way. It lets off stress and affects the teacher-student relationship more positively."*
- **Skills development such as collaboration, teamwork, exchange of ideas, critical thinking, creativity** as this English teacher shares "*DT and ME, let people use their minds and feelings in a creative way, and only then does learning become meaningful – they build skills and not only knowledge. We need skills in life, not just a pile of information. Information is necessary but applying it in practice is invaluable. It is then you build skills."* **Design thinking and Maker education skills development are also recognized by school directors who also mentioned** "*They promote critical thinking, creative initiative and interpersonal relations, as these are important for the future adult to succeed in life. Love for knowledge and research, emotional intelligence and empathy, co-operative spirit and communicative competence, ambition and motivation, which educators are now, more than ever, important to instill in the hearts and minds of the present youngsters so that they are successful and complete adults, both professionally and personally."*
- **Increase students commitment "***My students have always demonstrated engagement and commitment to the DT and ME process, wishing to work harder and longer, wishing to do better, solving problems that arise on the spot, testing, reiterating, making and remaking, deciding on what is best."*
- **Integrating DT and ME into the curriculum has the potential to be incorporated as a formal practice within the educational system,** as this English teacher shares "*I would like to be able to embed project work in the curriculum. In this way, DT, ME, or any modern pedagogy, could be tested within and in line with the curriculum, not as an extra informal activity, but a school formal practice, which every student could benefit from."*
- **School performance is also positively impacted by the introduction of Design Thinking and Maker Education** as this director recognizes *"DT has an impact on the way students engage in the*

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

learning process, it encourages creativity and innovation, and enhances collaboration among students, which are all motivating for students, as they like to share ideas among peers and do their own thinking and deciding. ME also applies to the natural inclination of students to make (whether physical artifacts or digital one) and build at the young age, imaginative and inventive skills."

Challenges when applying Design thinking and/or Maker Education:

- **Acceptance of the Design Thinking and Maker Education methods by the wider school community as alternatives to traditional teaching are challenging** as this Project teacher shares "*One of the cons is that techniques like these have not been accepted by all school community members (teachers and students alike) since the way our educational system is constructed does not always permit such interventions or ways of teaching and learning that are not traditional."*
- When applied **some students might feel isolated and it generates competition between members of the group** as this ICT teacher shares *"in some cases competition between members of a group or isolation of others"*
- **Students also face challenges when presenting their ideas and collaborating with other students** as the English Teacher shares *"The most challenging phases were those that required presentation of ideas (some students were shy and thought that their ideas were wrong) and the phase of team working where the students had to co-operate with students whom they did not know well."*
- **Limited time available** is also potential challenge for teachers as this English teacher shares *"As far as my subject is concerned (English), I do not have many teaching hours available (actually, only two) and I try to do my best when the lesson has to do with creativity, team work and communication."*
- **Tight school curriculum and lack of time** are recognized as challenges by school directors "*Lack of time in the tight school curriculum, few teaching hours - maybe if there were an extra school hour every day, this could be devoted to implementing the new curriculum. Lack of appropriate training or practical guidelines for teachers, who are sometimes called to implement a pedagogy, without being trained practically how to do so.*

Lesson Plans and Materials

When it comes to materials teachers use a **wide variety of materials from books to educational videos, apps and websites as this ICT teacher shares** *"Lesson materials: lesson plans, student's book, video/audio sources, maps, ICT apps for education. Some of them are developed by the Greek ministry of education, others by the application company and some others by me."* Where the school infrastructure permits teachers have also interactive whiteboards, robotics labs and such, however, these are more common in private schools.

From the two interviews with school directors, a **big difference between private and public schools was noticed when it comes to materials. In public schools there is no budget available and teachers purchase the materials themselves where for private schools they have access to more materials and**

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

advanced tools and materials. The private school director shared "*Yes, we have a robotics lab in the school, it is an extra-curricular club, which is implemented within school hours, for two 45 minute-sessions a week. The students are free to choose from a variety of clubs. In the robotics club the school currently uses the Engino kit."* and the public-school director shared *"No budget, no motives, just the teacher's will".*

Access to **advanced materials both mechanical and electrical are not common, and teachers seem to associate those with STEM classes** *"I did not use materials such as circuits, programming etc. but, as I said, I have attended other colleagues do this, especially those that teach practical subjects such as Physics, Computing, Math, Chemistry etc.) Personally speaking, I have used cartoon and other technical tools to design together with the Art teacher and other teachers' various constructions like board games, theatrical scenery and things like these."*

Ensuring that teachers and students have access to resources and learning infrastructure is one of the school directors' main priorities. Directors also encourage teachers participation in extracurricular activities and European projects such as eTwinning, which are linked to increased students performance and skills development *" Students show enthusiasm, because they are actively involved in the process, which enhances team-work, critical thinking and digital literacy, but mainly hands-on experiences and collaboration, which is missing from the teacher-centered model traditionally followed by the state schools, and prescribed by the government policy.*

Teachers like both open lesson plans using a suggestion format and structured open plans and there are examples when they use both. Those who prefer open plans are often open to adjust the learning to how the students respond to their teaching as this secondary teacher shares *"Open lesson plan, because I can be flexible and take advantage of the different students in each class. But sometimes one need to use a step by step structured lesson, especially when there are activities that have to be done and when there is a strict deadline for the deliverables."* However, teachers say that **they are also limited by how students respond to the format and they try to listen and adjust to students needs** as this primary teacher shares "*I prefer open lesson plans-suggestions format although this is not always possible, because there are students that prefer structured-Step-by-Step lesson plans since they feel more comfortable. I have to do this as well, but when I follow the open lesson plan structure I try to make these students realize that it is to their benefit to try to learn by empathizing, doing and seeing how all this relates them to the world around them and makes them more sociable."*

In Greece teachers are not comfortable teaching a theory they had not experienced themselves, an opinion shared by all teachers interviewed as this English teacher shares *"I do not feel comfortable, so I have to test it before I teach it! I need to have experienced everything myself to be able to instruct it. I am like my students. I am taught something or learn it on my own, I practice it, test and retest, if it is making, make and remake, and then, I can instruct it."* The reason behind this shared perspective is **because they want to be able to understand it well before they integrate it into their teaching** *"Not very comfortable, because students tend to lose their interest and active participation when the teacher doesn't seem to know exactly what he/she is doing."*

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

Teachers are open to adopting a new curriculum if there are materials, training is being provided and there are peers to refer to for support as this primary teacher shares *"The cooperation with a colleague that is more experienced or curious to implement a new curriculum usually helps and also the positive feedback of the students."*

New curriculum is normally designed by the ministry and the school must abide to the requirements, however in the case of private schools they can implement added upon curricula**. When implementing a new curriculum, school directors are emphasizing the need of clear guidelines and provide teachers with the appropriate training and support** *"Teachers need clear guidelines when a new curriculum is being implemented, they need realistic solutions to troubleshooting areas regarding the procedure itself, and the evaluation of the success of the procedure. Also, most of the teachers have the hard skills, acquired by their university training. And the traditional teaching focuses on spreading (in the form of lecture) this knowledge to your students. So, if a new, modern teaching approach and curriculum is to be implemented, teachers need to be trained on developing their own soft skills and then helping the students develop their soft skills."*

Roles:

Most teachers see their role as of someone who either inspires and empowers the students and/or someone who provides positive feedback. It is encouraging to see that none of the teachers selected "*Someone who influences students' decisions / guides their perceptions/ imposes a certain way of learning? "*by itself but there was one who uses it in combination with others two roles.

One of the teachers is also noticing a shift in the teacher role from delivering information and doing to more guiding and facilitating as this primary teacher shares "*The teachers' role now shifts from planning to doing. Doing here implies guiding, facilitating, and directing activities which will be done by the students."*

School directors in Greece understand their role as a mediator between school environment, stakeholders and government regulations and policies. They are responsible for administrative work, overall leadership and their school's academic programs as this director summarizes *"Provide leadership, according to the educational goals set by the government, but also according to our school policy and vision. Responsible for academic programs. Set clear directives for teaching procedure and educational goals. Supervise, assist, and encourage teachers and other staff and solve problems. Monitor students' performance. Supervise educational procedure to achieve the highest possible standards. "*

Interestingly all teachers see their role as of someone who tries to instill social awareness within their students either by addressing social or environmental issues with their projects or moral and values through teaching and their own example *"I consider it very important and I try to sensitize students to various issues of social solidarity through discussions but also through their involvement in activities such as recycling or creating activities for the integration of refugee children in our school."* Or as integrated part in their teaching as this literature and history teacher shares "*Yes, the subjects I teach give me this*

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

opportunity. There are many cases in literature or in history that inspire to social oriented conversations, reflections and finally activities."

School directors believe that the school has a broader role in the community development and the directors see their role as key in forming individuals and instilling social values "*the school has to be part of the community that requires social innovation, and set the foundations of this social change. The school pays special attention to the social development of the children too, through their participation in several projects. As regards ethics, the school teaches students high moral values and ideals, which a child needs in an ever-changing world. Values such as humanism, volunteering, fair play, social justice, diversity, tolerance, and family values become second nature for pupils through practice and experiential learning. "*

When it comes to **new projects** those can be identified by multiple stakeholders from teachers to parents and school director however the **final decision is taken in a centralized manner by the school directors with the support of the Educational Coordinator.**

Motivation:

Teachers are motivated by the fact that they want to perform better, serve their students, keep up with the latest methods as well as professional recognition and financial rewards. Some teachers look at trainings as an avenue to move from traditional limited learning to a learning focused on creativity and social awareness as shared by this primary school teacher "*What motivates me is the need to change my way of thinking as well as my teaching methods as much as this is possible in an educational system that does not always leave room for creativity and thinking under the light of social awareness. At the same time, this motivation will help me instill the same ideas in my students and help me make them aware that they do not live alone in this world but they have to act in such a way that will enable them and the rest of the society to overcome problems more easily and solve them more effectively."*

Furthermore**, teachers measure their performance thought their student's reactions and behavior. There is rarely a formal assessment** as this Primary teacher shares *"There is no formal assessment of my job if you are asking that, apart from my being continuously but informally assessed by the Head Master of the school, and of course, students themselves and their parents."* Or as this English teacher shares *"I measure my performance by being assessed by my students in many ways: The degree to which they attend, the will to participate in the teaching-learning process and their need to see if all the stuff taught can be used by them creatively and usefully when they leave the classroom*. **Evaluation is done very much informally and teachers rely on their intuition and perception** as this Projects teacher shares "*There is always a voice of conscience that informs me if I am doing a good job as a teacher or not, but the most important thing in my job is my audience, the students. If something goes wrong, it means that I have to go on under different principles, more learner-centered ones."* School directors confirmed that there are no formal tools used in measuring teacher's performance, which is conducted mainly through observations.

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

School directors are motivated both intrinsically and extrinsically to support their teacher professional development but also to satisfy external stakeholder *"Intrinsically, want to provide my teachers first of all with the best knowledge and training that would help them in the educational process, I want to satisfy all parents' and students' needs, and if possible, spread this knowledge to the community and become a role school-model. Extrinsically, I need to satisfy the parents/clients who are paying for the best education possible for their kids - there is always the option for ta state free schooling, yet they choose the private sector, so i have to do the best I can to serve my clients, and be the best in the private education market, which is competitive, and you survive if you are the best, esp. in the times of financial recession."*

Professional Development and Training Preferences

Teachers professional development is important for their school performance where they have to keep a competitive profile on the market as this private school director shares "*Teachers had better get professional development. Teachers esp. of private schools, have to make the difference and take advantage of every possible opportunity for development, if we want to provide good quality education, and be competitive in the business market."* However, this does not mean that it is the case for state school teachers as they do need the credits if they want to come closer to their homes, since some teachers may be appointed in a school far away from their family. **In the case of state-run schools, teacher professional development programs are even more important for those teachers who need the credits to move closer to their family**.

Greek teachers shared their preference for a training which **includes practical activities applicable in the classroom** as this Primary teacher shares "*An ideal training would look practical and socially-oriented. It would include material easily adaptable to the students' and teachers' needs."*

Both directors emphasize the need for a training that is tailored to teachers needs and provide the teachers with a certificate and a proof of participating to the course. *"Teachers need some basic theoretical information about a pedagogical method, and mainly easy to understand, practical, guidelines as to the implementation in a virtually real, not hypothetical/ non-existent/ ideal/ utopian classroom. We all know the limitations of the real class, whether those be time/ space/ equipment/ stress/ even financial, so teachers need hands-on professional development themselves, step-by-step guidance, ready-made material- some teachers would also like to learn to make their own curricula if they wish - and troubleshooting advice by the trainers for the worst-case scenario that could hinder them from implementing the procedure due to the limitations mentioned above. Also, a Certificate of attendance is required, which, wishfully also gives them extra credits, to help them ascend the salary-scale, or in the case of state school not only that, but also get them closer to their opportunity to be appointed to a school close to their homes (as in this country state school teachers have to work around the country for many years until they gather credits to approach their desired work-area)."*

Teachers **prefer a workshop format training with many practical activities and a brief part dedicated to the theoretical concepts** as this English teacher shares "*I would like to be provided with the conceptual framework in brief and the benefits from using DT and ME in the classroom, and then and*

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

for the largest part of the training a practical step-by-step guide on how to embed DT and ME in my classroom, with examples and workshops I will participate in." confirmed by this English teacher as well "*In such a training workshop I would like to be provided with the conceptual framework in brief and the benefits from using DT and ME in the classroom, and then and for the largest part of the training a practical step-by-step guide on how to embed DT and ME in my classroom, with examples and workshops I will participate in. "*

Teachers would **prefer a physical training where they can work on experiments and simulations** as this primary teacher share "*An ideal training is in a warm, "unusual" place and lasts at least 5 days. The trainers are the best in their field, use different training methodologies, combine theory to experiential learning and provide the trainees with the training material."*

Both teachers and school directors emphasized the need of a trainer who is experienced and highly qualified as this director shares *"Also, a recruitment of quality trainers with experience and in class knowledge is important."*

When asked what **skills and competencies teachers would need to develop, school directors answers were very similar as of the ones the students need to develop such as collaboration, communication, empathy, teamwork, critical thinking, digital skills, problem solving, but in addition they mentioned a sense of initiative, flexibility, time management.** This emphasized the idea shared also by teacher's that it is hard to teach something you don't master yourself as this English teacher shares *"I need to have experienced everything myself in order to be able to instruct it. I am like my students. I am taught something or learn it on my own, I practice it, test and retest, if it's making, make and remake, and then, I am able to instruct it."*

School directors also shared that the **ministry regularly organizes trainings for free attended by teachers to learn and receive the associated credits necessary for salary increase and/or other benefit**s "*Some training seminars/ workshops are organized by the Ministry of Education. They are free of charge for teachers and they are optional, but some only, give teachers extra credits, to help them ascend the salary-scale, or in the case of state school not only that, but also get them closer to their opportunity to be appointed to a school close to their home"*. **The schools also organize trainings for their teachers** on different subjects as identified as priority for them such as ICT, handling bullying and others and they have partnership with local Universities, well as private organizations and individual experts for teachers training.

At the end of the interviews both school directors spoke about the **importance of flexibility and adaptation of the professional development training to the school context, students' needs and teachers profile** "*Professional development needs to be applied taking into consideration the school context and the relevant teachers' profiles.", "Any Teachers' Professional Development and the implementation of any new curricula have to take into consideration the needs of the students in an ever-changing demanding society, but also the needs of the teachers for clear guidelines and realistic*

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

work demands from them. And all these have to be aligned with the national educational system, so national education policy changes have to be made."

Focus Group

Our team organized a focus group with 5 teachers who have experience with Design Thinking and/or Maker Education. In the first part of the focus group two videos one for each process were shared with all participants to create a common understanding of the two methods. After watching the videos, the group was asked what they understand by design thinking and they said:

- "Design thinking *involves around specific steps that you need to follow. DT is a process that enables you to dig deeper into a problem or a theme."*
- *"DT was thought only as a process where students could work altogether on finding a solution to an everyday challenge, they identify either in their school or in their neighborhood"*.

Maker education was defined as:

- *"ME was considered as a highly technical procedure where more people need to be involved for creativity to spur and for results to be more beneficial for everyone."*
- *"Another teacher with more knowledge on ME, stated that ME comes to complement DT by providing a 3D picture to the problem that you are dealing with and for which you would like to provide a solution by visualizing it."*
- *"Another teacher stated that ME are the prototypes that students create in a team as an extension to a solution to a problem, and through this process their talents are surfaced which is very important as they could then work on their talents and become good at something they really like"*

When comparing **Design Thinking to Maker educations teachers identified similarities such as students collaboration, 21st century skills, critical thinking, communications** as this quote demonstrated "*Through both these concepts students learn how to collaborate among them, students cultivate 21st century skills, they learn to think in a critical manner, they learn to communicate better with each other. Apart thus from the digital skills that come with ME, there are also transversal skills which are common and are more important for their future."*

When asked how they could integrate both methodologies into the curriculum teachers gave examples of how they could integrate parts of both approaches in some courses to teach ICT, English or other subjects using collaboration, digital skills, team work, communication and critical thinking?. As the three examples below demonstrate:

> *1) In an ICT course: Students could undergo specific research on specific themes, like environmental whereby students do research on how they could deal with the challenges that are evident and what steps and actions they could take to eliminate them. Then students can present in front of the class. Through this process they are motivated and empowered to present in front of a crowd,*

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

they cultivate their digital skills and learn how through collaboration they could deal with providing ideas that could assist towards solving societal problems.

2) In English course: Students involved in projects around diversity, poverty. They started working on a problem first on an individual basis and then in teams. So, their learning was dual: they learnt English and, they learnt to communicate and collaborate with their peers for providing a solution to a global challenge. Different web tools were utilized - cartoons, digital story telling.

3) Integrated as part of the course: through practical activities, discussion, through construction activities/ handmade constructions of students. In English again, their class was around Van Gogh and how he expresses parts of society through his art. Students were doing research on him and his art work, trying to understand what he was feeling and what he wanted to achieve through his paintings. Then, they were working in teams trying to create artifacts of how they were thinking of the environment they were leaving, how they were feeling by leaving in such an environment. They provided ideas on how they could intervene in their school trying to change it and make it look better and more friendly and welcoming. At the same time, through their art inside school, other students were empowered to work in teams and help their lives and their school. This happened in an intercultural secondary school. Through that, students learnt English as everything was done in English and learnt to collaborate and interact with each other, which was not happening in their school as a lot of kids were isolated and acting alone.

Barriers for adopting Design Thinking and Maker Education

Teachers spoke about some of the challenges and changes which need to happen for Design thinking and Maker education to be adopted at broader level as supported with quotes:

- **Teachers Mindshift towards making learning more interactive and collaborative while at the same time meeting learning objectives "***For these two approaches to be fully integrated in a school, the mentality of teachers themselves needs to shift, they need to have a common goal and while teaching integrate those two approaches in their classes not only for achieving specific learning objectives but also for making the course more interactive and fun, motivating in this way students towards collaborating with each other and also for wanting to come to school and be part of this learning community.*
- **Time limitation and Curriculum constrains "***There is limited time-as you need to follow a specific curriculum. So, all these activities can only happen –if we want to make them in an effective and equally beneficial way for everyone- on an extracurricular basis."* and *" Apart from time there are also a lot of subjects in a day that each teacher needs to follow and schools finish at 2 o' clock.*
- **Financial resources – "***Also, the financial resources needed is a huge constrain for integrating at least the ME approach in the curriculum and the different subjects.*
- **Training teachers - "***Training teachers is also a huge problem and a need at the same time."*
- **Teachers collaboration "***Collaboration of teachers within schools is of the essence for such practices to be integrated in schools. And sometimes this is not happening."*

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

- **Parents and student's mentality "***Also, the culture of the family and students themselves. A lot of parents do not want their children to leave their comfort zone and deal with projects that have a more innovative element."*

Alignment with students learning objectives at:

Classroom: Teacher noted that **some of the practices are already implemented but are not known/identifies as such by names** "*Another important aspect is that sometimes these two practices are being implemented in schools however teachers only afterwards realize that what they do is DT or ME.*

Design Thinking and Maker education don't always align with mandatory requirements and this is not easy "*sometimes what they do is aligned to the mandatory requirements. but this is not always the case and things are difficult for this type of alignment"*

Public (state) and Private Schools:

A teacher have noted that **the two methodologies could be easily integrated in elementary schools curriculum since they have more flexibility as opposed to secondary schools where there is little flexibility** "*Unfortunately, since all Greek school are abide by the national curriculum, changes need to come from top down. However, given that there are flexible zones (especially in elementary, whereas in secondary things are difficult for something new to come in) they could easily integrate those in these flexible hours (for state schools).*

At private schools where the curriculum is more flexible, specific hours could be dedicated to Design Thinking and Maker Education activities *"for private schools things could be easier by simply adopting an hour that is devoted to the so called clubs for projects"* and *"We could say that these practices could be integrated more easily in private than state schools. As the environment in private schools is more competitive and teachers need to make the extra mile".*

National/Policy:

At national level teachers believe that **having dedicated time for such practices can make a big difference**. In addition they specified that such methodologies can be implemented first at elementary levels where creativity flourishes "*We need to integrate in the weekly programme, an hour or two for projects so that we can make a difference and try new innovative teaching and learning activities and it should be initiated from elementary school as students of that age are very creative."*

For teachers to participate to the DESIGN FUTURES training we need to consider the following

- Clarify what are the benefits of the training
- Highly practical and no theory
- Have the course practical, short and concise

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

As the notes from the focus group clarifies *"you really need to be very persuasive in order to make others want to join because one of the first things they are asking is the 'what's in it for me' question. At the same time though they want to know that what they will be trained on would be highly practical with no theory in between and of course highly easy for them to understand; short and concise with practical examples. This is the only way it can work for them so that they will be persuaded to participate.*

SWOT analysis

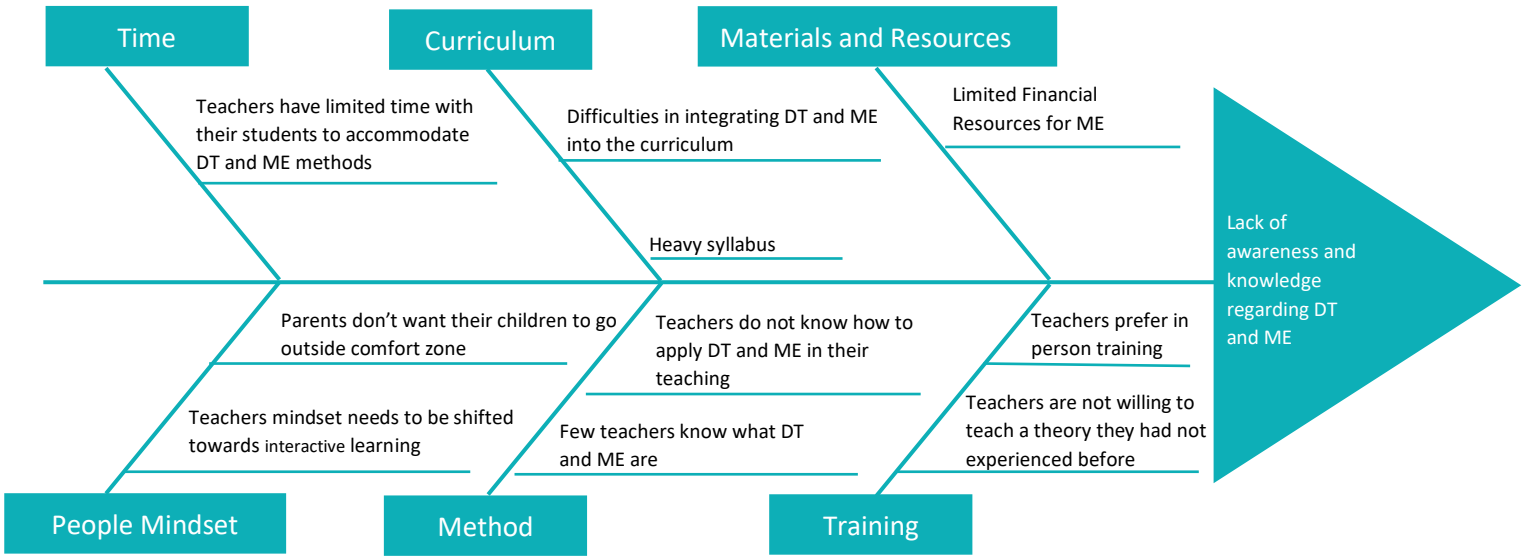
Below follow the results of the swot analysis in a nutshell, showcasing the most important strengths and opportunities together with the weaknesses and threats that come along with the introduction and implementation of the two approaches of Design Thinking and Maker Education, in Greek schools. The list as shown in table below is not exhaustive, however, it stipulates the most important aspects to be taken onboard while creating the DESIGN FUTURES teachers' training and curriculum.

Strengths	Weaknesses
- open and in need of TPD - proactive teachers - gaining the consciousness that we are global citizens through cooperation - keen on practical training	- lack of time because of the syllabus - limited time for travelling for teachers as there are hardly any substitutes available to cover for them while away - the age of teachers sometimes can hinder their involvement in such practices. As a result, these teachers (older teachers) need a clear scaffold that favors structured learning instead of a flexible one. - limited teachers' skills and lack of proper infrastructure -
Opportunities	**Threats**
- professional development - Personal enhancement - long term financial motivation - build self-confidence - empower students, satisfy parents - Strengthen the bond between the participants - Student-centered educational approach - Actual curriculum offered to teachers	- Covid for the next 4 months - teachers participating need to have some prior involvement in the project or at least be informed, otherwise time will be lost

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

Root cause analysis

Below is a root cause analysis which investigates key areas and causes which influence Design Thinking and Maker Education practice in Greek schools and how these causes may impact the development of the Teachers Training, Student Materials and overall DESIGN FUTURES strategy in each country.



