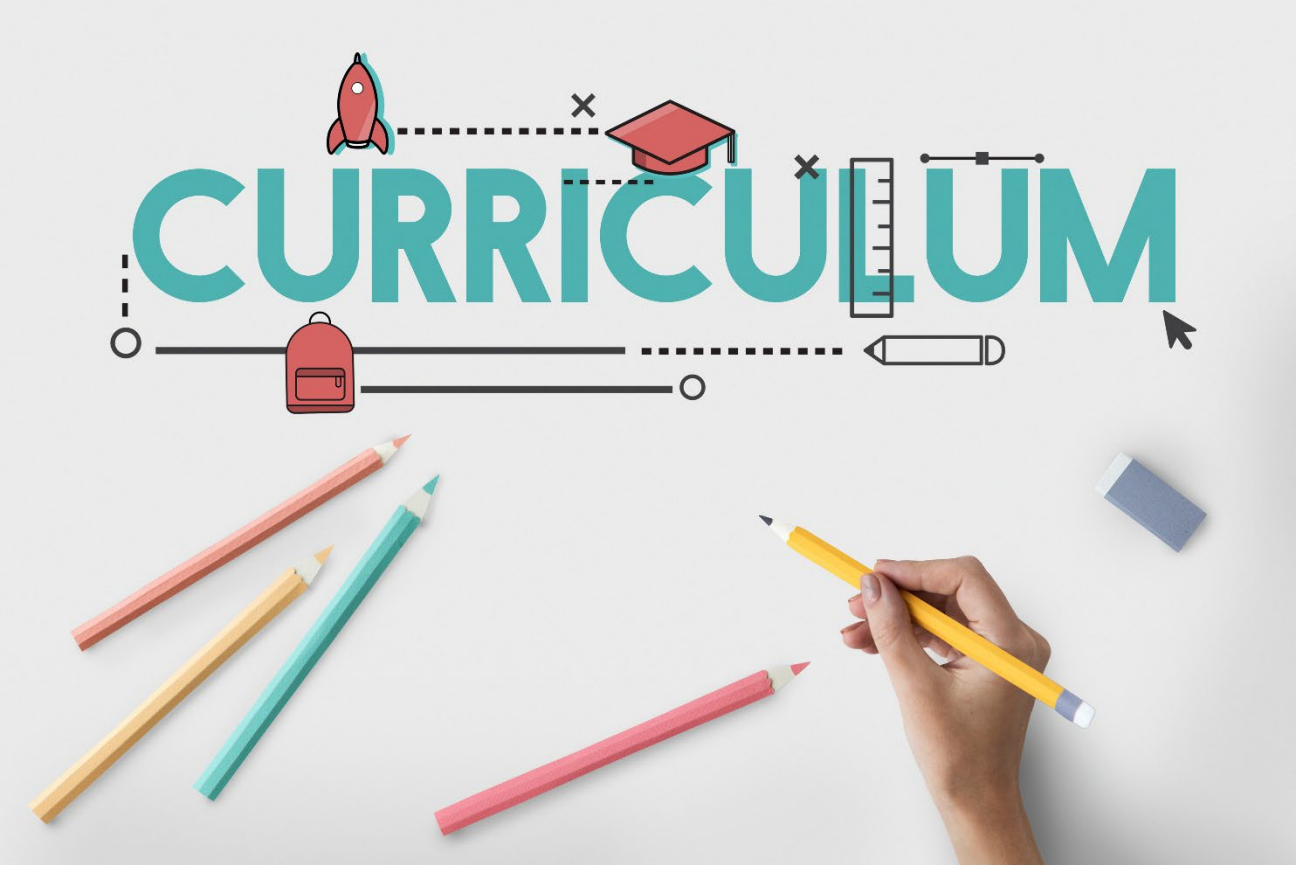
Titlul proiectului: DigitalCRAFT: Enhancing Vocational Skills Through Design Thinking and Graphic Design" [DigitalCRAFT: Îmbunătățirea competențelor profesionale prin intermediul principiilor de design thinking și al designului grafic"]
Proiect nr. 2023-1-RO01-KA210-VET-000166913
Proiect implementat de **Sindicatul Liber din Învățământul Județului Bacău (SLI BACĂU) în parteneriat cu UN-LAB -Italia**

DIGITALCRAFT PROJECT

CURRICULA



Activity A4. CURRICULUM DEVELOPMENT

I. OVERVIEW

The **DIGITALCRAFT** curriculum aims to improve vocational education and training (VET) in the fields of design thinking and graphic design. This curriculum incorporates comprehensive modules that address key aspects of design thinking, graphic design and the integration of digital tools in educational processes.

The curriculum framework is structured to provide a clear and detailed roadmap for the development of competences, learning outcomes and assessment methods that align with the project objectives.

The curriculum focuses on improving creativity, collaboration and accessibility in education, preparing participants to create innovative solutions to educational challenges, adapt teaching methods to emerging trends and develop a lifelong learning mindset.

II. OBJECTIVES

The proposed curriculum has as its main aim the development of essential competences for teachers in the use of modern technologies and innovative methodologies in teaching in order to improve the learning process and better meet the needs of students.

The objectives are structured to cover key issues, from acquiring technical and digital skills, to creating learner-centered lessons and promoting an inclusive and diverse learning environment.

Through innovative teaching methods and professional development of teachers, the program will support the transition to a modern, dynamic and labour market-oriented VET education.

Objective 1: IMPROVING THE QUALITY AND RELEVANCE OF VET EDUCATION THROUGH INNOVATIVE TEACHING.

Description:

The objective focuses on introducing **innovative teaching methods** in VET in order to improve the quality of education and ensure it is relevant to today's industry.