Students needs analysis

In Greece, two students' workshops were organized both in person and online. The online session was attended by 6 students and the online workshop by 2 students with ages between 9 to 12 years old. The findings of both workshops will be described below.

Current learning experiences:

- **Classes normally take place using PowerPoint presentations and the textbooks** as this student shares share *"At Math class, teacher explains the math rules through a ppt, and then we do the exercises on the book. At Language, and all classes, we do the same."*
- **Students share that sometimes they are really interested in the class but that sometimes they are bored** as this student shares *"If I like the subject I enjoy the lesson, but if I don't like the subject sometimes I get bored. But I am attentive anyway." "Sometimes I am curious to learn, sometimes I get bored, it depends on the lesson (eg I get bored at Religious Studies)"*
- **Students enjoy how the classes are taking place** as this student shares *"The use of the Interactive board. We play interactive games on the whiteboard, which is fun and educational at the same time. Also, having the lesson on a ppt – we understand the lesson better, but sometimes it's too long and the lesson time-plan is ruined."* However, they would like to collaborate more and

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

participate in interactive activities as this student shares *"I would like more projects, though, and collaboration."*

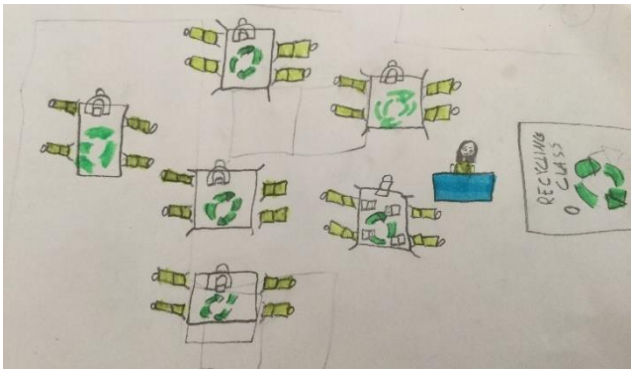
- Students **would like to participate more in collaborative activities and projects** as these students share *"I generally like my current classes. But I would like to work more in teams, collaborate with my classmates and do projects that we will later present to the rest of the class."* Also, they shared the fact that **they would like to be more involved in making activities and changing the learning environment rather than theory** "*I would like to go on more educational trips and learn by doing/ hands-on- learning. I would also like to make things myself; I think I would understand better, eg. in Science I would like to be shown how to do something and then do it myself. I want practice, not only theory."*
- Students shared that they **would like to be evaluated in groups** as these student shares "*I would like to change the way we are taught and the way we are assessed on the next day. That is, during the ppt presentation of the lesson I sometimes get bored and having the answers of the book exercises on the ppt does not help me think on my own. I would like to be assessed doing interactive educational quiz-tests (on the whiteboard) in teams, and the team that wins gets an award!"*
- **Integration of technology is an aspect the students enjoy** as this student shares "*Or we could use some web tools on laptops, eg. padlets, for the Geography lesson for example, or an interactive world map, and work together in pairs or fours."*

During the online workshop, the facilitator noted *"The current teaching model in class does not appeal to them. They want interaction, between learner and learning. They do not like the traditional passive learner model. They want more."*

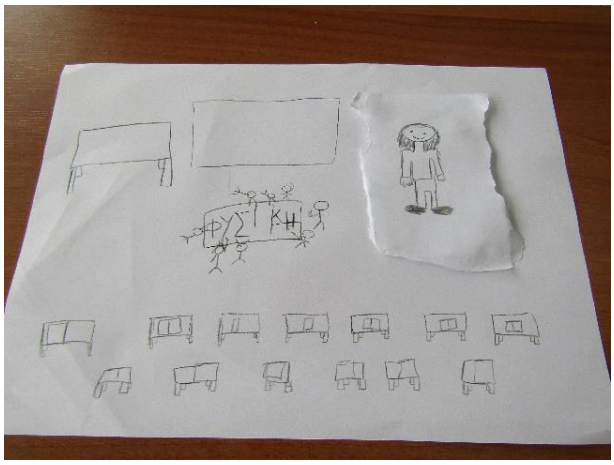
Positive learning experience

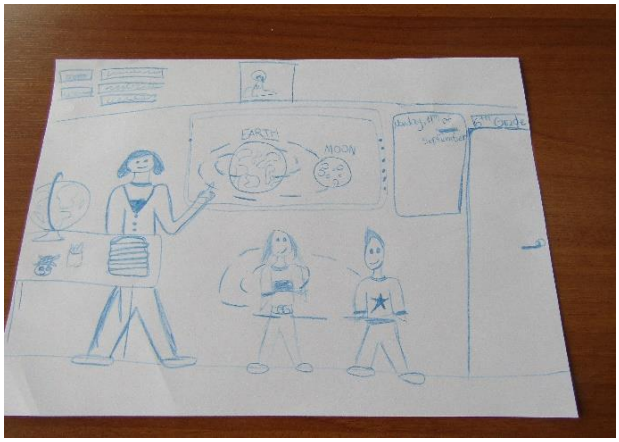
Students were tasked to draw a positive learning experience and to present their drawing by answering a few questions. The examples the students gave include:

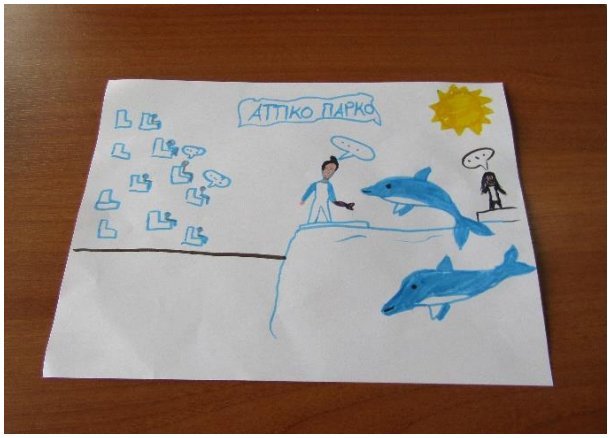
- **1. Outdoor learning experience called Real Case**
- **2. Hands on experience called – Imaginary Science class** – which was project based
- **3. Connectivity with issues that are relevant to them**

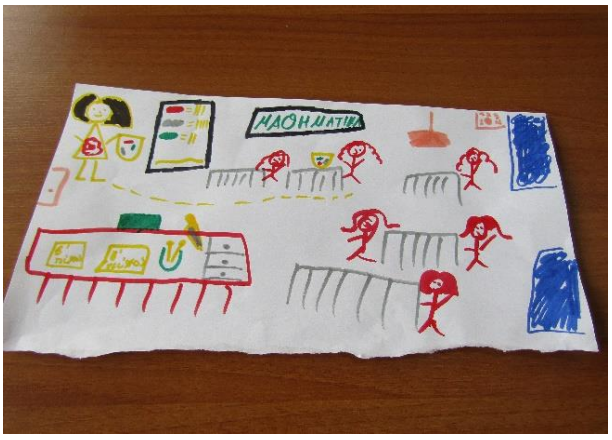


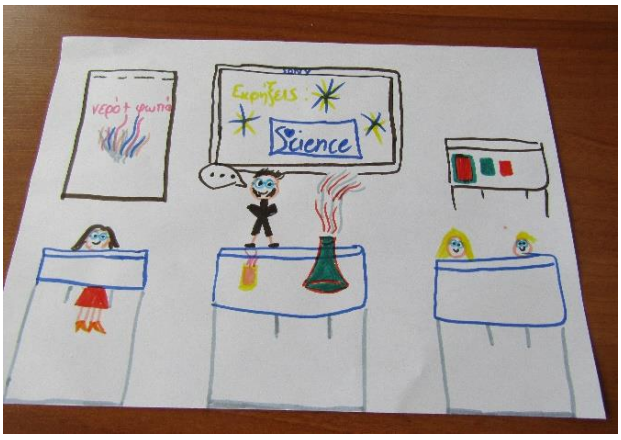
Co-funded by the
Erasmus+ Programme
of the European Union











- **Students chose these experiences because they were actively involved and interactive,** further they enjoyed that they could make something "*I actually made the experiments the teacher shows us on ppt, so I understood them better. Also, it would be more fun"*

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

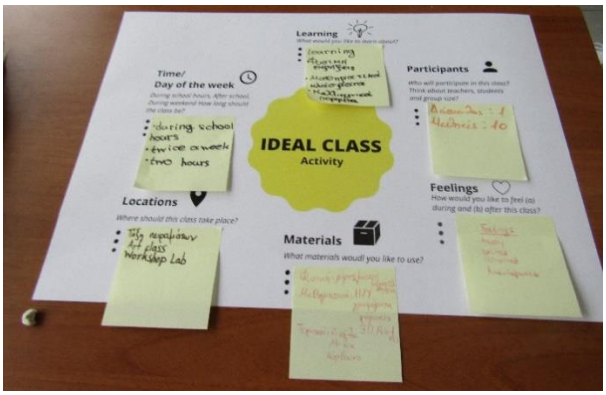
- **Students liked that they were not siting in their regular classrooms and the fact that the lessons took place in new locations** such as the Attica Zoological Park , the Recycling museum or **even other countries** where they liked the fact that they could connect with students from other countries as part of Erasmus project
- **The teacher was supporting and facilitating the activities** as these student shares *"The teachers helped us by supporting us through the building part of the hives, providing us with materials and tools. We already had in front of us the Beehive Model Making Guides of the country we worked with, and teachers were, let's say, Making Assistants, but actually let the situation in our hands. We did all the making."*
- **Students felt involved in the learning process while researching and building their projects** "*We research first and then on cardboard paper we write our findings, make comments and notes on the findings, stick photos, and make an informative tableau. Then we also conduct the experiment ourselves."*
- In terms of knowledge the students emphasized the specific **knowledge as well as gaining familiarity with the tools they used while conducting the activities** as this student shares *"I learned to use the 3D printer and the relevant computer software in order to design and then create the prototype of the recycling object I researched into. I learned to use various web tools for presentations too. Mainly I learned a lot about recycling."*
- Depending on the project students used **from simple materials** such as cardboard paper, crayons, pencils, scissors **to more complex ones** as these student shares *"3D printers, computers, and computer software (web-tools) for research and presentations, and CAD software for designing the 3D drawings. Some students used colors on their 3D prototypes."*
- The activities chosen by students were **not graded but students were assessed** as this student shared *"There were no grades, but there was assessment. The best whole package of research-presentation of research and prototype making got an award, like a certificate of mastery. Our teacher, to whom we presented our work (research and prototype making), was the judge, using a set of criteria for research achievement, presentation skills, designing skills and 3D making, that had been made known to us from the start."*

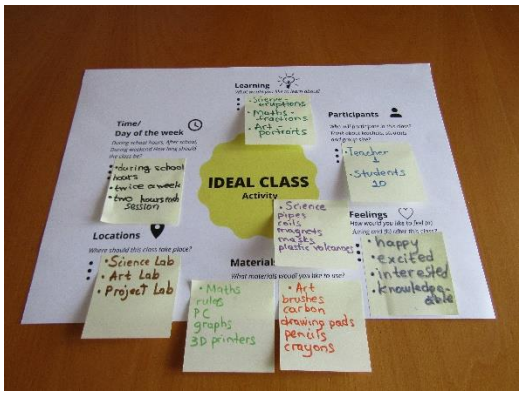
The facilitator notices students' interest in project-based learning and a maker approach "*They want more project-based learning, hands-on, and Maker approach. They want digital tools, less or more advanced, they want collaboration, they like creativity and a more practical assessment."*

Ideal learning experience

During these activities, the students were tasked to design their ideal learning activity by looking at key areas as connected to the curriculum spiderweb.

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





- **Learning:** Students mentioned many of the school subject such as Science, Math and so on but they also spoke about subjects which interest them such as Environmental studies, Arts, ICT as this student shares *"1.Environmental Studies (eg. Recycling, Plant life), 2. Art class (making crafts, not just drawings, taught by experts), 3. ICT class: how to make websites, blogs, apps, upload articles and videos on YT and elsewhere."*
- **Participants**: students would like to work in smaller groups of max 10 students
- **Feelings:** Happy, Excited, Interested, Confident due to knowledge obtained, motivated
- **Location**: Science lab, art lab, project lab, outdoor expeditions in nature, maker lab,
- **Time:** During school hours - Twice a week - 2 hours per session,

During the in-person session the facilitator observed that *"Generally, they want to have their current class model changed. Difficult for them to come up with their own ideas since it is totally new to them. But their confidence built up in the final part, when they felt they were given the initiative to change their learning environment."*

SWOT analysis

Below follows the results of the swot analysis in a nutshell, showcasing the most important strengths and opportunities together with the weaknesses and threats that come along with the introduction and implementation of the two approaches of Design Thinking and Maker Education with Greek students. The list as shown in table below is not exhaustive, however, it stipulates the most important aspects to be taken onboard while creating the DESIGN FUTURES students curriculum.

Strengths	Weaknesses
- adept in anything innovative - they love PBL - Widen their horizons - Becoming global citizens - Empowered students give motivation to teachers to go on - Fun learning environment	- children might be competitive missing the meaning of collaboration

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

Opportunities	Threats
- be creative - enhance collaboration - become critical thinkers - learn to solve problems - Enhance their digital skills - Work in a holistic educational approach - students raise their voice increasing their agency - opportunity to thrive at learning, which they would not in a traditional learning environment	- the strict curriculum sometimes hinders their willingness to be involved in innovative practices and be creative

Summary

The school staff needs assessment offered reach insights into Greek teachers' abilities, means and knowledge as well as the opportunities and barriers when it comes to the integration of Design Thinking and Maker Education. Overall teachers understand the Design Thinking and Maker Education as process with strict steps which is sometimes very restricting and not flexible. DESING FUTURES project should clarify better how the Design Thinking and Maker Education can be implemented and emphasize their flexibility, need already highlighted by teachers during the interviews. The DESING FUTURES should propose a method flexible and adaptable to the context of the school and the needs of teachers and students. Overall DESING FUTURES should provide them with a scaffold (step by step process) which is also flexible when implemented and can be adapted to their teaching and learning which occurs at schools.

Overall, in Greece most of the teacher are unaware of Design Thinking and Maker Education practices and due to the centralized system and teachers are not that flexible and open in experiencing new things. However, they are willing to know more and sometimes they are indeed using these approaches without though knowing that what they are doing in their classes is indeed defined as DT or ME.

As expected, students are interested in hands on activities where they get to be involved and collaborate. Overall students like the integration of technology and project-based learning and like diversity. They are often intimidated by evaluation and would prefer a no grates system. Based on their answers it is safe to assume that they will respond positively to Design Thinking and Maker Education.

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

CHAPTER 4

ITALY

In Italy, data was collected by our partner PACO Collaborative. The team conducted interviews with 10 teachers and the findings of these interviews are presented below. In addition, during the transnational meeting SWOT analysis for both school staff and students were completed and presented below.

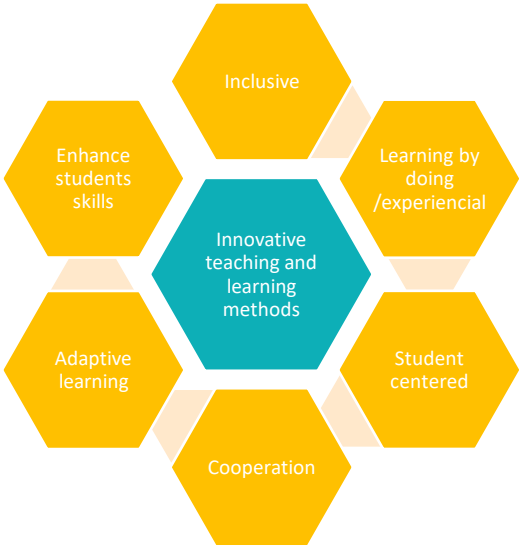
Italy was one of the countries most affected by COVID-19 and this has limited the team capacity to collect data.

School Staff needs analysis

Innovative Teaching and Learning Methods

Knowledge

By innovative teaching and learning methods Italian teachers understand those methods which are **student centered, practical, adapted to students needs and focused on students growth and development in an inclusive way** as this primary school teacher shares *"Inspirational for the kids, practical, and that put the student at the center."* Italian teachers also emphasize the **adaptiveness of such methods, where the students are practically involved in making and can change their learning path** as this secondary Art teacher shares *"A method based on making. Guided practical activities with the possibility of the student to take a new path during the exercise. I set the objective, but I always give the possibility to the student to change the path."*



Interestingly, none of the teachers felt the need to mention the opposition to traditional methods to explain what innovative methods are, indicating that they have more experience and a more in-depth understanding compared to their counterparts in Greece and Romania.

Teachers acquired the innovative teaching and learning skills from participating to trainings, peer to peer learning as well as self-led learning by watching webinars, videos and so on. **Interestingly, formal education was not mentioned, however many teachers mentioned courses on tinkering and Trinchero organized in collaborations with Museums and as part of European projects** such as eTwinning as this Primary teacher shares *"A course of tinkering organized by the Tech and science museum of Milan. The course of CLIL organized by www.etwinning.net. The course of Trinchero methodology (method*

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

developed by Roberto Trinchero). On robotics I did not follow a course, I did an auto-update. All courses are based on the personal interest, nothing is compulsory."

Practice

Innovative teaching and learning methods are extensively used by **Secondary and Primary level teachers teaching subjects such as Arts, History, Italian, Geography, Math, Technology, English, Physical Education and Music.** When asked for specific examples of using innovative methods, teachers mentioned the **integration of technology, collaborative learning and group work** as well as **learning by doing** as this Primary Math, Technology and Geography teacher shares *"Yes, in technology I try to use new methods once a week (with coding and robotics). I use Trinchero method for math. For example, when I tried to explain the sum, I let kids explain first what is for them the sum using their words and debating between them. In this way they build a logic language. For geography sometimes I use robotics. Technology for me is a method to do other subjects."* Teachers are also familiar with **coding and robotics** as this Italian, History, Geography, Physical education and Technology primary school teacher shares "*I use the activities of Code.org, and usually kids like that because they are different from the traditional learning. For example, coding helped them to learn right and left. I use CodyRoby, a robot with coding cards. Kids learned to code the robot to move on a path. I also used the robot Cubetto. I used also tinkering. For example, for Christmas I asked the kids to make a Christmas light card."*

The frequency of using innovative teaching and learning methods depends on teachers confidence/experience with the method as some teachers say that they **always** use them as this Italian, History and Geography Secondary teacher shares *"Always especially when I introduce new topics, in which all together we "hunt" for different solutions, points of view, hypotheses."* However, there are also **teachers who have difficulties in integrating the innovative methods and only use group work** as Primary Italian, History, English and Physical Education teacher shares *"For me is difficult to integrate these activities in the everyday school activities. I'm only able to use group work as a different method."*

Impact

When asked about the positive effects of such methods on student, teachers often spoke about the **inclusiveness of the methods, giving a voice to the shy students, improves relationship between students, resolving conflicts and the fact that the student learn to cooperate and are enjoying the process** as this Primary Technology, Italian and English teachers shares *"Yes, the results of INVALSI test are good. My students are good in discussing, they are good in the reading and comprehension. They can solve problems. My kids keep trying until they manage to do it.".* Even if **teachers truly see the benefits of using innovative methods,** they are **facing challenges from parents who want standardized learning** as this 5th grade teacher shares "*It takes time and the method is not immediately visible to parents. Not everyone understands the value. Very often parents are stuck with an old way of teaching. What goes beyond the standard is scary."*

Teacher also spoke about **some of the challenges of such methods such as noise and chaos and how these methods affect different types of students** as this Math, Technology and Geography Primary teacher shares "*Yes, but I still don't have certainty. For sure I have kids' attention. Teachers have also to*

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

learn to work with a small sound on the background because when kids work in group they have to speak, the productive chaos is inevitable. For sure these are all methodologies that push shy kids to come out. This method also helps kids with difficulties to come out. We have noticed that the traditional "good students" sometimes had difficulties in taking the challenge, they have difficulties in give it a try." Other teachers believe that **for best results innovative methods need to be blended with traditional methods** to provide good results as this Secondary Arts teacher shares *"The effect is positive to stimulate attention, but it should not replace deepening with the paper book. They certainly contribute to skills, because they are intuitive and fascinating tools that help motivation to study and develop creativity. Like the work in small groups in the mutual help for the resolution of technical-practical problems, where everyone participates, involving the other."*

When asked if such practices cultivate 21st century skills teachers agreed that such methods do and some of the skills they often mentioned are **collaboration, teamwork, problem solving, critical thinking, respect, conflict resolution.**

In terms of **evaluation of students' skills development, Italian teachers often use self-evaluation, reflection, and observation grids**. Teachers seem to dislike the usage or marks as this Primary Math, Science, Geography, Technology, Music and Physical education teacher shares *"I'm against classical test and voting. I understand I taught them well when I see them happy. When I see them not downhearted, when they think about the mistake they have made because they learn from it. I do not use grids. It is self-evaluation. Sometimes I exchange the children's notebooks and ask them to correct their partner's exercises."*

Teachers know and have used observation grids but man have **difficulties using observation grids and teaching at the same time** as this Primary Italian, English and Technology teacher shares *" I have used observation grids but they are difficult to use when you are alone in the class, because it is difficult to facilitate and to observe at the same time."* There are also teachers who have used extensively observation grids and have **insights about how the observation grids could be used for long term results** as this Secondary Italian, History and Geography teacher shares *"**In the refinement phase because they are "inherited" classes and, in my opinion, only if you start in first grade and get to the end of the school grade by setting the work in a certain way even with colleagues you can achieve remarkable results. Not only with self-reflection. I used observation grids for students with oppositional/provocative behavior and therefore only aimed at improving the behavior and the class environment. Serious grids should be built on the processes put in place to reach the different levels of competence of the students both in education and training."***

Design Thinking and Maker Education

Knowledge

In Italy, all teachers interviewed do not have practical experience with Design Thinking and those who are familiar define it as ***"Design Thinking is a shared process in which divergent thinking is encouraged to arrive at different solutions to a given problem**. I had a glimpse of this method during a training*

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

course organized by the school." as this Secondary Italian, History and Geography teacher shares. There were also two other teachers who said they are familiar with the term, and associate design thinking with the development of 21st century skills such as creativity, innovation, empathy, teamwork, and brainstorming.

When it comes to Maker education all teachers interviewed have had at least fundamental awareness and associate it with tinkering and robotics. They define **Maker Education as anything related to robotics, tinkering and more broadly learning by creating** as this Secondary Italian, History, and Geography teacher shares *"In my opinion it is learning by creating and experimenting and reflecting on what you have done."*

When it comes to learning about Maker Education many teachers mentioned **trainings organized by the Science and Technology Museum as well as European projects** as this Primary Italian, English and Technology teacher shares "*I participated in a course organized by Science and Technology Museum of Milan. Then with the school we won an Erasmus+ together with other European schools and the topic around it is Tinkering."*

Practice

Teacher who participated to the trainings had also applied the learnings in their classroom and they were **pleasantly surprised** as this Primary Math, Science, Geography, Technology, Music and Physical Education teacher shares *"Tinkering. Wonderful experience. We had a lot of fun during the course and then we did the same work with the children. It worked!"* Teacher have integrated **Maker education as a one-week event** as this Primary Italian, History, English and Physical Education teacher shares "*We organized the tinkering week. We gave boxes with materials, exercise instructions, video tutorial. All the class had to do different things. My students had to build different means of transportation."*

If for some teachers this was a onetime activity, some other teachers see it as a recurring activity adapted and integrated in their teaching as this Primary Italian, Technology and English teacher shares *"First, I gave robots to my kids (cubetto) and I observed how they used it. Then I used it for English. I asked the kids to recreate the path of Dorothy in "The Wizard of Oz" using the robot cubetto. They made all the characters of the story and then they created a feelings clock used to give feelings to each character. In this way they learned the different feelings in English. This year I would like to use the robot Mind Designer and to ask kids to build a fairy tale with it."*

Impact

Opportunities when applying Design thinking and/or Maker Education:

- **Students positive response to Maker activities despite challenging teachers' mindset** as this Primary Italian, History, English and Physical Education teacher shares "*During the tinkering course some of the teachers were scared that kids wouldn't have been able to make it. Instead with the **kids we did not have any problem during the tinkering week, they were happy, and they managed to create amazing transports**. "*

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

Challenges when applying Design thinking and/or Maker Education:

- **Access to the right materials can be challenging** for some teachers as this Primary, Math, Technology and Geography teacher shares "*It is difficult to have the right materials for each activity. Eg: For robotics you have a lot of engines that when you buy, they arrive all separated. You need to weld the parts. I had to ask for external help. Another time we wanted to make big poster with the circuits, but if you want to hang it up you need a drill."*
- **Cost for purchasing Maker materials may be challenging** as this Primary, Math, Technology and Geography teacher shares "*Another issue is the price. Robots are expensive and school cannot afford. Our school used a bit of the money they had for the coding lab, but it is not enough."*

Lesson Plans and Materials

In Italy teachers design most of their teaching materials using the textbook, the internet, peer to peer support and other materials available online. The difference with other countries is that **multiple teachers teach at primary level and the selection of materials takes place in a collaborative way between all the teachers who teach at that grade**. Another differentiating aspect with other countries is that **many teachers mentioned the usage of pedagogical methods such as Bortolato and Bogliolo** as this Primary Math, Technology and Geography teacher shares "*For math I use the materials of the analogic method (Bortolato method). I use the book, but not a lot because I prefer Bortolato material. I also look on internet and I prepare the materials by myself. For coding I use Bogliolo materials. He offers games, coding activities etc."* The same method is also used in other classes as this Primary Italian, History, English and Physical Education teacher shares "*For Italian I use Bortolato method because it is really well structured, but with little group work. For English, history I look on internet for exercises and activities. I often change material because it became old and boring. I use the book, but I integrate it with Bortolato materials because it is easier for the kids."1st grade teacher.* However, for many teachers the **textbook remains the core material** "*The textbook is the starting point. On the internet there are many resources, but it takes time to select them."* 5th Grade teacher.

Most of the **Italian teachers like open lesson plans** as this Secondary Math and Science teacher describes *"Open class, I don't program. I start with a topic, then a discussion starts, and it becomes open class. Students like to debate because they feel engaged in the lesson."* There are also **teachers who prefer semi-structured lesson plans where they start with a structure and are flexible as they teach,** as this a Italian, History and Geography Secondary teacher describes *"I prefer a semi-structured lesson: I establish a strong canvas with the activities I am going to carry out, if then the students' reflections take up more space than expected I dedicate more space (of the lessons) to a given activity."*

Lessons plans are designed weekly or monthly and where possible teachers coordinate their classes with other teachers teaching at the same grade as a 4th grade Italian, Arts, History and Geography teacher mentioned *"Each Monday we plan what to do with the other teachers of the classes of the same grade."*

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

All Italian teachers interviewed are open and interested to instructing a theory they have not experienced *"A lot. I like to put myself on the line. I think that is important to reinvent ourselves with new approaches."* said a Primary Math, Technology and Geography teacher. Overall, Italian teachers seam very keen on experiencing and trying new things as this Primary Italian, History, English and Physical Education teacher shares *"I like to explore, I don't like to replicate lectures."*

Role

Most of the **Italian teachers see their role as of someone who provides constructive feedback and empowers the students and dislike the option regarding someone who influences student decisions** as this Primary Math, History and Geography teacher shares *"I would like to be the option 1, but also the 2, to teach and make them believe in what they are doing. Definitely! I do not want to be a person who influences students. Sometimes is important to resume all the students' flow because they can get lost in the educational path. The respect in the teacher is fundamental."*

All Italian teachers interviewed believe they have the mission to instill social awareness in their students from active citizenships, the constitution, the environmental responsibility, the respect of the classroom and the common space and so on. They conduct such activities on **daily basis** as this Secondary Art teacher said "*Social issues are dealt with daily, in compliance with the rules of good behavior implemented in our institute. Sometimes we discuss environmental issues and talking about Greta Thunberg we decided to have in class 2 plants. Students are taking care of them and they use an observation grid to monitor them."* or as **a separate project** as this first grade Italian, History, English and Physical Education teacher did "*For example, this year I asked not to bring water in plastic bottles. The issue of respecting the others is also very much covered."*

Motivation

Teachers believe that **participating to courses keeps them motivated, updated with the new innovative learnings and helping them become better teacher** as this 5th grade Math, Science, Geography, Physical Education teacher said *"Keeping the motivation for teaching alive. It is an opportunity of growth."* Also, some teachers mentioned **personal interest** as this secondary Italian, History, Geography teacher shares "*I sign up for a course if I think I have a personal enrichment and secondly to learn about new effective teaching methods so that I can then try them out in class."*

Most of the **teachers measure their performance through their student's reactions and evolution as well as parents perception** as this Primary Italian, History, English and Physical Education teacher said "*If I see my students happy. If they want to come to school is a good sign. Also the parents are important: if I see them happy I understand I'm doing a good job."* Very few of them have use tools to measure performance however this one Secondary Italian, History, Geography teacher mentioned anonymous questionnaire "*I usually give an anonymous questionnaire to my students entitled "How do my students see me" which is important to get feedback and to be able to correct highlighted problems. Moreover, when I see that the shyest students or those most in difficulty are able to get good results."*

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

Professional Development and Training

When asked about professional development experiences which **truly enhanced their teaching capabilities** a large majority of the Italian teachers mentioned the **tinkering and robotics course mainly because of its positive effects on their students** as this Primary Italian, History, Geography and Art teacher shares "*The tinkering and robotics course because they give us some important insights to involve students in the class. Also, the course of "competence-based model".* Teachers also mentioned courses which help them better serve their students with some of their outstanding issues as this Secondary Math and Science teacher shares *"I've done various courses on child protection because we work with teenagers who are going through difficult times. I like, if I can, to help my students who are having problems."*

Teachers would **prefer a physical training, that is engaging and practical** as this Primary Math, Science, Geography, Technology, Music and Physical Education teacher shares *"Not too much theoretical because the risk is leaving nothing behind. I have tried to do online courses, but I think it's better to have a trainer who practically involves you. Not too short timetables. Teaching style based on collaboration and exchange. It is important the practical activity where we get directly involved."*

When it comes to the location and timing some teachers said that they **would prefer for the course to take place at their school** as this Art secondary teacher shares *"Place: My school. Times: 2 hours per lesson, every 15 days. Teaching style: to groups with a theoretical part of the trainer and our experiences. Activities: workshops, always in groups.".* When the activity takes place and how it fits with teachers schedule is also important as this Primary Math, Technology and Geography teacher shares "*Timing is important, they can't be too short, if I have to do an activity with my class I have to be flexible in choosing when."*

Teachers have remarkably interesting additional points to add:

- **Teachers role should stimulate 21st century skills development:** *A teacher should go along with the students in their live process. A teacher should stimulate critical thinking, creativity, self-esteem.*
- **Students materials need to contribute to student's conscious development:** *Those who do the training courses must contribute to help young people in becoming aware adults and to make conscious choices in the future.*
- ***Teacher age:*** *The problem I see is that all the teachers who decided to participate at this project are quite old. Why the young teachers are so stuck with the old methods?*
- **Need for a long-term innovation vision in education***: Innovations are left to the good will of the individual teacher instead we need a more ambitious and long-term vision from the school management. I am so tired that in the classroom we still have blackboard, desks, professorship chair. Schools are like this since many years ago!*
- **Good relationships with families:** *It is important to create a good relationships with the family. Sometimes parents want to have a say in the teaching methodology, but this is dangerous and wrong. I have 25 students and I must structure the class for everybody.*

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

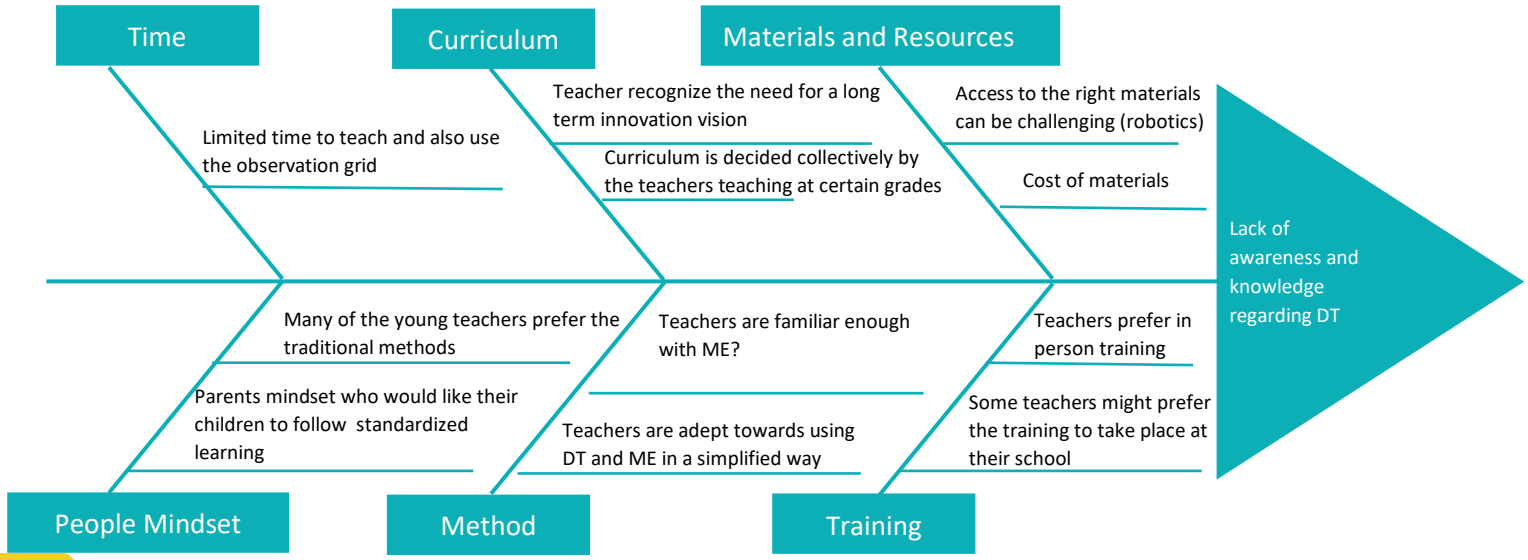
SWOT analysis

Below follows the results of the swot analysis in a nutshell, showcasing the most important strengths and opportunities together with the weaknesses and threats that come along with the introduction and implementation of the two approaches of Design Thinking and Maker Education with Italian teachers. The list as shown in table below is not exhaustive, however, it stipulates the most important aspects to be taken onboard while creating the DESIGN FUTURES students curriculum.

Strengths	Weaknesses
- Teachers like the "doing part" of the course - We give fresh materials to use with the students - Teachers are excited to share experiences with other Europeans' teachers	- If we do it only online teachers will lose the workshop feeling - Parents should be involved - Age of teachers' students
Opportunities	**Threats**
- Sharing experiences between teachers - That the course will push other teachers to participate in the testing - Teachers love to test new methodology; they love to learn new things	- COVID = impossibility to travel in Europe

Root cause analysis

Below is a root cause analysis which investigates key areas and causes which influence Design Thinking and Maker Education practice in Greek schools and how these causes may impact the development of the Teachers Training, Student Materials and overall DESIGN FUTURES strategy in each country.



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

Students needs analysis

In Italy due to Corona Virus the student workshops did not take place however the project parent PACO provided a SWOT analysis based on their extensive experience working with students.

SWOT analysis

Below follows the results of the swot analysis in a nutshell, showcasing the most important strengths and opportunities together with the weaknesses and threats that come along with the introduction and implementation of the two approaches of Design Thinking and Maker Education with Italian students. The list as shown in table below is not exhaustive, however, it stipulates the most important aspects to be taken onboard while creating the DESIGN FUTURES students curriculum.

Strengths	Weaknesses
- Learning by doing by themselves - Going beyond the obstacles, learning to do not give up - Seeing students happy of going to school - Learning to discuss and to solve an issue together - Learning to collaborate each other	- Teachers do not see the value of it - Parents do not see the value of it - School leader do not see the value of it - Spaces are not appropriate - Materials are missing
Opportunities	**Threats**
- Giving a "voice" to the students that in the traditional learning methodology usually do not stand out - Bring out the skills of each student	- -

Summary

The semi-structured interviews conducted with the Italian teachers offer reach insights into teachers' experiences, practice and means when it comes to the integration of Design Thinking and Maker education. We can notice that in Italy teachers are more adept towards using Design Thinking and Maker Education as part of their curriculum in a simplified yet effective way. As in other countries teachers have emphasized the importance of mindset of both teachers and parents and how crucial is to inform parents about the value of these methods. For teachers to be successful when implementing innovative methods and it needs commitment, willingness, proactiveness and close collaboration to their students, and participating to trainings in new methods is important but not sufficient.

Teachers emphasize the importance of flexibility, adaptability and creativity when working with Design Thinking and Maker Education. Education needs constant update and evolution therefore teachers need to look for new ways of triggering students' mindsets. Learning is inevitable. But the way that teaching occurs is especially important and this is the opportunity DESIGN FUTURES tap into to give students a voice and create a context in which they can develop successfully.

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

CHAPTER 5

NETHERLANDS

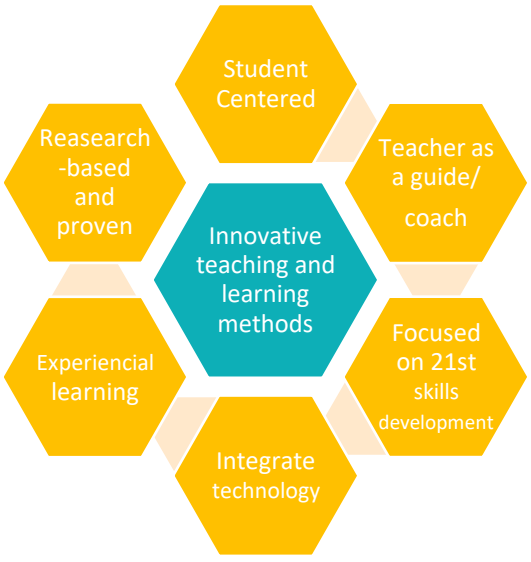
In Netherlands, data was collected by our partners Designation Works and Eindhoven University of Technology. The team conducted interviews with 11 teachers and 2 school directors. The two directors have experience both as teachers for 6 and 12 years and as directors of 15 respectively 6 years. The two directors coordinate relatively smaller school of 117 and 170 students and coordinate 9 respectively 10 teachers. However, due to the Pandemic it was difficult for the team to organize the focus group with teachers as the organizations we were in contact with wanted to shield their teachers from extra workload next to their workload of switching to online teaching activities. Two student workshops were organized online each with four students.

School Staff needs analysis

Innovative Teaching and Learning Methods

Knowledge

In Netherlands the teachers have a broader definition of innovative teaching and learning methods but overall are seen as **student centered, focused on 21st century skills, teachers role is that of a coach/facilitator, integrates technology, design thinking and methods supported by research** as this primary teacher shares *"Ways in which the child has a much more central role. The children look for information themselves instead of getting it from the teacher. It can be accompanied by technical innovations, such as a 3D printer, but not necessarily. So, it's very broad and in these a teacher also plays a coaching role: where the teacher evaluates the process in a different way than with just a test and a grade. These are already major innovative steps for our school. But it also involves using certain materials, which the children can use, so that they also develop technical skills."* **Having scientific research to demonstrate the efficiency of the methods is important** for teachers as this Primary teacher shares *"Using new methodologies which have been proven by scientific research to improve children learning."* Teacher often spoke about learning focused on the process and not the outcomes as this primary teacher shares "*The children need to be able to explore new subjects. They need to work together and research a topic and plan. So methodological work. And if it does not work, that does not matter. It is about the process."* This is a novelty compared with other countries where teachers are not asking for the methods to be validated by scientific research, showing a more informal adoption approach.



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

A major difference with other countries is that in **Netherlands teachers acquired innovative teaching and learning methods through formal education as opposed to other countries where it was mostly outside the formal education**. However, the Dutch teachers are also self-taught, participated to trainings and seminars, and learned from other peers about innovative methods, as this Primary teacher shares *"I learned about this during my studies but also from other teachers at my school."* **Teachers mentioned numerous trainings such *as Designathon,* as well as European projects and past work experiences** as this Secondary Engineering and Information Sciences teacher shares *"Design Thinking from Industrial Design, my bachelor, and at the UvA about change management. But also, through this European project, this specific model. Before this project we used the technical design model of the technical university of Twente."*

Practice

Teacher apply extensively innovative learning and teaching methods by **integrating technology, design based learning, research based learning and experiential learning** as this primary teacher describes "*We focused on the three O's [in Dutch]: Design-based learning, Research-based learning and Experimental learning. So, children go through the design and research cycle."* Teachers also look at these methods as a **combination of crafts and technology** and their experience with Designathon and Lego are often mentioned.

In Netherlands, teachers **try to integrate innovative methods as much as possible, some teachers have dedicated days** as this primary teacher shares *"I mostly use this on Fridays during Science & Technology, other days I use it less but I still use self-evaluation"* **and others try to integrate such practices daily**. Teachers **often referred to the integration of technology and collaborative work** as this primary teacher shares "*Yes, especially since the students have Chromebook now. I mainly create projects within lessons around geography, history and nature as well as language lessons. I have a more difficult time applying it to math because that is abstract. We could do that with engineering lessons, but we do not have the materials for that. And sometimes in the creative lessons, but a lot less."* But there are also **teachers who overall doubt the integration of such practices, the overall process and their benefits for the students** as this secondary information technology teacher shares *"Maybe the opposite. Because we let the students free to explore and do a lot themselves, we notice that they often get stuck by having too little knowledge or too little skills for the thing that they want to do. So as a teacher, we are still filling those gaps in a kind of traditional way. We also noticed that sometimes we create learning goals in which we want students to work with a certain tool, but if we don't teach this beforehand, they will never create concepts that involve these skills (e.g. they will never think of using a laser cutter when they are not taught how to use this). So maybe we should sometimes just teach these skills. It is a bit of a chicken and egg story."*

School directors emphasized the fact that the **integration of innovative methods needs to be done with care because it can create disruptions** as this principal share *"you need to have a certain level of stability".*

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

Impact

Dutch teachers share many examples of positive effects it has on students such as **students confidence, to peer to peer learning, taking responsibility, collaborating, giving feedback** as this primary teacher shares *" They take responsibility, when they give feedback to others they are more aware of their tone of voice, they are really engaged, learn to give compliments to each other and support each other when necessary. They tend to be more solution oriented."* Further, students **have more fun working on their projects and also teachers notice that students are becoming a partner in learning** as this primary school teacher shares "*I see this as part of a larger trend in education to make the children a partner in learning. The old (Montessori) materials are no longer enough. You need to supplement them with things that are happening now. If you do not, you miss the opportunity to connect with them regarding the things that are a big part of their world, like social media and games."*

Teachers have shared that the innovative teaching and learning contribute to skill development such as **teamwork, critical thinking, collaboration, self-confidence, problem solving, creativity, digital skills, independent thinkers**. Teachers see their relationship with the students changing and are becoming **more relax about having answers to all the questions and sometimes learning together with the students** as this Primary school teacher share "*Yes, I see the children becoming more assertive through this work. They create solutions that surprise, things I wouldn't have come up with. Sometimes they teach me a new technology or technique. 10 years ago, I would have been embarrassed if I knew less than my students about something, but not anymore. Yes, this way of teaching gives the children the chance to practice and learn the 21st century skills. Until recently, creativity in the arts was considered a different skill than* creativity *in math or the language arts. This creativity is essential and must be stimulated. I am able to do this by creating parallels between the work of Mondriaan and math. We work at our school with Top Ondernemers (a thematic, multidisciplinary approach to history, geography and science)."*

Teachers share that **the assessment of skills development is challenging as opposed to knowledge evaluation** as this Primary teacher said *"It's easy to check and test knowledge acquisition. Knowing if a child has acquired a skill is much more difficult."* **Some teachers conduct self-reflection and discussions, however overall teachers rely on their observations,** as this primary teacher shares *"I do not have tools for it, I use my intuition and experience. At our school, we have to sit in a circle to discuss things so that's a good moment to reflect together."* **Observations grids are not used in the evaluation and those teachers who know about them have difficulties in using them due to time constrains** as this primary teacher shares *"Not during a project, but we use it for social and emotional skills. Problem is that it is very time consuming and very subjective. If I discuss these with my colleague, I sometimes feel like we are talking about different children. But then again, children act differently with different teachers and we both focus on different things."*

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

Design Thinking and Maker Education

Knowledge

In Netherlands**, most teachers are familiar with Design Thinking and rated their knowledge level as advanced.** When asked what they understand by it they mentioned **that it is a iterative, methodical process to design solutions to solve problems** as this primary teachers shares "*Yes, design-based learning is based on a problem in which the children start looking for a solution to a problem in an iterative process. And that includes ideation, evaluating it, adjusting it and eventually reaching a final solution*". Interestingly teachers also spoke **about how they adapt the method based on the students age** as this Primary school teacher shares "*First, I give the students the design brief, then a problem with a challenge, and students will try to find a solution to that challenge. And based on the age, they will do it in different steps. In lower groups it is more trial and error, and in higher years they have to evaluate and iterate more."*

Teachers learned about Design thinking either through their formal education, European projects, trainings and observations as this two primary teachers share "*I learned about it within Industrial Design, University of Amsterdam, and during an Erasmus+ project"* and *"I have learned about that in that core group of the FKTO. From schools that already use it. And I learned about it on the course I took. And I have also seen it from some university students who came to try things out at our school."*

Teachers have also extensive experience with Maker Education and are able to make the distinctions between Maker education and design thinking as this Primary teacher shares "*Maker Education is also working from a problem but with a more technical approach. For example, making a power circuit or programming a microbit."* Dutch teachers can also **make the distinction between integrating Maker education with design thinking and using only Maker education** as this teacher shares "*Everything that is needed to create a real prototype of your concept. You can teach this in either a traditional but also in a Design Thinking method, in my opinion."*

When describing **what Maker education is, teachers often describe it as making thinks and sometimes integrating technology** as this primary teacher shares "*Making things. And the children think about it beforehand what they are doing and want to make"* and *"Use of newest technologies, in which it is very important that something is made."*

Teachers learned about **Maker education thought activities organized by local educational organizations such as NEMO, Designathon, and Het ABC** as this teacher shares "*I learned about this at a 'Maakkunde dag' at NEMO but did not like it since it was too much of a fixed program with little content. It had too much rules and too little room for the creativity of children."*

Practice

Teachers **had extensive examples about how they incorporated Design Thinking and Maker Education in their teaching** in projects such as "*design a game that makes learning math more fun"* to "*giving 30 minutes to the students to design a way in which an egg will not be broken when thrown out the window*" to sustainable energy, Lego league, "*learning about agriculture by solving a problem in the sector such*

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

as draught or the birds eating out the seeds" or making a weather instrument. All **these examples show the extensiveness the methods are being applied by teachers and the broad spectrum of experience they have.** Interestingly many teachers mentioned **the importance of making and the (self) evaluation parts of the process** as this Primary teacher describes *"A project around geography in which student needed to learn about the agricultural sector. Students first got some information about this and then needed to come up with a problem in this sector, e.g.: birds eating the seeds of the land or draught. Then they needed to come up with a design solution, make this and present it. They also needed to self-evaluate their team-work skills in a rubric. (A side note was that it is very important for this rubric to be very specific so students can work with it effectively.)"* **Many of the teachers interviewed have been part of the Designathon** project as this Primary teacher shares "*Every year we have month of technics, we do a research project, a Designation and a make project. A make project is for example making a weather instrument. The children counting clouds and make a logbook. They might take photos, analyze these and make a presentation about it. They need to challenge themselves."*

Both methods were applied in steps however depending on the organization the project was conducted in partnership with the steps were similar but varied. Students who worked with Fablearn@schooldk followed "Design brief - Field Study - Ideation - Fabrication - Argumentation – Reflection. Students who work with Blinq followed Step 1: research what you already know. Step 2: Make a mock-up. Step 3: Learn a skill. Step 4: Make a prototype. Step 5: Present. Students who worked with the model of LOOL (SLO Netherlands) followed these steps: Problem - Explore - Design Concept - Make - Test and Change - Communicate - Deepen. And other followed the following steps: Coming up with a plan together, presenting ideas, making together, Presenting the final product. Teachers shared that sometimes they did not follow the exact steps.

School directors know about Design Thinking and Maker Education and shared that with their experiences. Regarding design thinking they understand it as follows "*You look at the problem, then you ideate, make a prototype, and then you iterate. So, it a process to fix a problem.* I learned it in some projects in the school. And someone who I worked with did a lot around Design Thinking." As for Maker Education they mentioned a workshop and conference they participated at as it is shared here *"We just had a workshop. We used VR glasses and fabrication machines. I also went to an education conference in London and there we saw a lot about Maker education. "*

Teachers used **simple materials such as glue pistol, elastic bands, recycled materials from students' home**. Teacher also mentioned other resources such *as "MakerKit from Designathon and the Ozobot, MakeyMakey, Beebot, construction materials and free material. Lego. Material for art lectures. Laptops for scatch, Bluebots, etc.*" Some teachers even used some advanced materials as this Engineering Secondary teacher shared "*A big laser cutter that can cut 6mm material. 8 3D printers. A vinyl cutter. And other tools such as a drill press or hand-based tools. We also tried to implement little bits to teach children about circuits. Because you do not need to program little bits.*

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

Impact

Opportunities when applying Design thinking and/or Maker Education:

- **Teachers enjoy using these methods** as this primary teacher shares *"Personally I gain energy from these forms of education. I am disappointed at other teachers who do not dare to use it fully, with toddlers they use a project for the whole group instead of letting each toddler do their own project. I think I am a bit more relaxed than most teachers."*
- **Design thinking is methodical and helps put ideas into practice** as this Engineering Secondary teacher shares ***"****The biggest pro of Design Thinking is that is methodological. The problem in some schools is that they get the tools, but do not have a clear goal with them. So now it is something they can really use and that students learn that they can make things on different levels, different fidelities. And it really helps students that they can make something that is in their heads. Then they can also really talk about it. And we also try to facilitate this discussion."*
- **Children use their imagination to make something of their own** as this primary teacher shares *"Children get to make something of their own, not something the teacher told them to make. It appeals to their imagination; they get to imagine something and then adapt that to the reality which is a great learning experience."*
- **Children are really engaged which is very nice for teachers to experience** as this Primary teacher shares *"Pros for the teacher: the child is so engaged it's great to see."*
- **Children develop 21st century skills more than with traditional methods and** as this primary teacher shares *"More 21st century skills than in traditional methods. Also, more scientific, that kids learn how to learn how to work in a process, through a set method. Which is really needed in middle/high school and further education."*
- **Gifted students can also be included easily** as this primary and secondary teacher shares *"Children are able to express their creativity and children who are not so well at math show another side of themselves. Gifted children can work on their own level. All children can do the assignment on their own level.*
- **When working on projects having clear goal and materials nearby was helpful for keeping the students engaged** as this Primary teacher shares " *What was helpful was that materials were nearby and their goals were clearly explained from the beginning, I don't think there were steps that were difficult. They were very clearly formulated to the students at the beginning, so they knew what they needed to do and what to expect. Also, what they needed to do to get a good grade. Something I did wrong in a previous project is let them use their phones, they will not use it for school related things then. And it is important to have the materials close by, so you don't have to leave the room constantly."*
- **Schools leadership recognizes the need for more creative, problem solving skills** as shared here "*It fits with society. And it is good that the children learn that they can make something, that they can go through problems and a bit of meta-cognition. And they need some creative problem-solving skills."*

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

- **Multidisciplinary is considered an advantage and an opportunity for design thinking and Maker education by schools' leadership** *"It is very individual, so different students can have their personal development in different ways. It needs to be multidisciplinary."*

Challenges when applying Design thinking and/or Maker Education:

- **Design based learning activities are the first one dropped when teachers have to work on scores** as this primary teacher shares *"If you really have to work on scores with a class Design-based Learning is the first you drop. I do think it is a fantastic way of thinking to learn for children. They get broader thinking skills and learn 21st century skills. But not all can be done this way."*
- **Difficult to evaluate** as this Primary teacher shares "*Evaluation is difficult. And I think it might be difficult for a lot of teachers to get into the right role. Also, schools feel like it something on top of the traditional education. Maybe they do not want to change.*
- **Design Thinking and Maker Education activities take longer** as this primary teacher shares **"***costs more time."*
- **Getting the right materials might be challenging for implementing Maker Education.** According to a teacher *"A con would be that for Maker Education you really need to have the materials. Elementary schools do not have that much money. And you need to have the whole team behind this. So, everybody has the knowledge. Also, if the teacher changes grades, because this often happens, you don't want this expertise to be gone".*
- **Some children get stuck during presentations** as this Primary teacher shares "*Presentation of the product is challenging for me. How much attention is there for this presentation and what are children going to do? Also, challenging is to guess whether the problem definition is going to work for the children".*
- **Getting passionate and knowledgeable teachers with access to the right materials** might be challenging as this Primary teacher shares "*You need the right materials, passion and knowledge. The only problem would be for teachers to get those."*
- **Students struggles with argumentation and field research but adding reflections at the end helped** as this primary teacher shares "*Argumentation is something the children struggle with. And that is about: Why do you make certain decisions, and they are not used to that. So, what I did is to put a little reflection/argumentation moment at the end of every phase. So, I would ask them: tell me, why did you do this? Also, field research was difficult for some students. You see that they almost always go on the internet, but they do not want to go outside of the classroom."*
- **Teacher also had difficulties during field research and fabrication** as this primary teacher shares "*For me as teacher, the field research and fabrication were difficult to facilitate. Within field research because I must lose some control. And with fabrication because they have to work with new tools. And it is hard to look at every child, it is a logistical problem. I tried to make experts out of some children, so they could help others."*
- **Children might get anxious** as this Primary teacher shares "*Some children have a problem that they don't have a solution right away. And then get anxious and frustrated about that."*

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

- **Teachers need to be skilled in implementing these methods** was recognized as a challenge by school leadership "*Depends on how good a team is at implementing it. I think a team really needs to understand the urgency and the importance of teaching methods like this. And the financial aspect."*

Lesson Plans and Materials

Many of the **lesson plans and materials are designed by teachers and use multiple sources.** Compared with other **countries teachers in the Netherlands rely less on textbooks and use more the internet and local organizational resources such as Lego and Designathon Works** as this primary teacher shares *"During several years I did create a large database for design based learning projects. Every week I was searching through this but sometimes I do have too little time to prepare a lesson how I want, and I choose to use the regular method."* **The lesson plans teachers design are aligned with local standards and leverage existing online platforms and tools** as this primary teacher explains *"We have a method, because then we know it meets the SLO [Dutch center for curriculum development] learning goals and core goals of the government. We also started with Snappet on the computer, they work following the EDI model. We use it for math and language class. But we do not design it ourselves. But we like it if one lesson has one learning goal, so it easier for the students to reflect on that."*

When it comes to lesson plans **teachers prefer both open and structured lesson plans** as this primary teacher shares "*In the beginning more closed and structured, but in a way that I can change things myself when I get comfortable. So that option needs to be there".* However, when it comes to projects teachers recognize the importance of having more open lesson plans *"Depends on the context. In the course lessons, where we need to give instructions a structured plan is better. But in these more project-based curriculums it is better to be a little bit more open to implement it in your own context."*

All teachers are open to teaching new curriculum and they see themselves often as co-creators as this primary teacher shares *"I am open to implementing new methods, but I have to believe in the goals and vision behind it. Implementation is part of the skills a teacher must have. A useful tool in helping however is "co-teaching" with another teacher who is already skilled in the method and shows how to implement in it in the practical sense."*

When working on a new theory teacher emphasized the importance of knowing the desired outcomes *"For my colleagues it is important to know what the learning outcomes are at the end of the project. So, they know what is important to focus on"* **as well as having a clear structure** as this teacher shares *"A structured overview of what it will look like, and maybe also why it should be implemented (what are the benefits etc.)"*

School leadership also emphasized **the importance of using a phases approach when implementing a new curriculum,** as this principal share "*We do it in little steps. In every group we do a lesson, for example, then we evaluate. And then later we try to build up on this. We use Snappet for practicing*

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

certain skills on the computer. And we can use it for 9 courses, but we first implement it in one to see if it works. And then go further."

Both school leaders **emphasized the importance of creative lessons but also the threat that those ones are the first to be dropped due to time constrains.** Further they share the fact that if **the new curriculum fits with the school priorities the process of implementing it is really fast** as this director shares "*We are a small school, so it does not take really that long. For example, with Snappet we did it in 4 weeks. So, if it fits, then the implementation process can be fast. Depends on the complexity of the implementation and the knowledge of teams."*

Role

Teachers see their role as someone who inspires, empowers, and gives constructive feedback. *"I think someone who gives feedback to students and tries to empower them. I think confidence is extremely important, so I try to teach children to believe in themselves."* This Information Technology Secondary teacher makes an important remark about **how teachers' role is evolving and how it moves towards coaching as well as the limitations which come with this change** *"You have different roles. There is a new philosophy emerging around the role of the teacher, which is the teacher as a coach, which encompasses two aspects: the didactical and pedagogical in one. Traditionally these were a bit separated, didactical is the knowledge and pedagogical is about creating a climate in which students can take this knowledge in. But you see a shift to a coaching role. Which is interesting, but it also takes more time. But more coaching means: you must give more individual attention to a student. And per student, you look at which didactical strategy fits to the students. And you need to look which tools you need to give to the student, so they are able to learn."*

Teachers are determined to instill social awareness into their students and focus on issues such as race, religion and climate change as this primary teacher shares *"Yes, every chance you get, you talk to children about different viewpoints or religions, for example. There is a moment for social awareness in every class activity."* However, teachers recognize that is not always an easy process *"Yes, sometimes that is still a bit difficult. But I would like to show the students that they have the skills to change the world and which place they have in the world."* **Interestingly when asked about the impact in the community, school directors had a very different approach than other countries and they shared that they are more interested in collaboration with companies "** *We are interested in working together with companies outside of the school to do innovative projects with*", but also that overall work in their community is not how education is organized as this director shares "*That would be nice. But we do not organize education like this.*

School Principals main responsibilities include the overall coordination of the school from human resources to finance, students result, student health, and supervision of students and teachers as this director shares *"Responsible for everything at school: human resources, finances, results of the students, supervision of teams and teachers."* Both directors shared that **their school reputation is particularly important both rating it with 5 - especially important**. The school directors are also determined to

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

ensure that students need are met as this director mentioned *"To focus on the child and what he/she needs in every aspect, not only cognitively."*

A big difference with all other countries having more centralized school environments whereby in the Netherlands the structure is more decentralized and the school is organized in teams and the decisions are taken at the team level *"We work in a team-centered organization structure. So, the teachers work in an educational team. And they are responsible for the education of the students. And we also have expert teams, they make sure that the education is scaffolded. The expert teams advise which projects would be good."* **When it comes to projects and new activities the decisions are taken in teams and the teachers are responsible for the overall process or project implementation** *"We are a small school. So, we just have meetings with all the staff. But we also have two teams, one team that focusses on social and emotional development of the students and the other who focuses on didactical and pedagogical topics. "*

Motivation

Teachers are motivated to **participate in trainings because they want to improve their performance and how they respond to evolving students' needs** *"I like learning new things and improving. The teachers or trainers should be very enthusiastic about the subject themselves and convey this to the participants."* Teachers are also motivated by the fact that **they can innovate and increase their impact** as this teacher shares *"If it benefits the education I can give in the classroom, then I am motivated to do it. I am also motivated if there is a chance to innovate or to broaden the impact of the subject I teach."* as well as the chance to change the educational system as this primary teacher shares "*I think it is interesting to change the educational system like this. So, it is very intrinsic. Schools also need to give a more technical curriculum for 2024 from the government."* Teachers feel energized when participating in trainings as this primary teacher shares at the end of the interview "*I get energy from a study day and applying what I learned and that is very important."*

When it comes to **self-evaluation teachers mentioned students' reactions and behavior** *"If students have grown and are proud of their work."* as well as grades and more tools such as surveys and questionnaires *"Looking at the grades. But what I find way more important is to ask my students to fill in a questionnaire, sometimes that is confronting. But I will talk to the students that are not satisfied. And you need to know that some students are never satisfied. But if you ask often, they become open and honest about this."*

The school directors also share that they **do not have a formal tool to measure and monitor teachers performance** as this director shares "*I once made a table of the professional development skills that I just talked about and filled it in for my teachers. But we don't have anything specific."*

Professional development and training

School directors have shared their **identified gaps/needs regarding teachers training** from more **technical and programing skills to competencies regarding teachers' approach, role and knowledge** as this director shares "*In our organization structure, the teachers need to have some competencies. 3*

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

related to things in the classroom: didactical, pedagogical and knowledge of the topics they are lecturing about, and 5 outside of the classroom: looking for improvements, awareness about the organization, teamwork and reflection."

When it comes to the ideal training teachers would like a **combination between theory and practice and having a training/workshop that is very practical and includes peer to peer interactions and open communication** *"It needs to be applicable for your specific situation. Every school is different, for instance in their facilities or support from the directors. There needs to be room in a professional training to talk about these differences and how teachers can approach this. And it needs to be very practical"* ideas shared by this primary teacher as well *"It would be super when a training starts with good information. Not about theory of pedagogical vision but about how it works and what it does for the pupils. So, it is not only new but also deepening. Some older teachers do think: ' Oh another one with ideas again' and they do not want to participate. But not all of them think this way of course"*. School directors as well prefer that their teachers participate in interactive and experimental trainings. **Teachers also mentioned the Designathon works training and the fact that they enjoyed it** as this primary teacher shares "*No tests, making a portfolio, map the personal development, 3 to 4 lessons to apply design-based learning. I like it to be practical."*

When it comes to the format, teachers would like **a short course adapted to their busy schedule either in the evening or when they are not in schools** as this two primary teachers share "*Short workshops (like from the Waag or Mocca) makes it more accessible to teachers to join - they can go at the end of the day after teaching. 2,5 hours or so. In these workshops you can be introduced to the possibilities and it gives you direction for you to enrich your practice. Ideal training is mostly about experience and doing. It is important to be able to talk with your peers whilst you are having the experience. A good* ***combination of theory and practice is important*** *- it is nice to feel like a student"* or as this other teacher shares at the end of the interview *"Not having to take off time for a training is important for me. It would be good when a training takes place for example from* ***Friday to Monday or during a holiday (autumn break in the Netherlands during October).*** *"*

For those teachers who have more experience they would like to **refresh on some notions and gain more practical skills such as making and circuits** as this primary teacher shares *"For me specifically, more skills regarding engineering and maker education. So, for example, how to make circuits or ICT knowledge. But also, how to help students if they get stuck. And a refresher of the theory."*

Throughout the interview and at the end of the interview the teachers have mentioned **the importance of having clarity about what are the goals** "*I think it is important in a new way of teacher that there is a clear plan, clear structure. And if you want to make a part open, that is fantastic, but it should be clear what the teacher's role is in this 'open space' and how this open space should be filled up. The process to me is more important than the goal, even though I think the goal is also important"* as well as clearly explain what Design thinking is as this primary teacher shares *"It is important to know why this is important. Why is Design Thinking important? You really need to be able to answer that question.*

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

There are **no mandatory trainings, but school directors tend to recommend teachers trainings when they identify some.** The directors also emphasized the fact that it is important that **the training is aligned with school priorities, school's 4 years strategic plan, availability and scope** as the notes from the interview highlight "*Yes, some criteria: is it more important for the school or for the individual, team vs individuals, does it fit in the 4-year plan, does it involve some governmental recommendations, is it short or long, travel time, scope of reference."*

Both schools have **partnership with outside organizations** and the one they mentioned is called PLATOO as this director shares *"Yes, with "onderwijs maken we samen". Sometimes there is a coach. But we want to use more people who work within the foundation (PLATOO) with expertise. This would cost less money."* School directors highly encourage teachers to participate to development activities because this keeps them up to date as this principal share *"education always changes and students are always different and there is also budget for such activities*".

SWOT analysis

Below follows the results of the swot analysis in a nutshell, showcasing the most important strengths and opportunities together with the weaknesses and threats that come along with the introduction and implementation of the two approaches of Design Thinking and Maker Education, in Dutch schools. The list as shown in table below is not exhaustive, however, it stipulates the most important aspects to be taken onboard while creating the DESIGN FUTURES teachers training and students curriculum.

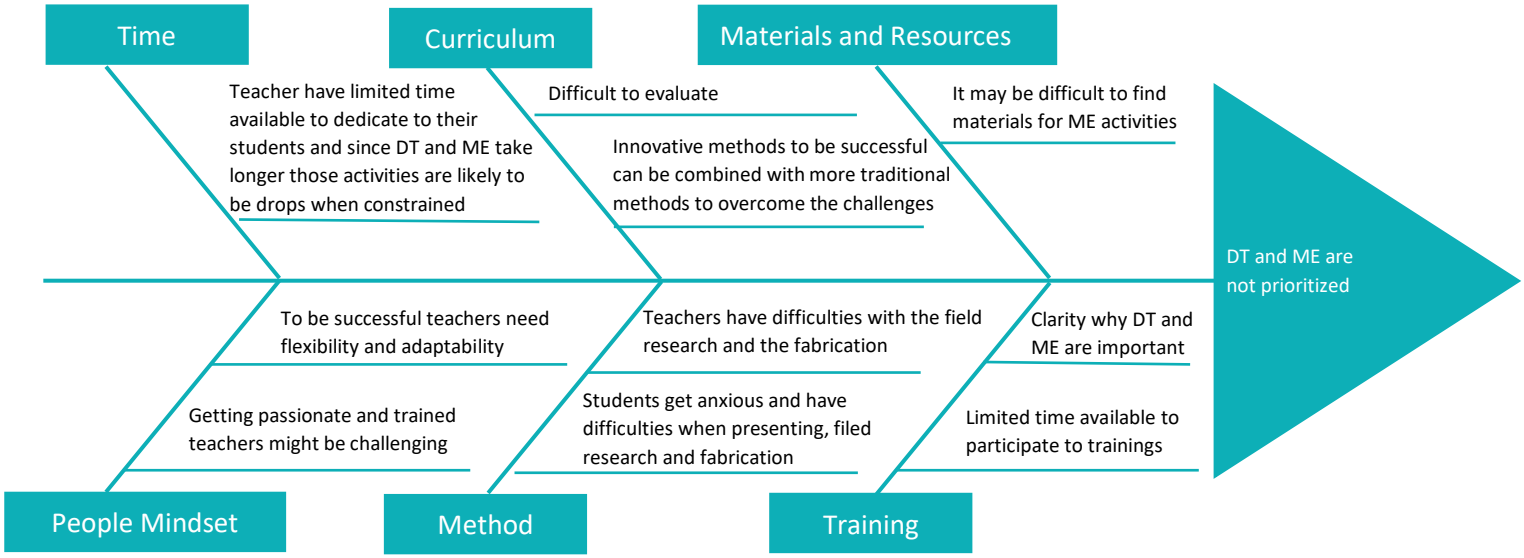
Strengths	Weaknesses
- A LOT of interest and excitement! - Insights in why this is important in the older and younger teachers that we have spoken to. - Willingness to learn.	- Older teachers seem to be more insecure about implementing new methods/lesson plans. They need more guidance. - There is a lot of unclarity about what design thinking is. Gets confused with problem solving a lot. So, this needs to be addressed. - Pedagogical side of DT/ME might not be clear either. How to create a space for creativity and how to diagnose problems in students?
Opportunities	**Threats**
- Teachers feel responsible to instill social awareness in their students - New and innovative methods of teaching and learning are linked to integration of technologies, research-based learning, DT, ME and 21st Century skills focused	- Problems with assessing learning objectives: 1) Might be too vague, 2) National inspection looks at learning outcomes in the form of grades.

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

- When teachers see the students engaged, they become motivated to work with DT & ME	- There is no mandatory training required in the Netherlands. So, teachers need to be intrinsically motivated to join. - Teachers said that when they need to focus on improving student's grades DT and ME activities are the first to be dropped

Root cause analysis

Below is a root cause analysis which investigates key areas and causes which influence Design Thinking and Maker Education practice in Dutch schools and how these causes may impact the development of the Teachers Training, Student Materials and overall DESIGN FUTURES strategy in each country.



Students needs analysis

Two online workshops were organized, with 4 students each, by Designathon Works. The findings will be presented below as well as the SWOT analysis conducted during the transnational project meeting.

Current learning patterns

Students were asked to describe their current classes and how they are learning. Their insights can be read below:

- **Students normally listen to their teachers and answer questions if asked.**
- Students feel that they are **good students however they often feel sleepy, bored and overwhelmed** as this student shares *"I am not so happy but sometimes a bit. This is because I often have a lot going on in my head"*

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

- **Students enjoy when they are presented with something fun and the fact that classed are calm**
- Students would like to "*To have someone different in the class each day as teacher and learn something else from them*" as well as "*I would like to be able to discuss things with the other children"*

Positive learning experience:

As a homework student were asked to draw a positive learning experiences and their descriptions and drawings can be seen below:

Students shared that they liked that they learned something new and are part of hands on activities which stimulates all their senses as these students share *"The class was different because it was like a regular gym" when* they learned how to cook and do gym/acrobatic activities.

Ideal learning experience

During this activity, the students described their ideal learning experience by referring to the following areas:

- **Learning** – how to build stuff such as a tree house, a robot who is like a pet, or a guitar to play
- **Participants** – Student would like to include their friends, experts, test dolls, and a teacher who is not too big
- **Feelings** – students spoke about the fact that they would like to be happy, satisfied, proud of their results and "*Very happy to make an invention and be able to use it"*
- **Materials** – electricity, iron,
- **Location** – students would like the location to be in the forest, in a big house or in the city – but none of them mentioned school
- **Time** – varies a lot from after hours, during the entire day and so on." you are in a building, you can design things first, you can choose how many days you do it per week and you can choose how easy or difficult you can choose many things"
- Students shared that they would like to use this activity in a **very practical way as well as to be rewarded for their work** as this student shares *"From 11 to 4. When your house is finished you*

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

can take it a step further, the small children can do it too once a year then they need a special teacher. When you're finished you get a certificate"?

The facilitator shares that the "*The children were excited to tell their ideas"* and *"the children weren't used to doing this online"*

SWOT analysis

Below follows the results of the swot analysis in a nutshell, showcasing the most important strengths and opportunities together with the weaknesses and threats that come along with the introduction and implementation of the two approaches of Design Thinking and Maker Education with Dutch students. The list as shown in table below is not exhaustive, however, it stipulates the most important aspects to be taken onboard while creating the DESIGN FUTURES students curriculum.

Strengths	**Weaknesses**
- Children are adaptable - Students love project-based learning - Children want to learn through invention and discovery - Children want to collaborate	- Children might underestimate their own ability to concentrate and self-motivate, they need guidance and structure too - Teachers need new competencies to run project-based learning DT & ME
Opportunities	**Threats**
- Children are open and excited to try new activities and learn in new ways - Covid has introduced teacher and students to working online - When children are given more agency, they will lead the learning more and that gives energy to teachers	- The difference between what children would like their classroom experience to be and the skills and time the teachers have available to offer these types of learning experiences is quite big - Knowledge of tools and equipment for making things is often not yet there - Some making materials are costly

Summary

The interviews with teachers and school directors in Netherlands offered important insights into their level of experience as well as interests and practical lessons learned regarding the integration of Design Thinking and Maker education. Netherlands has extensive experience with Design Thinking and Maker education however the challenge comes from prioritizing these methods. Teachers have suggested that in their classes it is very important to use a combination of innovative and traditional teaching and learning methods, as innovative methods do have specific cons that we need to be aware especially when it comes to skills development.

In Netherlands as in the other counties, Dutch teachers are requiring a clear plan and structure leaving space for teachers to be flexible but always ensure the role of teachers therein. Due to their extensive experience Netherlands offers a unique perspective and lessons which could be used in other countries

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

which are earlier in the process of integration of DT and ME into their lessons. The insights offered by the Dutch teachers can fast track DESIGN FUTURES project and increase the replicability and integration of innovative methods across other countries. Lastly, the decentralized educational system in Netherlands offers the possibility to experiment and gives teacher the flexibility to adapt their teaching however the collaborative approach offers the opportunity for knowledge and best practice exchanges.

Students workshops provide key insights into the positive response the students have to innovative methods and the opportunities as well as challenges they create as the SWOT analysis clearly demonstrates. Overall students love the opportunities to innovate and participate in hands on activities however teachers' skills and time available to offer these types of learning experiences challenging.

CHAPTER 6

ROMANIA

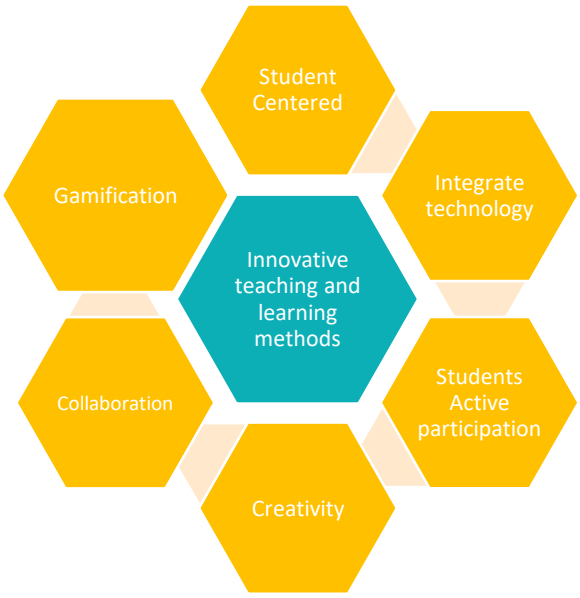
In Romania, data was collected by our partner All Grow. The team conducted interviews with 10 teachers, 2 school directors and a focus group with 5 teachers. One of the directors has 15 years of experience as teacher and 9 as director and the other has 32 years as a teacher and 29 as director. They are responsible for 179 students and 15 teachers and the other 600 students and 47 teachers. The team also organized 3 virtual workshops with 18 students. The findings of these activities will be presented below:

School Staff needs analysis

Innovative teaching and learning methods

Knowledge

Romanian teachers understand innovative teaching and learning methods as those **methods centered on students' needs which encourage students active participation during classes, creativity and collaboration** as this Secondary Romanian Language teacher shares *"Methods which let the students behave naturally and be able to express their ideas, feel valued and appreciated. Overall, they are methods which stimulate students' active participation in classroom".* Teachers spoke about the **integration of technology and gamification during classes** "*Mostly methods related to usage of technology -*



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

*if we have access to interactive boards, computer and such. When I try to use such tools in my classes takes a lot of time - sometimes links do not open and so on. Sometimes I use games or interactive activities to motivate the students. We also have digital manuals**.”.*** **Some teachers spoke about the need to blend innovative methods with traditional methods** as this Chemistry Secondary teacher shares *“The innovative methods have always been part of my teaching since I started teaching. Chemistry is a difficult subject and I must be creative and find alternative methods to make them understand. I do that by using games and fun activities and they truly learn when I do that. There are times when I must teach more traditionally, and I do that when there is no other way. Sometimes I use videos to show them experiments when I cannot conduct those live due to facilities or availability of materials. I cannot teach my students the same thing - I must adapt. We have used psychology and we know that each student has its own style of learning*. There were also teachers who shared that they could never apply the traditional teaching pattern as this Primary teacher shares *“I don t really like the distinction between traditional learning and new/innovative methods because I have always used what it is called today new. I could not fit into the traditional pattern. I like to work in teams to challenge my students to find solutions. I use autocorrection and supporting each other. My students learn more from what I do and say. They learn how to be empathic how to brainstorm and how to collaborate. I promote learning through discovery, and this is how they learn. For me, my school is my second home there is where I feel exceptionally good and it is habitat, I built myself which I love. “*

Teachers learned new innovative methods by participating in courses **organized by different NGO’s such as All Grow, Teach for Romania, or classes organized by the Ministry of Education** as well as through participation to **European projects such as Erasmus+ and eTwinning.** Recently, the Romanian Ministry of Education launched a program focused on competency development called CRED as this Biology Secondary teacher shared *“I participate at Teach for Romania training where they thought me to use 3 moments in our classes (I DO, WE DO and YOU DO) I also learned about how to encourage creativity, liberty of expression, self-confident and experiential learning. I also participated to a training organized by the Ministry of Education CRED, at this training I was surprised to learn that they are trying to move towards promoting students’ competencies development rather than information. We learned to put emphasis on creativity”.*

Practice

When asked what innovative methods they often use teachers often **mentioned games and technology integration** as Secondary Romanian Language teacher shares *“In my classroom I have been using digital manuals, I had also introduced new technologies such as Kahoot to evaluate students as well as Mycurio a platform approved by the Ministry of Education. For me one of the most innovative parts is the integration of technologies as well as integration of new methods such as Venn Diagrams, Kavintet and others”.* It is important to note that Romanian teachers refer to games as any activity that is fun which requires active participation.

Innovative teaching and learning methods are used at different frequencies by teachers**, some shared that they try to incorporate them every other lesson or when the students lost focu**s as this Romanian

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

Language Secondary teacher shares *"It is good to adapt to the classroom needs. I try to do more activities rather than content. I would say that one in every 2 classes has innovative methods. If students are tired, they are more likely to pay attention during activities type of classes."* Teacher share an interesting aspect about how students react during the implementation of innovative activities, more specifically **students don't respect or take innovative learning seriously** as this secondary teacher shares *"Yes I have used them but I can't use them all the time. I have to also focus on teaching more traditional learning because they don't take it very seriously when I do activities with them*."

There are also teachers who believe that **students learn better using innovative methods but recognized the issue of time and heavy curriculum** as this Chemistry teacher shares *"Our curriculum is very heavy there is a lot of knowledge we need to deploy and we do not have always time to conduct games. Some of these activities take a lot of time and I prepare a lot before the classes. I know these fun activities are efficient. I know when I do review sessions, I have noticed that students actually remember what we did during the games."*

School directors shared that **the extent to which innovative methods are being implemented in the classroom really depends on the teacher**, however, students respond well to innovative methods as this principal describes "*Students want a teacher who is active and who vibrates with them, they want teachers who use new teaching methods."*

Impact

Teachers recognize the **positive effects that innovative teaching and learning methods** have on their students as this Biology teacher shares "*Increases motivation, increases students' confidence, contributes to their communication and presentation skills and even the grades increase"*. Innovative teaching and learning methods are important for building 21st century skills as well as improve the relationships between students as this Chemistry teacher also shares "*Yes, they improve students critical thinking. It also helps them gain kinesthetic skills - when they play, they learn how to move objects. When we do the work in the classroom, we do reverse planning, we start with what we want, what can we do, what we need - using algorithms. Students are happy when we conduct such a class. They also learn how to be responsible, work in teams and slowly they learn how not learn how not to be Isolated and act on their own".*

There also seems to be a **contradiction between traditional and new methods, some teachers are very much in favor of traditional learning** as this Romanian teacher shares *"I believe these methods are useful but we still need to continue teaching in the traditional way with the blackboards and the book. I use these methods of teaching from time to time. I often use innovative activities after I taught a class and I need to settle the information and diversify the methods I use"* other teachers see it as a mix of traditional and innovative as this secondary teacher shares *"I believe we need to combine more traditional methods with the new methods. I am in favor of well-organized lessons with explanations and demonstrations - those methods work for the long term."*

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

Some of the 21st century skills developed by using innovative teaching and learning methods are**: critical thinking, creativity, communication, digital skills, empathy, team work, collaboration** and this primary teacher shares a good summary "*Empathy, team work, collaboration everything they need to become a person adapted to the society. We need to encourage students to do more to act and believe in themselves. I believe in altruism and doing what you say."*

Teachers also noticed that students behave differently during innovative activities, some students who are successful in traditional learning have troubles adapting and the students who don't excel in traditional activities seem to like more alternative activities as this Biology and Chemistry teacher shares *"Organizational competencies - they learn how to organize themselves. They see these activities as a chance to excel - there are students who are not very active on traditional activities but love to become more active during new practical activities. DIGITAL competencies - my students like when we use the computer and when we do interactive sessions".*

Romanian teachers use a mix of **individual formal evaluation with grades, self-evaluation, reflection and group evaluation but many mentioned that they don't have a formal tool to evaluate skills development** as this secondary school teacher shares *"Not too much - most of the evaluation is through observations of how they present or how they respond in classes. I can assess how they express themselves, how confident they are in the topic, their creativity. I don't have a formal tool to observe these".* Also teachers shared that using other forms of evaluation than the formal system might not be encouraged by the educational system as this secondary teacher shares "*I use individual evaluation, we also use group evaluation (the Romanian Ministry of Education wouldn't approve these approaches). What happens is that the group receives a grade. This has helped a lot of students to get a good grade and build their confidence. The teamwork helps them grow and become even more motivated. Students often say that I felt that our teacher trusts us and I (teacher) could see the change. Also, students work on their portfolios which are evaluated over the semester and as a group."* Romanian teachers do not use observation grids.

Design Thinking and Maker Education

Knowledge

Most Romanian teachers **are intimidated by the usage of English language and when asked if they know about Design Thinking and Maker Education they were not really sure what such concepts represent,** however from our past collaborations they have experienced and integrated such practices into their activities. Both school directors we interviewed did not know what Design Thinking or Maker Education are.

For Romanian teachers **Design thinking is mainly a process to design a solution to a problem** as this Romanian teacher shares "*It is a process which you come up with solutions through brainstorming to important problems. It feels like you dive deep into the unknown and sometimes felt lost but as we dove deeper things started to become clearer and at the end, we discovered things we were not aware we*

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

were capable of." Teachers also emphasized the benefits of these methods in terms of skills development such as **critical thinking, problem solving, adaptability, flexibility, negotiation,** as this Chemistry teacher shares "*Design thinking helps students think critically (for themselves) and come with solutions and ideas to different problems and situations. I have used this concept last year with my students. The students shared that design thinking is not something new to them instead it is how things should be – they must have a voice and take decisions. They will be adults soon and nobody teaches them how to take decisions and solve problems and find solutions. They never get the chance to learn how to behave like adults in schools and they need to have a flexible thinking and adaptive mindset."* There were teachers who shared that they used parts of the method.

The teachers we interviewed **did not know the concept of Maker Education.**

Practice

Teacher implemented the **design thinking activities either through the school year**, during the Activities week **or on certain days of the week** as this primary teacher shares "*Mostly on Fridays we conduct classes differently. We change how the desks are arranged and we try to do activities differently".*

Many of the **teachers who experienced Design Thinking were part of All Grow program** as this teacher shares how the implementation process went as this Biology and Chemistry teacher shares *"I was part of AllGrow program following Feel, Imagine, Do and Share. I first looked at the guide and realized that the steps are not hard to follow. First, I presented to them the concept and activities and from there we started working together. We first looked at the main problems in our lives, communities, and school. We chose a problem we could solve and once we had that it was easier. We had good meetings and activities. When I was meeting the students, they were already prepared for these activities. Once we finished, students were proud of what they did. They saw their work; they were delighted of what they did, and this gave them confidence in their own capacities. They are often not appreciated at home and this project made them realize that they are capable of more. I was happy - once they told me that I was like a mother to them. Also, these activities helped them know each other in a different way. I could speak with them about their lives and I always encouraged them. I took them out and I appreciated their work and efforts. The thing I am most proud about is that I was able to do all this in a school where everybody says you cannot do anything. I realized that it is up to me to do, create and change."* This testimony shows how the method impacts the student as well as how it changes teachers' perceptions.

In their innovative lessons teachers have been using **computers, projector, the white boards as well as cardboard, glue,** however there were teachers who **used more advanced materials such as circuits** like this Math teacher shares *"We have projector, interactive white boards and access to internet. We had used electrical circuits and students build houses. Students were very proud of that they did."* Most of the **materials are purchased by teachers or the school has accessed them as part of projects or collaborations with NGO's** as this secondary biology teacher shares "*Apps, materials from nature, I purchased materials, collaborations with NGO's, donations, etc.*

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

Impact

Opportunities when applying Design Thinking and/or Maker Education:

- **Students openness and positive reactions** as this Romanian teacher shares "*Students become really involved, they become more confident, they have more self-esteem, they have larger horizons, they are able to identify problems and solve them.*"
- **Interdisciplinarity of the method** as this Math teacher shares "*On the positive is the integration and linking to other subjects*"
- **Student self-esteem and peers' relationships improve "***The PROS are mostly encouraging them to be themselves, come up with ideas, their relationship with other students become stronger and students get to spend more time together in a new context. After each experience they were telling their parents what they did, and they were appreciated. "*

Challenges when applying Design thinking and/or Maker Education:

- **Teachers perception of their role might be challenging.** *One of the challenges has to do with teachers' perception - the teacher needs to be open and ready to handle the students - not all teachers are ready to open themselves to the students and make the student their partner.*
- **Teachers mindset and expectations.** *Other challenges are their mentality - teachers see their job very transactional and they just want to deliver information and they want to spend as little time at school as possible. Also, they want to be rewarded - is there any money in this.*
- **Limited time available.** On the negative side, teachers do not have much time – *"Math is a subject where students are evaluated on national exams and missing classes is really challenging. We only did two interactive workshops in a school year, but we should do at least once a month.*
- **Students attitude and mindset:** *It is hard for students to respect and be serious during such classes and activities as they think that such activities are more like entertainment mainly because they are not conducted on a regular basis.*
- **Lack of time for activities and finance for resources.** M*ostly the lack of time - if you want to do high quality activities you need more time - I also needed money for materials and asked the school director for support. Some parents were not supportive.*
- **Sharing students work with the community was challenging.** *Feel, Imagine, Do and Share – the Share part was the most challenging. Our community is not ready to accept and listen to our students. The community does not give students credit for their work and believes that community affairs are for adults only.*
- **Getting started and students expressing their opinions. "***The hardest part was the start -the students were not used to be asked for their opinions and what they think - but as we continued to do so and I gave them few examples, they opened up".*
- **Technological limitations "***It was hard to use videos from the internet as part of the Design Thinking activities due to poor internet access"*
- **Students interest.** *"It was hard to mobilize the students. Some students are not motivated to take action".*

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

Lesson Plans and Materials

When building their lessons **teachers rely on a variety of materials such as traditional textbooks as well as websites, NGO's resources, online and educational platforms** as this Biology teacher shares *"I developed my own materials I have books with experiments, I have movies, There is a platform from other NGO's who share resources, I have materials from Scouts as well as materials and activities I learned and adapted from other classes.*" Many of the **materials are designed in collaboration with the students** as this Romanian teacher shares *"I am very creative but I use a lot of the Pinterest educational boards. I also listen to my students and their wishes and try to integrate them as much as possible. I learned this at a conference about objectives that during lessons I need to set my objective together with them. Also, I like to add relaxing moments to all my classes - we need a moment where we make a joke or we laugh and relax. Sometimes those movements are planned, sometimes they come in spontaneously."*

Romanian teachers prefer both open and structured lesson plans but with some flexibility. Some teachers are also adapting their lesson plan based on the lesson and the students' grade as this Chemistry teacher shares "*I use a mix of both - it really depends on the lesson, the student group. I prefer flexible lessons. I prefer more flexible classes at older students and mores structured for the younger students. There are moments during the classroom when they have questions and curiosities. I add activities all the time because I always find new materials and novel activities I can include.* There are also teachers who are very much in favor of open lesson plans as this Primary school teacher shares "*I prefer open plans and the possibility to be flexible and adapt to student's needs. If at some point the student raise an important question about their civic behavior during the math class - I stop the math and we address the civic issue. Also, I adapt my class to the student. For example, we have students with special needs we all go one by one to solve tasks and I am able to adapt the task to their capacity, the other students know that, and they celebrate each other successes".*

Romanian teachers are open to teaching a theory they have not experienced before but to do so they need to have a clear structure as this teacher shares *"I just need to see the structure and see what the student has to say."* Further, in order to teach a new theory they would need training, clear materials as well as motivation and believing/trusting that theory *"Yes - I would do it but only if I believe it is interesting and I feel confident to teach it. Understand it and believe I can do it".*

New curriculum is normally proposed by the ministry and the teachers adapt, however each school has the possibility to include one elective per grade, which can be either selected from the electives approved by the ministry or can be prepared and proposed for submission 3 months before the school year starts. *"It really depends - each can have at least one class - this one is based on our proposal or what is previously approved by the ministry. If the proposal comes from the school, it needs to be submitted to the regional office in May and it is approved by the ministry in August. Normally the parents with the teachers approve it but what happens is that we fill out the hours each teacher needs."*

School directors also emphasized the fact that implementing a **new curriculum needs to be aligned with teachers' competencies**. Further the directors feel that many teachers lack facilitation and "soft"

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

skills as this director shares *"Teachers "soft" skills are often lagging behind. The traditional learning has been focused very much on knowledge, on information and it emphasized very little on the approach and the psychology behind it. Teachers need to learn how to listen to students and empathize with them."*

Role

Most of the teachers see themselves as someone who inspires and provides feedback to the students as this math teacher reflects on their teacher role *"I Like to offer them feedback but mostly I try to inspire my students. Make them more confident and over years I want them to say that these teachers did something for me and going to their classes was not a waste of time. I often asked myself why had I decided to be a teacher - what is my role- is it because of how other see me maybe a little but mostly is because of my students - I want them to develop themselves and learn things and be responsible and involved."*

School directors shared that they are responsible for communication, managing teachers, engaging with partners and overall school climate *"Overall ensuring that students receive good education and that they have good results at exams. Their involvement at national and international activities. I am responsible for making sure that student to student, student to teacher and teacher to teacher relationships run well. I oversee student climate and school relationship with the community and educational partners such as local police force, local medical clinic, other NGOs and so on".*

Further, the **school operates in a centralized, top-down manner** where a new project can be proposed by any member of the school, however the school director is the one deciding whether the project will be implemented or not.

Instilling social awareness is perceived as teachers responsibility however they conduct such activities during extracurricular activities as this French teacher shares *"Yes, but outside of the current classes - as part of extracurricular activities with impact clubs / service learning, with Change Architects."* Teachers have also mobilized student groups outside school activities to address community problems as this Romanian teacher shares *"Yes- My own example is very important. Sometimes when we see a problem we go together to investigate and see what we can do. I am lucky to have a "nucleus" of students who always get involved".* Overall **social awareness activities address students' behavior, students' interactions, environmental issues and taking care of the school their classroom** as this Primary teacher shares *"Yes we always do so. From simple conversations with someone who is not doing well to making sure we keep our community clean. It is not easy to make my students active but through personal example I help students become more active. When I have classes with them, I try to guide them towards social behavior."*

School directors, both form rural Romanian communities, see their **schools as key in bringing positive examples in the community** as this director shares *"the school is part of the community and an example for it. At the school we have the opportunity to create models and see those models in the community".*

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

Further the directors recognize that their school reputation is very important, and they link it to trust as this director shares *"The better our school's reputation is the higher the trust the community has."*

Motivation

Teachers are avid learners and motivated to participate to trainings because they want to continue to learn and have access to the newest methods as this History teacher shares "*I need to be up to date with all the information. There is always something new and I like to learn new things"* besides knowledge teachers also acknowledge **the importance of coming together with other teachers and the motivation and exchange those interactions generate** as this Biology teacher shares "*I want to do a better job at my classes and be able to motivate the students and engage them. Another reason is that these activities give a bust of energy and knowledge when there is stillness. I really like to learn practical tools and get to know other people and exchange experiences".*

School directors also shared that **motivation among teachers is often different, there are teachers who are open and motivated to try new methods and work with their students, and others who are more traditional and do not intend to change**. "*As a Principal it is hard to work with them and create a common vision."*

At the end of the interview a teacher mentioned that she always wanted to become a teacher and she would like to inspire more student to do so as she shares here "*I would like to be the reason why some of my students will decide to become teachers. Because now so little of them want to become teachers and this job is so important. "*

Teachers measure their performance mainly thought their student's reactions and behavior as this Romanian teacher shares "*My students are my meter. When they say things, this class goes too fast, or can we use the break too, when they are open and smile, I know I did a good job. When they are in a rush to leave, I know it didn't go well."* Some schools also use surveys where students measure their teacher's performance as this Romanian Language teacher shares *"Mostly feedback from students. My school also evaluates our performance and students fill out surveys. Students like that I am fair. I try to be as supportive and as fair as possible with my students. My colleagues also appreciate my work".*

Professional development and training

Most of the **teachers mentioned experiences outside the classroom which profoundly changed their mindset** as this biology teacher shares "*Teach for Romania was one of those experiences for me. It really focused on personal development and how I relate to students. I was mostly doing in my classroom what I learned and saw at my teachers and this was an experience which truly changed me. Often, I could feel the symptoms but did not know the causes. An important element was self-confidence, emphasis on the emotional relationship with the students, emphasis on the practical part. My strength is structure. I learned about creativity, getting outside of my comfort zone, feeling appreciated and gaining confidence and approval that I am in the right direction. "*

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

Teachers often feel isolated and in need to learn new methods and upgrade their teaching as this Romanian teacher shares "*There are 2 experiences which were truly transformative for me. Open mind course was a training which really reminded me that my role as a teacher is truly fundamental and it is my responsibility to be a teacher who is wanted by its students. I can be vulnerable with them"*

European projects were also often mentioned for their important role in teachers' transformation and training as this Romanian Language teacher shares "*I participated to eTwinning seminar in Vienna in an initiative of the institute of Educational science. There I learned more about how to integrate technology and how we as teachers need to create a space for students.*

When it comes to **the training teachers mentioned that they would like those to be practical, interactive where participants work in teams and are able to communicate openly and freely** as this primary teacher shares "*To be practical , include team work and activities. I would like a training that enhances creativity, helps me get closer to my students and help me get to students where they are. For example, how can I use Tic Tok to teach students science and so on."*

Few things teachers would like to know are **how to work with special needs students, how to be more creative, how to write and implement projects, foreign languages (English)** as this director shares *"integration of special needs children , training takes time and we need to take that into consideration, personal development, time management, how to write and implement projects, learn about the benefits of projects*" as well as skills such as *"psychological competencies, intercultural and linguistic competencies as well as team work, working with parents. We are good at knowledge."*

Teachers **need to participate to professional development activities because they need 90 PDU /credits who contribute towards their qualifications.** Many of the classes the teachers participate too are paid. Many of the trainings are organized by Casa Corpului Didactic with whom most schools have collaborated.

For school directors **an ideal training will be practical and focused on experiments and building competencies** *"no papers - role play that put themselves into the shoes of the students. Some teachers have a hard time to go outside their comfort zone".* School directors have shared that **they hardly have funds to buy necessities and lots of the new materials are acquired by teachers themselves, from parents' contributions or through NGO's, European projects and private sector initiatives**.

School directors shared that in general **teachers are monitored based on observations, student's performance and activities conducted during classes. There are formal evaluations, but those are not audited and really they are seen just as paperwork that needs to be filled "***there is a lot of paperwork and the methodology is approved by the ministry. Each teacher must fill it and submit it. There are strategic targets and goals to be achieved. From my perspective this method does not work. An alternative would be an interview or a presentation. we could do some swot analysis or things that are more interactive".*

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

Focus Group Results

Our team organized a focus group with 5 teachers who have experience with Design Thinking and/or Maker Education. In the first part of the focus group two videos one for each process were shared with all participants to create a common understanding of the two methods. After watching the videos, the group was asked what they understand by design thinking and they said:

- *Design Thinking has five steps: Empathy, Define, Ideate, Prototype and Test. Overall the DT process is very logical and comes naturally. The multiple iterations are important because you learn how to receive feedback and listen actively to make changes to the product up until the product meets its purpose.*
- *DT is a method that follows multiple steps focusing on searching problems and coming up with practical solutions. It develops imagination and it works well especially with older students since it is more autonomous than ME. It is focused more on reality and solving a real problem. DT seems to be more focused on the community and its problems rather than ME.*
- *I really like the empathy part because you do not design a solution before touching base with the community, that step is important for them. Normally the projects they must do are about coming up with a solution first without consulting and understanding what the real need is.*

After watching the Maker education videos, the teacher shared:

- It focuses a lot on **creativity and imagination**. In the case of **ME activities are more concrete**. This **method does not really emphasize the applicability of the solution in real life, but it focuses more on fostering creativity and imagination in the classroom.**
- **ME seems to be more suited for younger students,** who are guided by teacher and is focused on learning by doing. ME focused more on kinesthetic activities rather than audio or visual learning.
- Some teachers said *"I liked DT more because it is more practical, and I believe DT could include ME."*

When asked about **similarities of the two methods the teachers shared the skills development aspects, the methodological approach** *"Both methods foster teamwork, creativity, problem solving. Both steps have clear steps for implementation which need to be followed strictly. Both methods include feedback/reflection. Both methods foster collaboration, but CREATIVITY seems to be the common denominator."*

Teachers have identified multiple ways in which the two methods could be integrated in their teaching:

1. **Large project for one learning unit.** *"A larger project taking place over a learning unit - it could be very practical and integrate learning with community work."*
2. **Small project which will integrate ME and DT. "***A small project integrating both ME and DT in one of the lessons where it is appropriate such as experiments, prototypes and such."*
3. **Conduct interdisciplinary lessons. "***We could use the methods to design and conduct interdisciplinary lessons."*

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

4. **Overall changing the educational approach and have the student come up with projects and decide what they would like to learn.** *"The DT and ME could be really useful in changing the way we work with students - it could help us define with students what they would like to learn and together design activities based on their interests."*
5. **Connect schoolwork with community work.** *"DT and ME could be integrated in projects which connect schoolwork with community work and student's involvement in their community "*
6. **Redesign evaluation.** *"We could use DT and ME as a tool to redesign our evaluation processes - students are capable to evaluate and bring in their own perspective."*
7. **Integrate DT and ME in online activities.** *"We could use DT and ME to make our educative activities more fun and even think how we can integrate them in online learning - an issue which is becoming the status quo."*
8. **Involve parents.** *"We could use DT and ME as a tool to involve the parents more in our educational process."*
9. **Collaborate with businesses, NGO's, and other organizations to conduct DT and ME activities** *"We could conduct site visits to organize the classes with businesses, NGOs and such."*

When asked about resources, teachers said that at **a minimum you will need computers and projectors.** *"Overall, the resources shouldn't be a problem we only need people who are interested and dedicated to work on this."*

Another interesting point that was discussed during the focus group had to do with how and in which classes/ courses could DT and ME be integrated. Even If the teachers recognized that such activities are more appropriate for STEM classes, they came up with many ideas of how such methods and activities could be integrated in social sciences and languages such as Romanian Language classes, English and others and also concluded that we just need creativity and imagination.

Opportunities

- **Cultivate creativity –** *"In Romanian educational system creativity hasn't been cultivated and if we start early, primary, elementary, our students will become capable to change things on the largest scale. The key is for students to learn how to collaborate, become creative, gain kinetical skills. "*
- **Students engagement** – "*When students can discover and apply their ideas, their motivation grows, their self-esteem grows. "*
- **Students participation** – *"When students are encouraged, they become more creative and come up with more ideas."*
- **Adaptive learning and the opportunity the current pandemic has created towards more innovation** *"I believe we live in historical times - the change is here and it is now time of reflection on what we did and what we can do. We are now going outside our comfort zone and discovering new methods and ideas. Overall, the learning process is changing as we speak, and lessons plans are becoming more fluid".*

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

Challenges

- **Meeting students' individual needs** *"This generation ~snow flacks~ are challenging it is true that they are more concerned, but it is more challenging to work with them because they all want to be treated differently. "*
- **Adults mindset** *"Adults need to be more open to this. They, have little empathy and their attitude damages our kids. If we can start early, we can change their mentality."*

Key actions to increase the adoption of Design Thinking and Maker Education

- **New syllabus with less content.** "*An important aspect would be to have less content which we are obliged to teach."*
- **Special classes dedicated to projects.** *"It would be great to have special lessons dedicated to projects."*
- **Open classes – where teachers can innovate.** *"It would be great to have more classes where we can design our own activities and adapt our lesson plans. "*
- **Champions.** *"At national level it would be great to have an organization to champion this initiative and be outspoken about it. "*
- **Printed materials. "***It would also help to have printed guides for such activities"*
- **School training with practical activities. "***At school level, it would be great to have some trainings on these methods with practical activities."*

Promotion and Engaging other teachers

- **Personal example** *"I would give examples from my own experience; how did we apply those methods in our schools and communities."*
- **Benefits of the methods** *"I would tell teachers that this is a student center initiative which includes practical activities. I would tell teachers that at start it is hard but as they learn more their involvement becomes less, and they are more observers, and this could become more relaxing for them too."*
- **Empathy and Reflection** *"If we want a better future, we need to start now. We need reflection and empathy - these two will help us in the long run."*

SWOT analysis

Below follows the results of the swot analysis in a nutshell, showcasing the most important strengths and opportunities together with the weaknesses and threats that come along with the introduction and implementation of the two approaches of Design Thinking and Maker Education, in Romanian schools. The list as shown in table below is not exhaustive, however, it stipulates the most important aspects to be taken onboard while creating the DESIGN FUTURES teachers training and students curriculum.

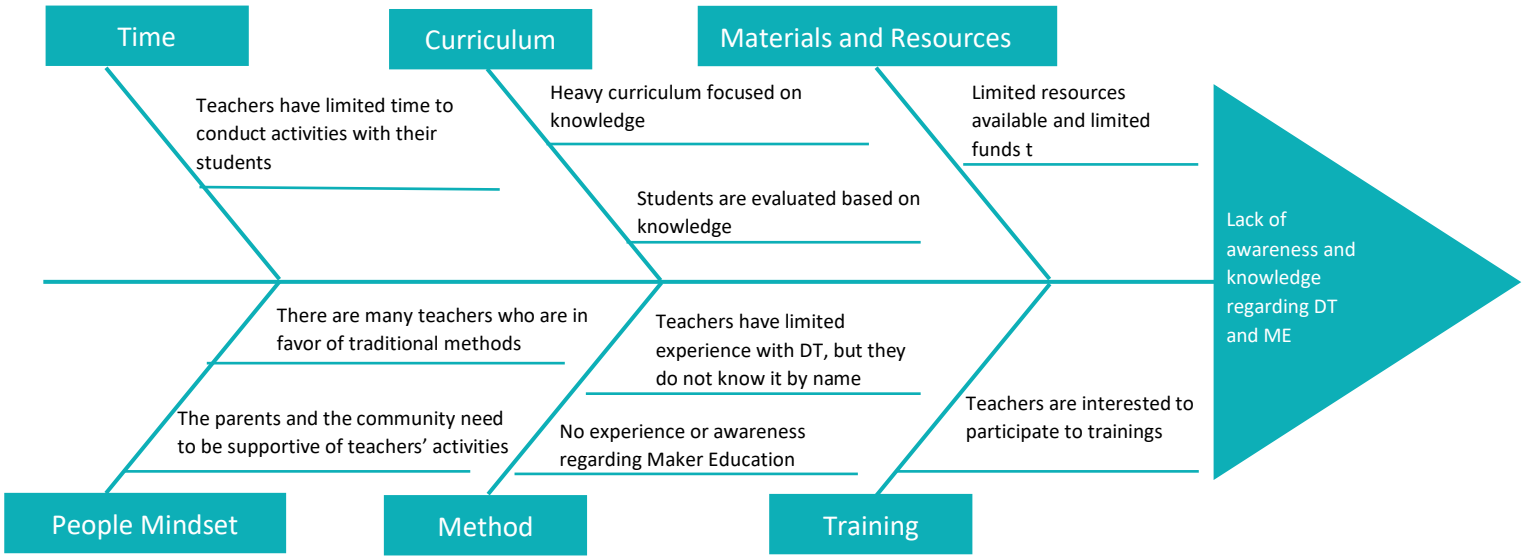
Strengths	Weaknesses
- teachers already see the benefits of using DT and ME like practices in their classrooms	- teachers have limited time available - hard to quantify the impact - lack of assessment tools and experience

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

- teachers are dedicated to students learning and development - teachers see themselves as someone who inspires and empowers the students - teachers are open to incorporating new curriculum - teachers see themselves responsible for instilling social awareness	- used to traditional teaching (role models
Opportunities	**Threats**
- National ministry is conducting classes on teachers training - Teachers have been forced to innovate in the context of COVID and students are demanding more interactive classes - electives for some schools	- Large amounts of paper work - restrictions to travel - uncertain school schedule - too many projects (NGOs)

Root cause analysis

Below is a root cause analysis which investigates key areas and causes which influence Design Thinking and Maker Education practice in Romanian schools and how these causes may impact the development of the Teachers Training, Student Materials and overall DESIGN FUTURES strategy in each country.



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

Students needs analysis

Due to CODVID-19 the student workshops were organized online. In total 18 students with ages 9 to 12 participated in 3 online sessions.

Current Learning Patterns

During this activity students were asked to describe how they are learning and what happens during classes:

- Students describe their current classes by talking about what they learn and how they spend their time. Normally **the teacher is leading the class and they need to take notes**. They learn new things or recapitulate.
- **Students feel good, active, and understood.** Here we can notice that **students miss being in the classroom and they are excited for the times when they will go back as this student said** *" We like that at school we are together with other colleagues and we can interact with others."*
- Students **like current classes because they are active and prefer interactive activities and the fact that they can receive teachers' support**. "*We like to learn new things and communicate with each other."*
- If students could change their classes, they would like to **go out in nature more** as well as to **remove grades**.

During the activities it was observed that the students were open and used to connecting to a session online via zoom as young as 9 years old. During the session they were very dynamic, they knew how to take turns and raise their hands when talking. The facilitator noticed that even if the session was conducted online the students participated actively and were engaged during activities. However, it was difficult to speak with the students about their regular classes especially at the start of the pandemic, when they were in the face of such a major change such as going from in person classes to online classes without too much preparation.

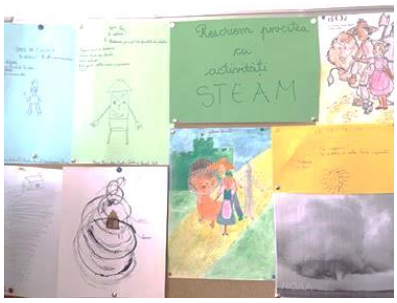
Logistically the online activities took longer to conduct than estimated and it was challenging to have in depth conversations. At the start of the session the students were shy, however they opened as the activities engaged them.

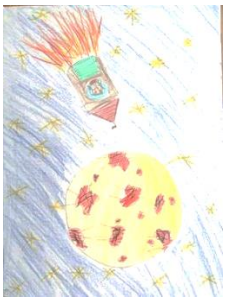
Positive learning experience:

Prior to the workshop the students were tasked to create a drawing of their favorite learning experience and during the workshop they presented their drawings and shared why they chose that experience and respond to a few questions.

- When talking about favorite learning activities students' examples could fit into 3 categories:
  1. **Interactive** activities during which students were able to learn new things by doing including STEM activities, storytelling, play games, dress up and so on.

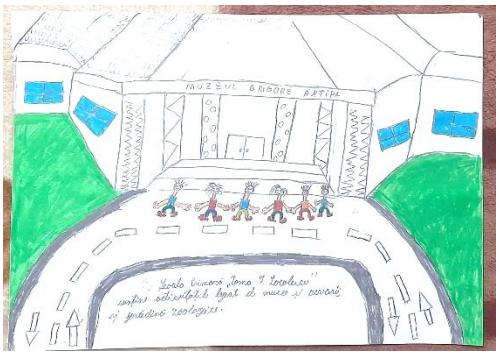
Co-funded by the
Erasmus+ Programme
of the European Union

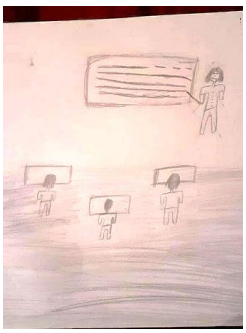


2. **New environment outside the classroom –** classes conducted at museums, community activities or activities taking place in nature as they show in these pictures.




3. **Integrated the technological aspects** *"by watching movies or completing the homework on a cell phone"* online classes etc.




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

- Students preferred these classes because **they learn and have fun in the same time** "*During classes we learn but during activities we have fun we can be creative and have fun."* Students **were able to identify the learning aspect as well as the creativity, teamwork and fun when working on these projects as well as the teacher role in doing so** *"Our teacher knows how to make us laugh and play a lot of games with us but we also learn. For instance, in math we learn divisions using pizza slices."*
- When it comes **to their role students emphasized the creativity, imagination, exploration and problem solving** *"we learned to be creative, to answer questions, to explore, to imagine"* and "*We are creative we draw, we paint, we use our imagination, we work in teams."*
- The **teacher was seen more as a facilitator who is there to help them and document their journey** as these 9 years old shared *"The teachers is facilitating, taking pictures and helping us"*
- Many of the activities they shared were **not graded or where part of a competition students participated to.**
- In terms of materials they **used basic accessible materials** such as pens, papers, glue and so on.

During the focus groups the **students were proud to present their drawings** and they remembered with pleasure the activities they chose to represent in their picture. We also noticed that when presenting the **students encouraged each other and when they had some artifacts from the activity, they were happy to show those artifacts on camera**. This shows students enthusiasm, empathy and comfort using e-learning.

Ideal learning experience

During this activity the students were tasked to design their ideal learning experience using a predetermined set of categories.

Learning: Students mentioned teamwork, creativity, sports, civic activities

Participants: Students want to interact with more people in their learning both people in their networks like their families and friends as well as outside individuals such as hackers, specialists in various filed, YouTube stars, etc.

Feelings: having fun was repeated multiple times by students, they want to be able to joke and be happy, also they dislike conflicts, and want to work in teams

Materials: Students mentioned a lot of technological materials such as computers and phones as well as games (Fort Night, Mindcraft) and online tools like Kahoot as well as offline materials such as play dough, pens, boxes, papers, markers and so on.

Environment Students also mentioned that they would like to be able to have snacks and food, as well as have their pets in the session to help them. Student also proposed to have different corners of the classroom dedicated to different activities

Location: Students highlighted their preference for conducting activities in nature, online at their home, as well as museums, cinema. Students also emphasized the important of having activities in nature in the summer and in a gym during the winter – they seam to prefer open large place where they can easily move.

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

Time: Students prefer activities to be no longer than 50 minutes but also not too early in the morning preferably in the afternoon

Evaluation: Even if this is was not a topic proposed, students felt it was important to mention evaluation. The students said that they want to be evaluated only on those subjects which interest them (selectively). Further, they also shared that they do not like the evaluation methods currently used, specifically being evaluated in front of the colleagues "*we often they **feel judged by our colleagues and feel intimidated.** Our evaluation should be done verbally and individually so that we feel less intimidated and even if they are not sure about the answer, they would be less afraid of what the colleagues would have to say*. The also shared that they "***don't like written evaluation either."***

We could notice that currently, in the pandemic period, they spend more time playing video games and they would like to have more of that enjoyable experience in their day to day learning, opinion shared by most of the boys present in the session.

SWOT analysis

Below follows the results of the swot analysis in a nutshell, showcasing the most important strengths and opportunities together with the weaknesses and threats that come along with the introduction and implementation of the two approaches of Design Thinking and Maker Education in Romania . The list as shown in table below is not exhaustive, however, it stipulates the most important aspects to be taken onboard while creating the DESIGN FUTURES students curriculum.

Strengths	Weaknesses
- Students interest in using interactive methods - Students are familiar with technologies and are inclined to try new" fun" activities - Students like to study in nature, be outside the classroom and use their hands - Students want to be engaged in more creative activities - Students want to learn through games (Mindcraft, Kahoot) and project based	- Have a little say into what is being taught - Students feel judged when graded in front of the classroom and would prefer to be evaluated individually and orally - Some students think they are not learning when the activities are not done in the traditional way
Opportunities	**Threats**
- Parents are demanding new results - There are many programs online/offline for students	- Some students from rural area have little access to new programs and many must work around the house as well

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

	- Hard to get consistency in teaching – some teachers use new methods some don t and they must adapt - is hard for them

Summary

School staff in Romania provided key insights regarding their experience with Design Thinking, Maker Education, and overall innovative methods. Overall, many of the teachers are still in the early phases of integrating such methods in their teaching due to the lack of time, heavy syllabus and overall little exposure and incentives. There are teachers who have experiences and integrated DT and ME however they do not know them as such and have accumulated their experience by collaborating with NGO's and participating in European projects. Being flexible and able to adapt and integrate these methods is also a priority in Romania. Teachers are proactive and willing to integrate new methods in their teaching and have already tested and integrated reflective activities, blended traditional and innovative learning and recognize the importance of giving students a voice.

That if teachers are proactive, they can utilize evaluation means even if they are not approved centrally. Teachers need to be flexible and adapt accordingly. Not all centrally imposed evaluation methods are effective. Hence a mix of methods is important to cater for the different needs and wants of education and educators in general.

The focus group brought constructive information about how teachers respond to DT and ME as well as their capacity to understand and integrate the two methods into their teaching, insights which are valuable for the design and deployment of DESIGN FUTURES.

The Students Workshops were an opportunity to capture students' perspectives and preference regarding learning. They shared their preference for hands on interactive activities taking place in nature and outside the school environment and using technology or other interactive tools. Students also emphasized the importance of feeling happy and having fun during classes. Lastly, their capacity to adapt to online classes and be engages shows their adaptability as well as demonstrates the important role the teacher has in creating avenues for student's participation regardless of where those activities take place.

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

CHAPTER 7

CROSS COUNTRY RECOMMENDATIONS

The needs assessment provided key individual country insights however a cross country analysis is also important to understand and further decided on how to design and deploy the DESIGN FUTURES project in the four participating countries and beyond.

First, we will be looked at a cross country comparison of participating teachers at the interviews which it can be seen in the table below shows the differences and similarities among all counties. Few things we can note is first the relatively more experienced teachers in Italy 24 years in comparison to only 13 in Greece, the lowest. Also when it comes to subjects taught in Netherlands most of the teachers 90% taught all subjects where in Romania only 10% which also influences the number of students teachers get in contact with, a larger number in Romania as teachers spend less time teaching with a larger number of students across multiple grades.

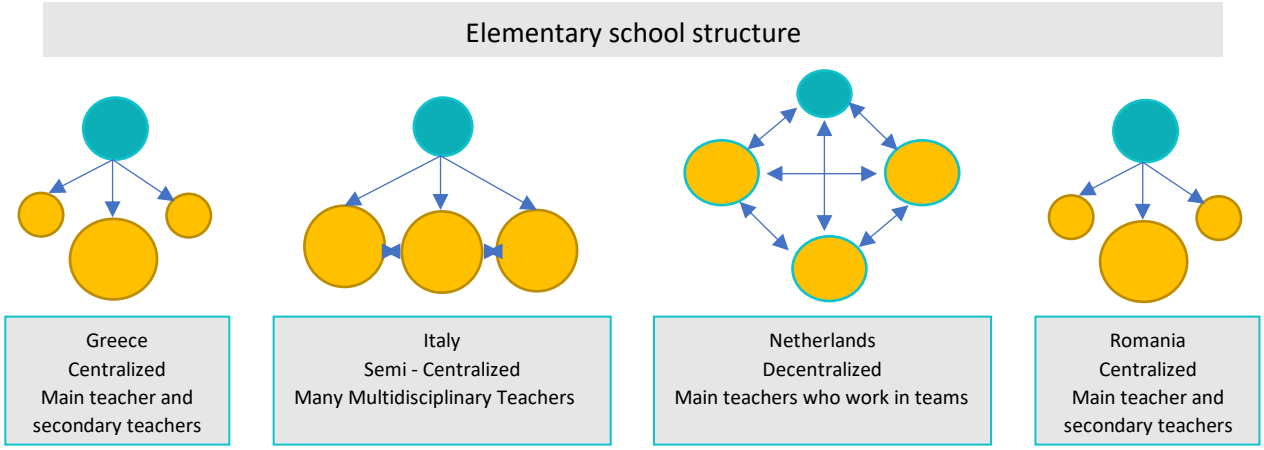
	GREECE	ITALY	NETHERLANDS	ROMANIA
NUMBER OF TEACHERS INTERVIEWED	10	10	11	10
AVERAGE NUMBER OF YEARS OF EXPERIENCE	13	24	15	18
ALL SUBJECTS TEACHER	50%	40%	90%	10%
STEM TEACHER	10%	20%	10%	40%
SOCIAL SCIENCE AND ARTS TEACHER	40%	40%	-	50%
AVERAGE NUMBER OF STUDENTS PER TEACHER	71	19	23	211

Even if the scope of this analysis does not include the national educational system, the environment and the system in which the teachers operate has a strong impact of how familiar and experiences teachers are with innovative methods respectively Design Thinking and Maker Education. In Netherlands, the decentralized system and formal education prepared Dutch teachers to have more experienced with innovative method compared with Italy which has a more centralized education system which is not that flexible with adopting such practices daily. In the case of Italy, it is dependent upon teachers will and proactiveness whereas Greece is totally unaware of such practices and due to the centralized system teachers are not that flexible and open in experiencing new things. However, they are willing to know more and sometimes they are indeed using these approaches without though knowing that what they are doing in their classes is indeed defined as DT or ME. Romania's case is very similar to Greece, the only difference is that teachers who have been exposed to such methods did so by participating in NGO's or European projects.

Further if we look at the teacher's relationship with each other and how they interact with the school leadership provides us with interesting learning necessary for adapting the project to each county context. We specifically looked at elementary level which includes most of the 9 and 12 years old and was recommended by teachers as the most appropriate group for integrating Design Thinking and

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

Maker Education activities. In Greece there are normally multiple teachers who work with the students and report to the school director. In Italy we have a semi centralized system where teachers teach a set of subjects and the teachers collaborate when deciding the method and the teaching they will conduct at a certain group of teachers. Netherlands has a decentralized system where teachers work in teams and collaborate in designing their lessons following schools' priorities. In Romania we have a centralized system with one teacher teaching most of the subjects and additional teachers teaching niche subjects such as foreign languages, religion, sports or IT where the main teachers lack experience, here as in Greece the director is the ultimate decision maker inside the school. A draft representation of these complex relationships is attempted below.



School Staff needs analysis

When conducting the needs assessment important similarities and differences were found between the four countries which will be presented below categories by Innovative teaching and skills development experience, Design thinking and Maker Education preferences and Overall teachers' preferences.

Similarities

Innovative teaching and skills development:

- Innovative teaching and learning methods are perceived **as any methods which are not "traditional"** (black board and book based), however there is not a clear definition of what they are. However, if we look at their definitions across the four countries analyzed we can divide them into two components: 1**. Technology related** which include computer base, e-learning, Educational platforms such as Kahoot, 3D printing, interactive white boards, programing, robots, videos etc. 2. **Teaching approach** where the teacher's role is more of a coach, guiding the students in the process and adapting their teaching to the students needs.
- **The frequency of integration of innovative teaching and learning methods varies from teacher to teacher in all countries,** some use it on daily basis where others use them from time to time when they have specific activities or where they have dedicated weeks. However, the depth of

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

understanding and experience using these methods varies from country to country. In places like Italy and Netherlands teachers have more experience with innovative methods and learn about them in their formal education and have a better understanding and command about how to integrate them in their teaching, where as in Greece and Romania it is more directed towards the integration of technology such as videos and gamification and teachers learn about those methods relatively recently through European Projects and collaboration with other organizations.

- Innovative teaching and learning methods are recognized **to have positive effects both on students and teachers' performance**
- Teachers have recognized a direct link between innovative methods and student's development of **21st century skills such as: Creativity, Collaboration, Teamwork, Problem Solving, Communication, Negotiation and Digital skills.**
- **Innovative methods are recognized to determine students to be "noisy"** and teacher need to give away some of their control and be willing to discover together with students. This could be a challenge for teachers as well as how other teachers and parents see the lesson and overall, their teaching capacity.
- One of the most common reason given by teachers who do not use innovative teaching methods more broadly is the **time constraints**. Innovative methods are perceived to take longer to deploy and organize and many teachers have limited time available due to the **heavy curriculum and national exams requirements which evaluate knowledge assimilation.**
- **Students competency development evaluation is rarely done** and is seen as challenging process in all countries. Teacher across all four countries rely on their own observations and information gathered during reflection activities.
- Innovative methods are used by teachers teaching a **wide range of subjects form Math to History to Languages to Religion by both primary and elementary teachers.**

Design Thinking and Maker Education

- In most of the country's **teachers feel intimidated by the English names the two methods have,** however it was hard to come up with a good translation or alternative set of words to explain what they are when conducting the interviews. Further, in countries where the teachers have been exposed to the methods, they learned that there are a wide range of steps depending on the leading organization some organizations use a more concentrated version when others use it more extensively.
- In all countries **Design Thinking and Maker education are understood differently by the teachers who have been exposed to the methods**. To summarize Design thinking is seen as a problem-solving methodical tool, which includes multiple iterations and a clear set of steps to follow. The same goes for Maker Education which is associated with anything making and technology related from crafts to robotics and coding.
- Besides 21st Century skills development teachers have noticed that the two methods also **contribute to increasing student's engagement, giving students a voice, improving**

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

communication, increasing student commitment, reducing stress, conflict resolution, and facilitating over all students' competencies development, however as it is the case with all innovative methods are **hard to evaluate.**

- **European Projects, Collaborations with Non-Profits, and educational institutions and organizations have been** the main sources for teachers training when it comes to Design thinking and Maker Education.
- **One of the challenges teachers face across the board is overall parents, teachers and community mindset,** who even if they can see the positive effects of such methods, they do not believe those methods are important for students education because the students are not evaluated on those, overall are perceived as a nice to have.
- As recognized by directors and teachers alike, identifying teachers who are motivated, passionate, and available is not an easy task. Teachers also noticed that sometimes **students who are used to being successful in the traditional context have difficulties adjusting to the innovative activities and students who are less successful in traditional context thrive more in non-traditional context.**
- Depending on the complexity of the materials they can create challenges for teachers both in terms of availability and acquisition. **Overall budgets are limited and the simpler,** cheaper the materials are the easier it is to use and purchase those. Teachers who have access to more complex materials accessed those through partnership in European projects or NGOs collaboration**.** When complex materials are being **used teachers often feel intimidate and would like to be trained especially during the fabrication phase of making.** Teachers also have a hard time during the field research phase.
- **Students are intimidated during filed research, collaborating** with others, and **presenting** when they get anxious, however teachers have recognized that students need to develop further their **creativity and problem-solving skills**
- Integrating Design Thinking and Maker Education with **elementary / primary teachers would be easier because teachers have more flexibility and the curriculum is more flexible.**
- **Overall having dedicated hours /classes to projects** would make the integration of such activities easier for both teachers and students.
- **Part of a course, Special project, Multidisciplinary lessons** are an opportunity to blend and integrate Design thinking and Maker Education in education

Teaching preferences

- Teachers prefer to **participate in training which are practical, interactive, gives them flexibility and provide relevant applicable and adaptable tools and knowledge.**
- **Teachers** love to test and try new methods; they often get bored of doing the same thing and want to try new methods and they recognize that trainings are often a good opportunity to upgrade their skills.

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

- School directors emphasized the fact that many of the teachers also need to develop similar skills as their students such as: **collaboration, communication empathy, teamwork, critical thinking, digital skills, etc.**
- Teachers also like **flexibility when it comes to lesson plans** and there is not a strong preference for more structure to more open, it is really depending on the teachers' style.
- Teachers use a **wide range on materials** when preparing their classes from classical textbooks to online resources, self-developed tools, online tools, and other materials they acquired through participating in seminars, peers to peers learning as well as self-taught.
- Overall teachers **are open to introduce new methods if those methods align with their priorities/objectives and they feel confident in using those methods/theories** by receiving the right materials, training, and peer support.
- **Teacher role is of someone who gives constructive feedback and empowers and inspires the students.** It is interesting to observe that teachers who feel empowered themselves can empower their students.
- **Teachers see their role as of someone responsible for instilling social awareness however the activities and the social issues address vary** from country to country
- Overall **teachers are motivated to better serve their students and overall professional recognition.**
- Across all four countries there are **no formal tools used in measuring/evaluating teacher's performance other than student's performance, reactions, and behavior.**

Differences

Innovative teaching and learning methods

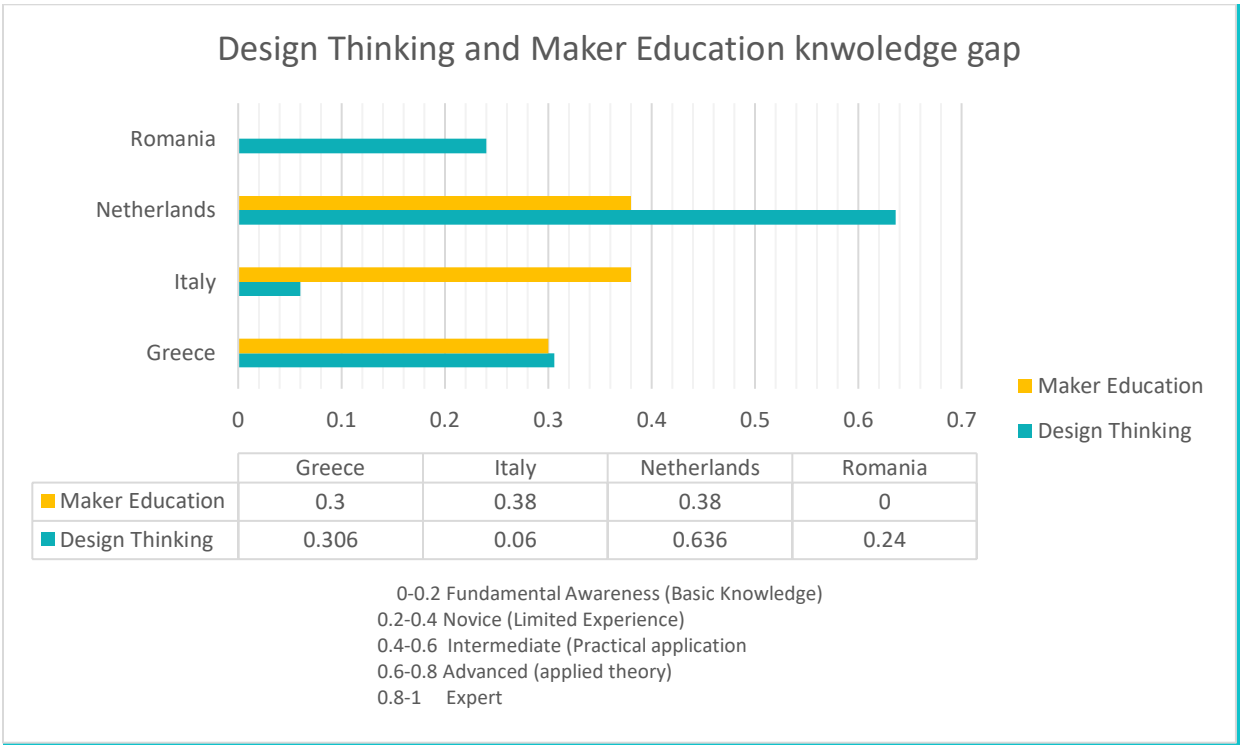
- **In Italy innovative methods are focused more on inclusivity** and giving student the freedom to change their learning path and in teaching they are using recognized methods such as Trinchero. Teachers who also recognizing the need for a long-term vison in education
- In all counties **except Romania and Greece project-based learning and service learning are widespread** and perceived as innovative teaching and learning methods.
- In **Italy and Netherlands teachers see themselves more as coaches and facilitators**, where in Greece in Romania teacher as a facilitator is an element of novelty, except for private schools.
- **Dutch teachers prefer methods which are efficient as determined thought scientific research** a request with is not made by other teachers, which shows a higher exposure to a variety of innovative methods.
- There is still a lot of **tension between the integration of innovative methods and traditional methods,** some teachers in Netherlands doubt the efficiency of innovative methods without students having basic knowledge.
- In Romanian **nontraditional teaching is referred to as games** and a lot of teachers/students do not see it as "serious learning" and sometime students believe that too. Innovative methods are often used when students are tired or to recap some info.

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

- If in **Netherlands a lot of the innovative methods where acquired in formal education** in Greece, and Romanian most of the new methods are acquired thought participation in European projects and collaborations with NGO's

Design thinking and Maker Education

Experience and **exposure to Design Thinking and Maker Education varies widely from country to country** as it can be seen in this graphic. We can see differences in the way of teaching and the integration of the two methods vary across counties, because of the way the educational system is organized as explained earlier as well as how teachers respond to such methods. For example, in Greece the educational model is more traditional, abide by the national curriculum whereas here we have Italy who are adept at using DT and ME as part of their curriculum in a simplified yet effective way. So the fact that Greek school are abide by the national curriculum is not a constraint as such as we see that the most problematic aspect is the willingness sometimes of teachers to get out of their comfort zone and try something new while at the same time follow what is instructed by the national curriculum. Also, this graphic shows how much further Dutch teachers are as oppose to Romanian teachers. Further familiarity with the terminology used it is also a factor which influences these results. Lastly this graphic does not capture teachers' interest and capacity to adapt and learn as it was shared through this report and it further proves the need for project such as DESIGN FUTURE and how they can be effectively adapted and integrated considering counties environment and priorities.



	Greece	Italy	Netherlands	Romania
Maker Education	0.3	0.38	0.38	0
Design Thinking	0.306	0.06	0.636	0.24

0-0.2 Fundamental Awareness (Basic Knowledge)
0.2-0.4 Novice (Limited Experience)
0.4-0.6 Intermediate (Practical application
0.6-0.8 Advanced (applied theory)
0.8-1 Expert

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

- Italian teachers have been exposed **to Maker education and have known it as tinkering**, thought their collaboration with Museums which is also linked to making, robotics and coding
- Dutch teachers are sharing that when conducting Maker activities, it is important to **have making materials nearby.**

Teachers Preferences

- **Teachers in Greece are not comfortable with teaching a theory they had not experienced before** themselves, where in other countries they are open
- **In Greece and Romania – teachers are encouraged to participate to trainings to receive credits going towards salary increases and other benefits**, it is also important to provide teachers with **a certificate** or a proof of participation
- In Italy it is also interesting to notice that Elementary/Primary teachers do not teach most of subjects as it happens in Greece, Romania and Nederland's, they each have each 3-4 subjects and collaborate to decide what method or approach they will use.
- **In Italy teachers know and have more experience with observation grids** but do not use them as it is time consuming. They are proposing using observations grids over the school period as the only way to achieve remarkable results. The grids could be used for students with provocative behavior as well.
- **Italy teachers seem to favor more standardized learning** as well and prepare their lessons plans on weekly basis and there is more coordination with other teachers teaching the same students compared to other countries.
- **Community involvement is different from country to country,** in Netherlands principals are interested in partnering with private companies whereas in other Romania principals from rural areas see themselves as examples and direct contributors to the wellbeing of the community
- Dutch teachers are asking to have **clear desired outcomes and clear goals in all the activities** they are implementing, and further those activities need to be aligned with school goals.
- **Schools in Netherlands are relatively smaller in size, decentralized** and organized in teams where **in Romania and Greece are more centralized**, where the director is the main decision maker.
- Implementing a **new curriculum in Netherlands takes place in phases and must be aligned with the school goals**
- **The educational system is very much centralized in Romania and Greece and curriculum is approved by the ministry,** little flexibility is given to schools

Students needs analysis

In the following paragraph, we showcase how students experience their current curriculum and we present their positive experiences and preferences for a novel curriculum based upon 8 themes: Learning content, Learning activities, Teacher Role, Location, Grouping, Assessment, Materials, and Time. Surprisingly, we found a lot of overlap in the analysis of the students' needs in the three countries that conducted the student workshops. We will therefore not make a distinction between similarities and differences but highlight information specific to a country in text.

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

Current curriculum:

- *Teacher role:* All students describe that they experience **the current role of the teacher as being traditional**. In other words, the teacher stands in front of the classroom to transfer knowledge.
- *Location:* The learning of all participating students happens mostly **within the classroom**.
- *Grouping:* In all countries the students learn **primarily individually with some collaborative tasks**.
- *Assessment:* In both the Netherlands and Romania students mention that they are **given grades for their work**.

Positive experiences and preferences for a new curriculum:

- *Learning Activities:* In all countries student's mention that they want to include more **interactive activities** in their curriculum. These interactive activities include: STEM-related activities, educational games, theatre, physical activities, and cooking. Moreover, students in both Greece and the Netherlands mentioned **making activities** as enjoyable or preferable. And in Romania the students mentioned **civic activities** as a positive experience.
- *Grouping:* All students mentioned to prefer or have positive experiences with **collaborative work.** Moreover, students from the Netherlands and Romania also want to i**nclude individuals that are currently not part of the direct school eco-system.** For example: experts, family and friends, hackers, and YouTube stars.
- *Teacher role:* Students' in Greece and Romania mentioned that they have had positive experiences when the teacher took a **facilitating role** while they were doing an activity.
- *Location:* All students mentioned that they would prefer to have activities **outside of the classroom**. Locations that were mentioned by the students were different kinds of labs, such as science labs, art labs, project labs or maker labs, outdoor expeditions in nature, online at their homes, museums, or cinemas. When conducting activities within the classroom, Romanian students posed the idea of **having different corners of the classroom dedicated to different activities**.
- *Content:* In Greece students mentioned **skill learning**: they want to learn more about tools while doing activities. For example, in art class they would like to learn more about crafts by experts and in ICT class they mentioned that they wanted to learn how to make websites, blogs, applications, and make video's for the YouTube platform. In the Netherlands there was a focus on **making**. And lastly, in Romania students mentioned **making** and **teamwork** as core learning objectives.
- *Materials:* All participating students mentioned a preference for **both simple making materials combined with more complex technologies.** In the case of the Netherlands hands-on technical materials like **circuits** were mentioned, while in Romania the students' preferred more digital technologies like **computers and phones with games** or online tools like Kahoot were discussed.
- *Assessment:* All students mentioned that they wanted to **feel rewarded for their work**. In the Netherlands and Greece certificates for participation were mentioned as a way to achieve this. Moreover, in Greece the students had positive experiences with formative competency

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

assessment. And in Romania students enjoyed competitions. However, the Romanian students also mentioned that they did not like to be evaluated in front of their peers nor did they like written evaluation.

– *Time*: With regards to timing, the **preferences of students per country vary**. In the Netherlands, students would like to have hands on activities twice a week for two hours. While in Romania the students prefer activities to be no longer than 50 minutes. At the same time, the Greek students' preferences were more varied: either from after school activities to during the day.

CHAPTER 8

CONCLUSIONS

In this last chapter we will look specifically at the recommendations for teacher training O4 and student's material O3, as well as overall and lessons learned.

Teachers Training favorable factors and design constrains

Favorable factors

- Teachers are interested and open to participate in trainings
- Teachers are open to trying new methods if they receive the right materials and training
- Teachers had positive experiences with trainings in the past
- Teachers have participated to European projects and had positive, constructed experiences
- Teachers are interested to learn new skills, integrate new methods both to better serve their students but also because they are incentivized through compensation or other benefits
- There can be seen an overall tend towards teachers being more like coaches and partners in learning
- Teacher already see their role as someone who empowers the students and want to instill social awareness in their students
- Teachers have some basic awareness of Design Thinking and Maker Education
- Teachers do not have a strong preference for structure or open lesson plans
- Integrating Design thinking and Maker Education at elementary/primary level is easier

Design Constrains

- Teachers prefer in person training as oppose to online training because beside knowledge they also value the human connections build during such activities
- Teachers have busy schedules and they would prefer to participate to trainings outside school hours
- Teacher like highly practical trainings where little time is spent on theory and more on practice.
- Design Thinking and Maker Education English names are intimidating teachers
- Teachers, parents, and student's mindset is not aligned and would need to adjust

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

Student Materials favorable factors and design constrains

Favorable factors

- Students love hands on interactive activities where they can explore and be creative
- Students want to have fun and be happy during their classes
- Students like when they can study in a new context such as in nature or interact with new tools and methods
- Students are adaptable and open to new methods
- Students favor activities in which technology is integrated and are excited to use new materials and tools
- Students are open and excited to learn new things
- Student would like to involve their family, friends, youtube starts and so on in their lessons
- DT and ME are recognized to positively impact the students and contribute to 21st century skills

Design Constrains

- Finding the balance between clear steps that need to be followed and giving teacher the flexibility to adapt and adopt the DT and ME methods would be key for integrating DF activities broadly
- Teachers need to be able to build a safe environment for students to collaborate
- Teachers need to create space for reflective activities and create a space where it is safe to fail and learn by doing and trying
- Teachers have limited time to prepare their lessons
- Teachers have limited time for Design Thinking and Maker Education Activities
- Students curriculum for national exams is heavy in most of the countries
- Teachers need to prepare their students to pass the exams
- Teachers want to maintain good relationships with parents and school leadership
- Students competency development evaluation is rarely done and seen as challenging
- Students are intimidated by presentations especially when they know they will be evaluated
- Competencies development is not linked to knowledge development
- Both students and teachers need to develop 21st century skills such as collaboration, communication, creativity, empathy, problem solving and so on.
- Depending on their complexity, materials can be challenging to find especially for Maker Education

RECOMMENDATIONS

- Integrating Design Thinking and Maker education is more favorable at elementary/primary school level as the curriculum is more flexible and teachers have more time
- Different counties have different levels of experience with the two methods, the training needs to be informative and useful for all teachers participating
- DT and ME needs to be linked to school curriculum and offer teachers flexibility and adaptability while in the same time following the methods steps.

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

- Create content which provides a clear plan and structure while in the same time is leaving space for teachers to be flexible but always ensure the role of teachers therein
- Create/Use language, terms, which are clear and easy to understand by teachers across all countries
- DT and ME activities need to clearly emphasize the desired outcomes and benefits – build the case for the methods for teacher to promote
- Create an evaluation tool which measures both skills/competencies development as well as knowledge so that teachers do not have to pick one or the other
- Integrate the activities as part of a lesson, project or learning unit across one or multiple disciplines
- Build awareness at school and community level regarding the activities conducted at school as well as how those activities impact student's development over the long term
- Creativity and Problem solving are the skills which are often mentioned by both teachers and school leadership
- Special attention needs to be given to presentation, fabrication and field research by both teachers and students as those seems to be the most challenging
- Materials need to be clear and offer flexibility and give students the possibility to adapt them to their context
- When building their prototypes, it is important for the materials to be nearby so that important time is not lost
- Teachers also emphasized the importance of peer to peer support, and this can be a component it can be included as the project is deployed
- DESIGN FUTURE could inform parents and teachers and the overall community regarding the value of their methods specifically DT and ME
- Often teachers are faced with the dilemma or choosing between traditional and innovative methods however the solution for DESIGN FUTURES could be a combination of innovative and traditional teaching and learning methods which need to be followed in schools as innovative methods do have specific cons that we need to be aware especially when it comes to skills development.
- When using DT and ME Students' Emotional engagement is being further cultivated and developed as through this process students' voices are heard and valued thus a strong feeling of being important is generated leading to intrinsic motivation, confidence, sense of belonging and self-empowerment
- The level of acquaintance and experience with DT and ME as presented in this report across the different countries. NL is more experienced with IT following which due to a centralized education system are not that flexible with adopting such practices daily so it is dependent upon teachers will and proactiveness whereas Greece is totally unaware of such practices and due to the centralized system teachers are not that flexible and open in experiencing new things. However, they are willing to know more and sometimes they are indeed using these approaches without though knowing that what they are doing in their classes is indeed defined as DT or ME.

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

- Teachers need to be creative as well. It is not only being trained to these approaches but teachers and educators in general need to be creative and innovative, need to research and adapt to the new circumstances where education needs constant update and evolution. So, teachers need to look for new ways of triggering students' mindsets.
- Students need to adapt to a reflective way of learning which will enable them to learn from their mistakes and be better in everything.
- Reflective learning is especially important in the DT process and any process that involves around innovative teaching and learning methodologies
- Teachers who are proactive can utilize evaluation means even if they are not approved centrally. Teachers need to be flexible and adapt accordingly. Not all centrally imposed evaluation methods are effective. Hence a mix of methods is important to cater for the different needs and wants of education and educators in general.

LESSONS LEARNED

- This needs analysis was designed before the Pandemic started, February 2020, and the data was collected at the start of the pandemic March and April 2020. Initially designed the take place in person, the team across all counties ended up using remote tools to conduct interviews, organized focus groups and students' workshops. This shows DF team capacity to adapt and flexibility in from of this unique challenge.
- Collecting the data remotely introduced new challenges such as limited capacity in observing participants behavior and body language, limited availability of teachers and students to participate in interviews.
- However it also created unique opportunities especially for those teachers who did not have a clear remote teaching plan in place as they had more time to dedicate to our conversation and were excited to speak with someone, this made them more open during our interviews
- Due to Covid19, teachers and directors were also more reflective of their role, educational system and students learning
- The data we collected was reach and provided key insights into teachers lives, however the sample and the unique times the interviews were conducted create unique limitations and is more of snapshot of the group interviewed in all four countries

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

References

In APA format

van den Akker. (2003). Curriculum perspectives: An introduction. Dordrecht: Kluwer Academic Publishers.

Appendix

1. Teachers Interview

Introduction
Welcome (script) *[Thank you for agreeing to participate in this interview. The goal of the interview is to identify teachers and students training needs for embedding Design Thinking and Maker Education in the school curricula, which can contribute to the development of the 21st Century skills, such as critical thinking, problem solving, interpersonal skills, entrepreneurial initiative, media and information literacy and more. The Design Futures project is co-funded by the Erasmus+ Programme of the European Union.* *This interview is part of Design Futures' needs assessment process. We are interviewing Teachers interested in participating in the countries where the project will be implemented, which includes Greece, Italy, Netherlands and Romania. In [Your Country] our organization, [Name] is one of the strategic partners. [Short description of your organization].* *The information and insights that you will provide will help us in designing better materials for the students and teachers, and we would like to thank you for taking the time to speak with me today.* *The interview will last for approximately 45 minutes and is recorded on a safe device. The information you will provide will not be attributed directly to you (anonymity) as you already know from the release form you just signed. When you are ready, we can start.*

Part 1. Background information (5 minutes)		
1	*How many years of teaching experience do you have?*	

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

	Ask the question and rephrase if needed.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
2	*What subjects do you teach?*	
	Ask the question and rephrase if needed.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
3	*What grades (age groups) do you teach?*	
	Ask the question and rephrase if needed. If you first, ask about grades confirm the age groups the students have.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
4	*How many students do you have in total?*	
	Ask the question and rephrase if needed.	Write down the number of students and any other relevant comments.
Part 2. Innovative teaching and learning methods - (10 minutes)		
5	*Can you describe in a few words what you understand by innovative teaching and learning methods?* *What are some innovative teaching and learning practices you are using during your classes?*	
	Ask the question and rephrase at any point if needed. The goal is to understand what they understand by innovative teaching and learning methods and what is their experience with using them.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
6	*How did you learn about them? Did you participate to any training activities?*	
	Ask the questions and rephrase if needed. The goal is to understand prior training/ learning methods exposure and experience	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
7	*Are such practices/ activities integrated in your everyday teaching?*	

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

	If yes, how often? When do you use them?	
	Ask the questions and rephrase if needed. The goal is to understand if they are integrating innovative teaching and learning methods into their teaching and how are they doing so?	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
8	*Do these activities have a positive effect on students' results?* *Do you think that these practices cultivate the 21st century skills? such as creativity, teamwork, communication, problem solving, etc. – If so, how?*	
	Ask the questions and rephrase if needed. The goal is to understand what the perceived effects of innovative teaching methods on students' performance and skill development are.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
9	*How are you assessing the skills developed by your students? Have you ever assessed a student through competencies or self-reflection?* *Have you ever used an observation grid? How would you implement these methods?*	
	Ask the questions and rephrase if needed. The goal is to understand if they use any skills/competencies assessments or they just conform with the standardizes/mandatory procedure	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
10	*How would you describe your role as a teacher?* 1. *Someone who provides constructive feedback to students?* 2. *Someone who inspires/ empowers students into believing in what they are doing?* 3. *Someone who influences students' decisions / guides their*	

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

	perceptions/ imposes a certain way of learning?	
	Ask the questions and read the options. Rephrase if needed. The goal is to understand how the teachers see themselves and their role.	Write down the answers number and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
Part 3. Design Thinking and Maker Education (5-10 minutes)		
11	***How would you describe your experience with Design Thinking?*** ❑ I am not familiar with the concept – Not applicable ❑ 1.Fundamental Awareness (basic Knowledge) ❑ 2. Novice (Limited experience) ❑ 3. Intermediate (practical application) ❑ 4. Advanced (applied theory) ❑ 5. Expert	
	Ask the questions and read the options. Rephrase if needed. If they are familiar with Design thinking (1 to 5) jump to the next question, if not go to Q12.	Write down the answers number and any other relevant comments they are making.
	[Only for participants who are familiar with Design Thinking] *Can you describe in a few words what you understand by Design Thinking? How and Where did you learn about it?*	
	Ask the questions and rephrase if needed. The goal is to understand what teachers understanding of design thinking is and how it was acquired.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
12	*How would you describe your experience with Maker Education?* ❑ I am not familiar with the concept – Not applicable ❑ 1.Fundamental Awareness (basic knowledge)	

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

	❑ 2. Novice (limited experience) ❑ 3. Intermediate (practical application) ❑ 4. Advanced (applied theory) ❑ 5. Expert	
	Ask the questions and read the options. Rephrase if needed. If they are familiar with ME (1to 5) jump go to the next question.	Write down the answers number and any other relevant comments they are making.
	[only for participants who are familiar with Maker Education] *Can you describe in a few words what you understand by Maker Education? How and Where did you learn about it?*	
	Ask the questions and rephrase if needed. The goal is to understand what teachers understanding of ME is and how and where it was acquired.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
*If participants **are familiar** with either DT or ME go to **Question 13*** *If the participants **are not familiar** with DT or ME skip Q13 to Q16 and go to **PART 4***		
13	*From your experience can you describe one or two situations when you applied DT and/or ME?*	
	Ask the questions and rephrase if needed. The goal is to understand what teachers understanding how teachers are integrating DT and ME into their teaching.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
14	*What where the phases/steps you followed when using DT and/or ME methodologies? Which phases were more challenging and how?*	
	Ask the questions and rephrase if needed. The goal is to understand what process teachers follow when integrating DT and ME into their teaching.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.

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

15	*What are the pros and cons of using DT and/or ME in your classroom? Think about yourself, your school, your students and your community?*	
	Ask the questions and rephrase if needed. The goal is to understand what teachers see as benefits and challenges when using such methods.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer. Inquire about student's participation and engagement, school and parents' satisfaction, attendance rate, graduation rate and others.
16	*What materials/resources did you use when implementing DT and ME in your classroom?* *Did you use any materials which had more of a technical aspect such as circuits, programing, etc? If yes, how did you know how to use and integrate them in your teaching?* *How did you procure them?*	
	Ask the questions and rephrase if needed. The goal is to understand what access to materials as well as comfort with more technical tools and materials.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer. Inquire about how they procure the materials and current needs.
Part 4. Curriculum and Materials - (10 minutes)		
17	*What lesson materials do you use? Who develops them? What sources do you use to develop your lesson materials?*	
	Ask the questions and rephrase if needed. The goal is to understand how they are developing their lesson materials and what sources they use, and how much freedom they have to design their own materials vs. standardized ones	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
18	*What type of lesson plans you prefer and why?* ❑ *Open lesson plan – suggestions format*	

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

	• *Structured – Step-by-Step lesson plan* *How and when do you decide which activities you want to implement during your classes?*	
	Ask the questions and rephrase if needed. The goal is to understand teacher's preference when it comes to standardized versus open lesson plans.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
19	*How comfortable are you with instructing on a theory, you have not experienced yourself?* *And what will make it easy to implement a new curriculum?*	
	Ask the questions and rephrase if needed. The goal is to understand teacher's openness to new theories and adoptions process of such theories.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
20	*Do you try to instill social awareness in the students? If so, how?*	
	Ask the questions and rephrase if needed. The goal is to understand if they are conducting and social oriented activities, which are does and how are those integrated into their curriculum.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
Part 5. Professional Development and Training - (10 minutes)		
21	*From your experience, can you describe a professional development experiences you participated in that truly enhanced your DT and ME teaching capabilities?*	
	Ask the questions and rephrase if needed. The goal is to understand teachers experience with professional development experiences and their preferences.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
22	*What motivates you to participate in professional development activities, both*	

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

	intrinsic (internal) and extrinsic (external) motivation?	
	Ask the questions and rephrase if needed. The goal is to understand teacher's motivation when participating to professional development activities.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
23	*How would an ideal training look like? How would you like to be trained?*	
	Ask the questions and rephrase if needed. The goal is to understand teacher's training preferences such as location, duration, training style/attitude, follow up activities and learning methodologies.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
24	*How do you measure your performance? How do you know when you are doing a good job as a teacher?*	
	Ask the questions and rephrase if needed. The goal is to understand teacher evaluation tools and who are measuring their performance.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
25	*Is there anything else you believe is it important for us to know regarding the topics we discussed today and in general?*	
	Ask the questions and rephrase if needed. The goal is to give teachers the chance to add any other information or knowledge we might have had missed.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
CONCLUSIONS		
Review Summarize some of the main findings of the interview and clarify any remaining misunderstandings. Script *[Thank you for your time and contributions to the development of Design Futures student materials and teachers training. We will keep you informed regarding our project. In the next [number of days] days we will let you know if we have decided to invite you to*		

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

participate in a focus group with fellow teachers. The focus group will be organized on [date] at [location and hour]. Thank you very much again]

2. School decision maker interview

Introduction		
Welcome (script) *[Thank you for agreeing to participate in this interview. The goal of the interview is to identify teachers and students training needs for embedding Design Thinking and Maker Education in the school curricula, which can contribute to the development of the 21st Century skills, such as critical thinking, problem solving, interpersonal skills, entrepreneurial initiative, media and information literacy and more. The Design Futures project is co-funded by the Erasmus+ Programme of the European Union.* *This interview is part of Design Futures needs assessment process. We are interviewing school leadership in the countries where the project will be implemented, which includes Greece, Italy, Netherlands and Romania. In [Your Country] our organization, [Name] is one of the strategic partners. [Short description of your organization].* *The information and insights that you will provide will help us in designing better materials for the students and teachers, and we would like to thank you for taking the time to speak with me today.* *The interview will last for approximately 35 minutes and is recorded on a safe device. The information you will provide will not be attributed directly to you (anonymity) as you already know from the release form you just signed. When you are ready, we can start.]*		
Part 1. Background (5 minutes)		
1	*For how many years have you served as a teacher? How about principal?*	*Teacher:* *Principal:*
	Ask the questions and rephrase if needed.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
2	*As a principal, can you describe your responsibilities?*	
	Ask the questions and rephrase if needed.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.

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

3	*How many students do you supervise?* *many students do you supervise?*	
	Ask the questions and rephrase if needed.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
4	*How many teachers do you supervise?*	
	Ask the questions and rephrase if needed.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
Part 2. School environment (10 minutes)		
5	*On a scale of 1 to 5 where 1 is the lowest and 5 the highest. For you, how important are the following and why:* *A) (My) teachers participate in professional development activities* *1 2 3 4 5* *B) (My) teachers use new and innovative teaching methods in their classroom* *1 2 3 4 5* *C) (My) students are involved in extracurricular projects/activities* *1 2 3 4 5* D*) (My) community is positively impacted by the work that takes place at school* *1 2 3 4 5* *E) (My) school has a high reputation for the quality of education we provide* *1 2 3 4 5* *What else is very important for you besides what was mentioned here?*	
	Ask each question and rephrase if needed. After each answer ask the principal to motivate their answer.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.

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

	The goal of this question is to understand what principals' priorities are.	
6	*In your school who does the following: (Select all that apply)* *A. Identifies a project/new activity which could be implemented in the school/classroom* ❑ *Teachers* ❑ *Parents* ❑ *Students* ❑ *School director* ❑ *Other ___* ❑ *B. Decides if the project/new activity will be implemented in the school/classroom* ❑ *Teachers* ❑ *Parents* ❑ *Students* ❑ *School director* ❑ *Other ___* *C. Implements the project/activity school/classroom* ❑ *Teachers* ❑ *Parents* ❑ *Students* ❑ *School director* ❑ *Other ___* *D. Evaluates the impact of the project/ new activity* ❑ *Teachers* ❑ *Parents* ❑ *Students* ❑ *School director*	

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

	❑ *Other ___*	
	Ask each question and rephrase if needed. After each answer ask the principal to motivate their answer. The goal of this question is to understand what principals' priorities are.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
7	*Can you describe what is the process of implementing a new curriculum? When do you need to start the process of implementing a new curriculum?*	
	Ask each question and rephrase if needed. The goal is to understand the process of adopting a new curriculum from principals' perspective.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
8	*What would be difficult about implementing a new curriculum? What would be some changes you want to implement?*	
	Ask each question and rephrase if needed. After each answer ask the principal to motivate their answer. The goal is to understand what some of the challenges can be when implementing a new curriculum.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
Part 3. Design Thinking and Maker Education - (10 minutes)		
9	*Are you familiar with Design Thinking? If yes, can you describe in a few words what you understand by Design Thinking? How and where did you learn about it?*	
	Ask each question and rephrase if needed. The goal is to understand if principal is aware of design thinking, what is their understanding of the topic and how they acquired the knowledge.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
10	*Are you familiar with Maker Education? Can you describe in a few words what you understand by Maker Education? How and where did you learn about it?*	
	Ask each question and rephrase if needed. The goal is to understand if principal is aware of design thinking, what is their understanding of the topic and how they acquired the knowledge.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
If they are not familiar with neither DT nor ME jump to Q 13		

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

11	*Do you or any of your teachers use DT and/ME in teaching? If yes, during which activities?*	
	Ask each question and rephrase if needed. The goal is to understand how and when DT and/or ME is adopted by their teachers.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
12	*What are some of the pros and cons of using DT and or ME or other innovative teaching and learning methods?* *What school performance areas are impacted by it?*	
	Ask each question and rephrase if needed. The goal is to understand what some of the advantages and challenges with DT and ME are or in general cu innovative teaching and learning methods.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer. Inquire about students' academic performance, students' social skills, student's participation and engagement, teacher's satisfaction, parent's satisfaction, attendance rate, graduation rate – other?
13	*Does your school provide any supportive materials/resources for teacher activities? What are some of these materials? Do you have anything like robots or materials to build them?* *How are there materials being procured? Is there a budget for materials?*	
	Ask each question and rephrase if needed. The goal is to understand what materials are available and how are those being procures.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
Part 4. Professional development and training (10 minutes)		
14	*What would be some skills and competencies you believe would be beneficial for your teachers to acquire and why?*	
	Ask each question and rephrase if needed. The goal is to understand what principals' priorities are when it comes to teacher's professional development.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.

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

15	*What is some policy/national requirements you need to comply with regarding teachers training and professional development?* *Are there any required/mandatory trainings/activities your teachers need to be part of?*	
	Ask each question and rephrase if needed. The goal is to understand what the requirements are the school needs to comply with when it comes to teacher's professional development.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
16	*Have you organized or recommended your teachers any professional development experiences/activities?* *What motivated you to do so, both extrinsic and intrinsic motivation?*	
	Ask each question and rephrase if needed. The goal is to understand principal's role in professional development and their motivations	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
17	*From you experience how would an ideal training/ look like for your teachers?*	
	Ask each question and rephrase if needed. The goal is to understand principal's expectations towards training activities.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
18	*What tools do you use to monitor and measure your teacher's performance? When, how and why you measure?*	
	Ask each question and rephrase if needed. The goal is to understand how teacher's performance is being measured and how it that linked to schools' objectives.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.
19	*Do you have any partnerships/ collaborations with organizations and public institutions for your teacher's professional development?*	

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

	If yes, who are those organizations and institutions? How is the collaboration structured?	
	Ask each question and rephrase if needed. The goal is to understand how the school operates regarding teacher's professional development. regarding teacher's professional development.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer. Inquire about the partnerships/collaboration and what are some of the advantages and challenges.
20	*Is there anything else you believe is it important for us to know regarding the topics we discussed today and in general?*	
	Ask each question and rephrase if needed. The goal is to give the principal the chance to add any other information or knowledge we might have had missed.	Write down the answers and any other relevant comments they are making. Ask any follow up questions to clarify the answer.

CONCLUSIONS

Review
Summarize some of the main findings of the interview and clarify any remaining misunderstandings.

Script
[Thank you for your time and contributions to the development of Design Futures student materials and teachers training. We will keep you informed regarding our project and a potential collaboration. Thank you very much again]

3. School Staff Needs Assessment Focus Group

Introduction - 10 minutes

Welcome

Description: The facilitators will introduce themselves and will present the organizations they work with. The goal of the focus group is briefly presented, and all participants will receive an identification number. (see data privacy doc)

Script
[Thank you for agreeing to participate in this focus group part of our part of Design Futures needs assessment process. In [Your Country] our organization, [Name] is one of the strategic partners. [Short description of your organization]. My name is [name] and I am

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

here together with my colleague [note keeper name] who will take notes and make sure we finish on time.

The information, ideas and insights that you will provide will help us design better materials for the students and for training teachers.

This focus group will last for approximately 1 hour and 30 minutes]

Introduction of the rules

[There are no right or wrong answers, so you shouldn't feel bad if your opinions differ from the rest of the group. Participation in this session is completely voluntary and nobody is required to answer any question they do not want to answer. Everything that is discussed in the Focus Group is used only for our research without identifying any individual participant. The privacy and confidentiality of the opinions of other participants needs to be respected.

A digital recorder will be used to record the session. This will help our analysis of the information that the participants will share.

In order to have a successful meeting, it is necessary to establish some ground rules to ensure mutual respect during and after the discussion.

Here are the basic rules:

- *Please respect the others and do not disclose what other participants say during the session.*
- *Please speak one at a time. In this way, everyone can listen and react to the contributions of other properly. If you have something to say, please raise your hand and wait to give the word.*
- *Please treat each other with respect. This means avoid doing or saying things that might make others uncomfortable.*
- *Please turn off your cell phones or put them in silent mode.*
- *If you must leave the focus group for some reason, please raise your hand and report it promptly.*

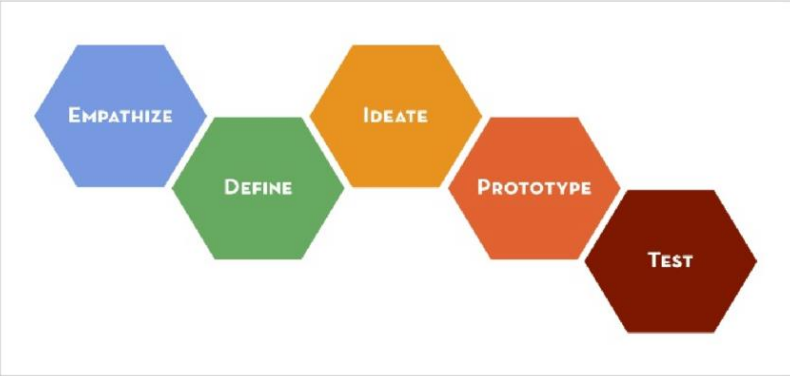
Part 1. Level setting Design Thinking and Maker Education (15 minutes)	
Objective:	• The goal of this activity is to have a common understanding of what DT and ME are. • Participants who are not very familiar with the topic are able to learn from other participants responses and from seeing the posters and the videos

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

Facilitator Instructions:	Start by showing the participants the chart – Next ask them the questions
Notetaker Instructions:	Fill out the observation chart and record all the answers given by the participants

1. From your experience, can you describe briefly what DT is?
Secondary questions:
What activities do they include?
What are their characteristics?

Show DT process map:



https://www.youtube.com/watch?v=_r0VX-aU_T8&t=

2. From your experience, can you describe briefly what ME is?
Secondary questions:
What activities do they include?
What are their characteristics?

Show Maker Video
https://www.youtube.com/watch?v=6yOB-IV9X-o&t=81s

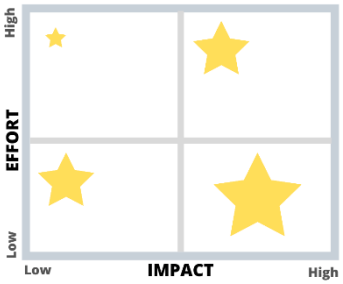
3. For what learned today and from what you already know what are some similarities between DT and ME?

Part 2. Integrate Design Thinking and Maker Education (45 minutes)

Objective:	• The goal of this activity is to start brainstorming of how can DT and ME be incorporated into student curriculum
Facilitator Instructions:	• Start by telling teachers that you will need their help to incorporate both DT and ME into student's curriculum. • Guide the participants through a process of brainstorming, prioritizing and determining the characteristics of their ideas.
Notetaker Instructions:	Fill out the observation chart and record all the answers given by the participants.

4. Integrate DT and ME into student's curriculum

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

4.1 Brainwriting:	For 5 minutes the participants will be asked to write down as many ideas as possible about ***how they would integrate both DT and ME in the student curriculum?*** *Give participants some hints such as:* • *Think about classes where you could incorporate DT and ME* • *Think about some activities you are already doing which could be enhanced by using DT and/or ME* • *Think about what you would like your students to learn and feel during classes* • *Think about your role as a teacher and how would you like to engage and teach* *ONLINE: each idea is typed in a chat box*	
4.2 Discussion and sorting	Together with the participants discuss and place the ideas in an impact/effort matrix. Ask any questions needed to clarify their ideas. If there are ideas which are similar try to cluster them. ONLINE: we create a slide with all the parts and putting ideas into the right sector	
4.3 Shortlist top 3 ideas	Together with the participants select top 3 ideas, which have a high impact in student education, and require little effort to execute Online: Create an empty slide	• 1 • 2 • 3

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

4.4 Characteristics	For each idea discuss the following. • Advantages • Challenges • Subjects/classes where the idea can be implemented • Resources needed to implement it Use a large paper or a white board write their insights. ONLINE: Create am emply slide	
Part 3. Integrate DT and ME into student's curriculum (20 minutes)		
Objectives:	The goal of this activity is to learn about the structural changes which need to take place so that ME and DT are broadly integrated and adopted as teaching methods.	
Facilitator Instructions:	Ask the participants the questions listed below. Try to learn as much as possible from teacher's perspective. Follow up with questions as much as needed.	
Notetaker Instructions:	Fill out the observation chart and record all the answers given by the participants.	
5.What would be the benefits of DT and ME being adopted more broadly into teaching practices? Think about students, teachers, parents, school and overall community perspective. How about challenges?		
6.How would you integrate/align DT and ME methodologies with the current students learning objectives (mandatory requirements) demanded by your national authority? • *Do you have to do any change to the work you are already doing?* • *What would be those changes?*		
7. From your perspective what changes at the national/policy level need to happen for you and more teachers be able to use DT and ME broadly? • *How about at the school level?* • *How about at the community level?*		
8. If you are to convince a teacher to participate in a DT and ME teachers training, what arguments would you use?		
9. Is there anything else you would like to add?		
CLOSING		

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

[Thank you for your time and contributions to the development of Design Futures student materials and teachers training. We will keep you informed regarding our project and a potential collaboration. Thank you very much again]

4. Students Workshop

Theme:	**Introduction**	
Introduction	*Facilitator's instructions:*	Start the activities by telling students that you will spend 60 minutes with them during which you will facilitate easy and fun activities to learn about their learning preferences and experiences. Tell the students that this is a safe space and all the information that will be shared here will only be used in the design of students' materials.
Activity 1. Get to know each other	*Facilitator's instructions:*	Ask the participants to stand up and form a circle. Once they are in the circle ask them to say their name and what is their superpower. Start yourself by stating your name and superpower, next each student will say theirs. Try to clap and encourage the students as much as possible. They can help each other if they get stuck or shy.
	Duration:	2 minutes
	Materials:	None
	Preparation:	None
	Objectives:	Build trust and a place for open communication
(Optional) **Activity 2. Icebreaker Tangle up or Watermelon Or any game you like**	*Facilitator's instructions:*	**Instructions for Tangle up (requires holding hands)** Ask the participants to stand in a circle and grab the hand of anyone in the group except the people standing next to them. Once they are ready, they will have to untangle themselves without letting go of each other's hands. Encourage them to be creative and think outside the box.
		Instructions for Watermelon

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

		Ask the participants to stand in a circle. Next tell the participants that we are going to pretend that we are passing a watermelon. • To pass the watermelon you will need to take your hand passing over you mouth and make a "slurp" noise. Your right hand goes to your right and your left hand to your left. • The "watermelon" is passed around from one player to another in a circle • You can switch directions by switching the direction of your hand passing over your face. Form right to left or from left to right. • You can skip the person next to you by moving your hand up over your face instead of across. The turn is of the person after next. • You get "out" if you miss your turn, or pass the watermelon when you have been skipped. • Once you are "out" you will need to exit the circle • The objective is to be the last person in the circle.
	Duration:	3 minutes
	Materials:	None
	Preparation:	None
	Objectives:	Get the students to collaborate and communicate effectively
Theme:	**Current learning patterns**	
Activity 3. M&M	*Facilitator's instructions:*	Ask the participants to stand up and form a circle. Pass around a bag of candy and tell everyone to take as much as they want. Once everyone has some M&M's tell the group that each color corresponds to a question and they will have to answer. Show students the questions and start going around the circle per color. Ensure each participant will answers a minimum of two questions. **Questions:**

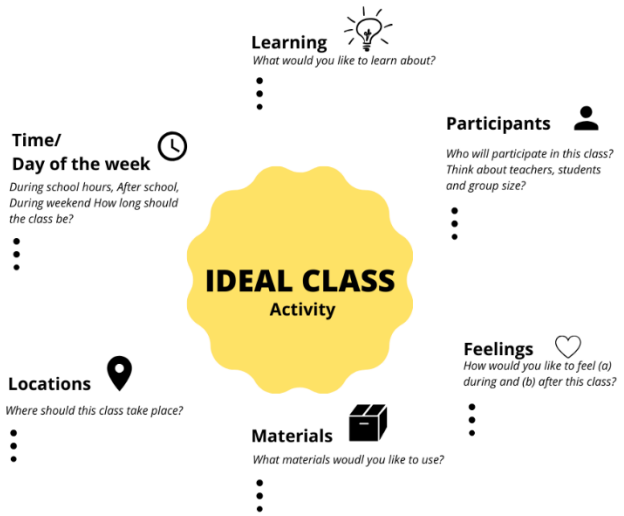
Co-funded by the
Erasmus+ Programme
of the European Union

		Color 1: Describe what happens during a regular class? ***Color 2:*** How do you feel during your classes? ***Color 3***: What do you like about your current classes? ***Color 4:*** If you could change your current classes; would you like to change?
	Duration:	14 minutes
	Materials:	M&M's, Skittles or other type of colorful candy If the school does not allow you to bring candy try to find other similar objects such as LEGO bricks
	Preparation:	1. Sort your candy to make sure you only have four colors 2. Assign each color of the candy to a question 3. Prepare a poster with the questions corresponding to each color
	Objectives:	Students get to share insights about their current classes, in a fun and engaging way.
Theme:	**Experienced positive learning experience**	
Activity 4. Picture a positive learning experience	*Facilitator's instructions:*	Ask the students to grab a piece of paper and start drawing a picture of their favorite learning experience/class. Tell them they have 8 minutes. Announce the students when they have 5- and 1-minutes left. Once all the students finished post/tape all the drawings on the wall, and each student will be asked to present their drawing. After they present ask any of the following questions they didn't answer during their presentation: 1. What did they like about this class? 2. How was this class different?

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

		3. What did the teacher do what was his/her role? 4. What was their role? 5. What did they learn? 6. What materials were used during this class? 7. What activities did they do? 8. What was the assessment like? Were there any grades?
	Duration:	8 minutes drawing 10 minutes presenting
	Materials:	Papers and colorful pens/markers/crayons
	Preparation:	You can prepare a poster with the questions.
	Objectives:	Learn in an engaging way, if students have had any experiences like DT and/or ME as well as get insights about their preferences.
Theme:	**Imagine the ideal class/learning experience**	
Activity 5. Ideal learning experience	*Facilitator's instructions:*	Have all the students sit around a table. Tell them that they are now designers and they can design their ideal class/learning experience. They have 12 minutes to discuss and come up with the characteristics of this class, by filling out the following themes: • Learning • Participants • Feelings • Materials • Locations • Time Let the students know when they have 10, 5- and 1-minutes left. Once the students finished have them present. Ask them follow up questions as needed.
	Duration:	12 minutes brainstorming

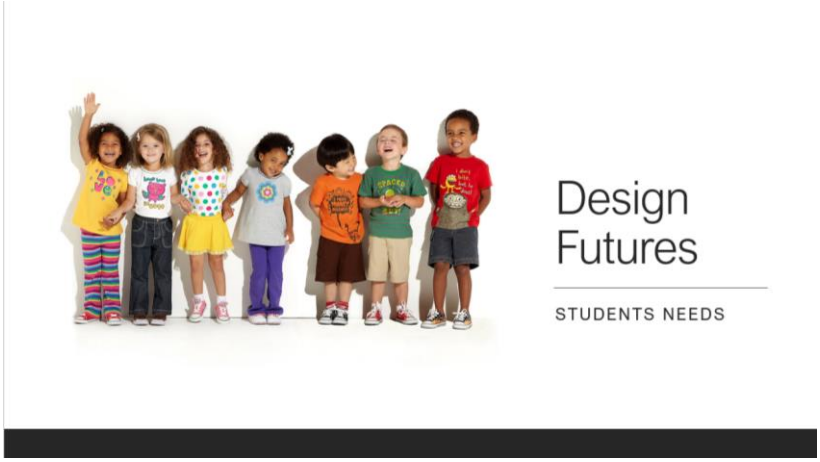
Co-funded by the
Erasmus+ Programme
of the European Union

		5 minutes presentation
	Materials:	Print or create the IDEAL CLASS form Canva link
	Preparation:	
	Objectives:	Learn how would an ideal class/activity look like for students, and how its characteristics look like.
Theme:	**Post workshop interview**	
Activity 6. Evaluation	*Facilitator's instructions:*	Tell students that you would like to gather their feedback regarding the experience of designing their own curriculum and to do so we will play a game called High, Low, Ha. • Each student will have to say that they liked the most (HIGH) • What they liked the least (LOW) What was challenging • What they enjoyed – made them Laugh (HA)
	Duration:	5 minutes
	Materials:	None
	Preparation:	None
	Objectives:	Gather feedback from participants regarding their experience for the day when they had to design their own curriculum

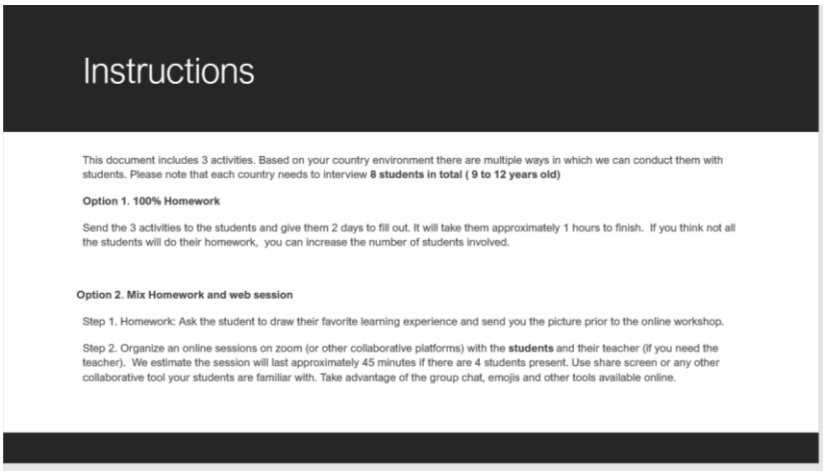
Co-funded by the
Erasmus+ Programme
of the European Union

Theme:	Closing	
Activity 7. Thank you	*Facilitators' instructions:*	Thank students for their participation and answers. Tell them that their contributions are very important and will help you and the team design better activities for them and other students. At the end shake their hands/or high five them and give them some chocolates (if possible)
	Duration:	1 minute
	Materials:	Chocolates (or candy box)
	Preparation:	None
	Objectives:	Thank and reward the students for their contributions.

5. Online Student workshop slides



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



Instructions

This document includes 3 activities. Based on your country environment there are multiple ways in which we can conduct them with students. Please note that each country needs to interview **8 students in total (9 to 12 years old)**

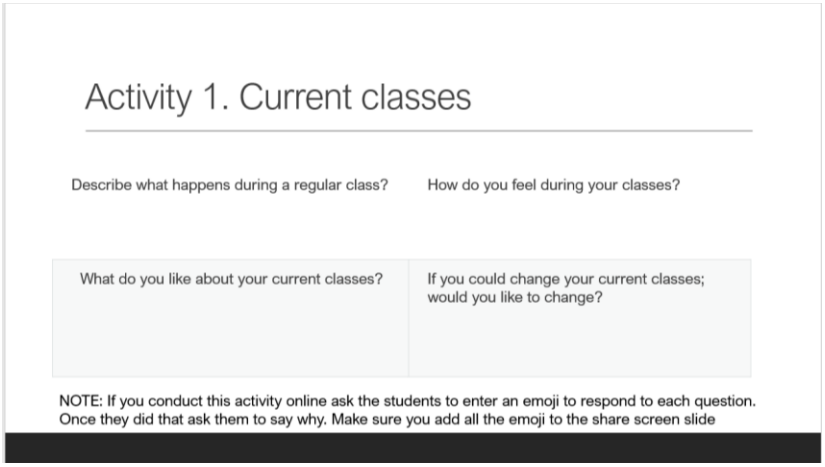
Option 1. 100% Homework

Send the 3 activities to the students and give them 2 days to fill out. It will take them approximately 1 hours to finish. If you think not all the students will do their homework, you can increase the number of students involved.

Option 2. Mix Homework and web session

Step 1. Homework: Ask the student to draw their favorite learning experience and send you the picture prior to the online workshop.

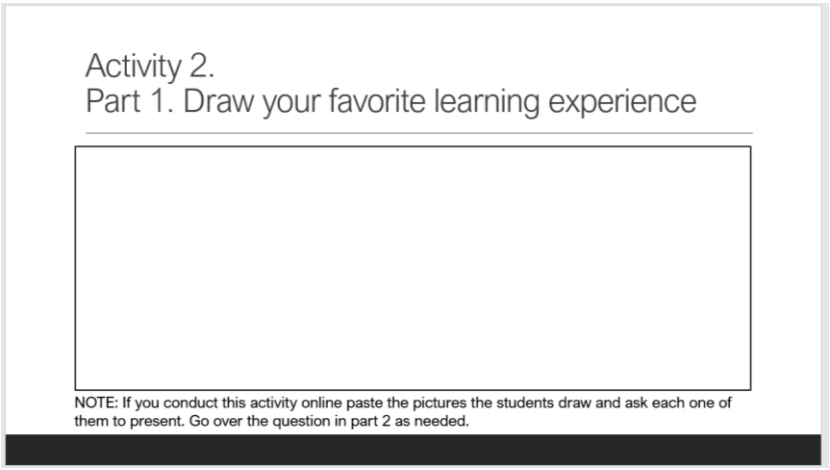
Step 2. Organize an online sessions on zoom (or other collaborative platforms) with the **students** and their teacher (if you need the teacher). We estimate the session will last approximately 45 minutes if there are 4 students present. Use share screen or any other collaborative tool your students are familiar with. Take advantage of the group chat, emojis and other tools available online.



Activity 1. Current classes

Describe what happens during a regular class?	How do you feel during your classes?
What do you like about your current classes?	If you could change your current classes; would you like to change?

NOTE: If you conduct this activity online ask the students to enter an emoji to respond to each question. Once they did that ask them to say why. Make sure you add all the emoji to the share screen slide



Activity 2.
Part 1. Draw your favorite learning experience

NOTE: If you conduct this activity online paste the pictures the students draw and ask each one of them to present. Go over the question in part 2 as needed.

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

Activity 2.
Part 2.

What did you like about this class?

How was this class different?

What did the teacher do what was his/her role?

What was your role?

What did you learn?

What materials were used during this class?

What activities did you do?

What was the assessment like? Were there any grades?