It will emphasize active learning, collaboration between students and teachers, and the integration of technology to provide a dynamic and applicable education.

Expected results:

- **Learner-centered teaching:** Teachers and trainers will adopt interactive, problem-based and project-based methods to stimulate learner engagement and enable learners to actively develop their competences.
- **Technology integration:** teachers will learn to use modern technologies (VR, AR, digital design apps) in their teaching to make learning more engaging and tailored to industry needs.
- **Industrial relevance:** VET education will be more closely linked to the requirements of the labour market, by involving industry partners in the development of the programs and by using real industry cases in the lessons.

Objective 2: SUPPORT THE PROFESSIONAL DEVELOPMENT OF VET TEACHERS AND VET TRAINERS

Description:

The objective focuses on the continuous professional development of VET teachers and trainers to ensure that they have up-to-date knowledge and modern teaching skills. Trainers will be supported to adopt new teaching methodologies and use innovative educational technologies to create relevant and engaging lessons.

Expected results:

- Modern pedagogical skills: VET teachers and trainers will develop modern pedagogical skills, such as project-based teaching, the use of digital technologies and the adoption of competence-centered learning methods.

- Improving digital skills: Trainers will learn to use digital platforms and teaching technologies, including graphic design, to create engaging and industry-relevant lessons.

- Updating subject knowledge: teachers will have access to ongoing training and industry resources to ensure that their lessons are in line with the latest trends and technological innovations.

Objective 3: TRAIN VET STUDENTS IN DESIGN THINKING AND GRAPHIC DESIGN WITH INDUSTRY-RELEVANT SKILLS

Description:

The objective focuses on preparing VET students to become competitive in the job market by acquiring **specialized skills** in key areas such as **design thinking** and **graphic design**. The curriculum will emphasize the development of creativity, visual skills and problem-solving abilities, using innovative design methods and visual techniques applicable in today's professional environment.

Expected results:

- **Design thinking skills:** Students will learn to apply **design thinking** principles in the context of solving industrial problems, such as creating innovative solutions for products, services or processes.
- **Graphic design skills:** Students will develop technical skills in using graphic design programs such as **Adobe Illustrator**, **Canva** or other relevant applications. They will be able to create high-quality visual materials such as posters, logos, brochures and infographics.
- **Adaptability to market demands:** Students will be able to respond to modern industry requirements and standards, becoming flexible and prepared to collaborate in interdisciplinary teams or manage design projects.

Objective 4: ADDRESSING CURRENT SKILL GAPS IN THE WORKPLACE THROUGH THE DELIVERY OF A COMPREHENSIVE EDUCATION PROGRAMME

Description:

One of the key objectives of this curriculum is to address **skills gaps in** the labor market by providing a **comprehensive educational program** that equips VET students and teachers with industry-relevant skills. It will emphasize the development of technical skills (graphic design, digital technology) and soft skills (collaboration, problem solving, creativity).

Expected results:

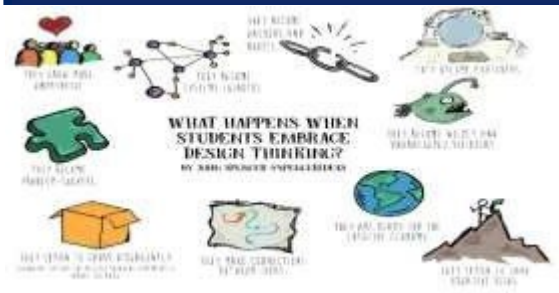
- **Advanced Technical Skills: The** program will provide VET students with the technical knowledge and skills needed to meet today's industry requirements, including in areas such as graphic design, use of specific software and digital prototyping.
- **Developing transversal skills:** students will develop transversal skills such as critical thinking, teamwork and adaptability, which are essential for success in the job market.

- **Bridging the skills mismatch: the** program will contribute to reducing the mismatch between the skills demanded by employers and the skills offered by the education system.

III.KEY COMPETENCES ACQUIRED

Completion of this curriculum will equip participants with a number of key competences required to integrate innovative methods and modern technologies into the educational process. These competences will help to improve the quality of teaching and to adapt education to the demands of a changing world.

I. IMPLEMENTATION OF DESIGN THINKING METHODOLOGIES



Description.

emphasizes empathy, collaboration and rapid testing of solutions. In education,

This competence will help teachers to create lessons and activities that are learner-centered, tailored to learners' needs and based on continuous feedback.

This involves:

- Ability to understand the needs of students through direct observation, interviews or gathering feedback, enabling the creation of solutions that respond to students' real challenges
- The ability to clearly define the educational problems or needs that require innovative solutions and to transform the insights gained from the empathy phase into clear objectives.
- Ability of to to use the techniques of brainstorming to generate creative and innovative solutions to identified problems.
- Ability to develop rapid prototypes and test them with students to check the effectiveness of proposed solutions and to adjust lessons or educational projects

II. GRAPHIC DESIGN TECHNIQUES

Description: This competency is concerned with learning and applying the fundamental principles of graphic design to create effective, attractive and clear visual materials in an educational context. Teachers will develop a thorough understanding of the use of color, typography and space in the creation of educational materials.

This involves:

- Ability to use balance, contrast, repetition and alignment to create well-structured and understandable visuals.
- Ability to use color theory to choose color schemes that attract attention and highlight important elements
- Effective typography skills, by knowing how font choice and use of white space can improve the readability and clarity of the visual message

Description: The effective use of digital tools is the ability to make optimal use of available digital technologies and platforms to improve teaching and learning processes, collaboration and management of educational resources. This skill is becoming essential in an era where technology is ubiquitous in education and access to digital tools can make all the difference in the quality of teaching and student engagement.

Teachers will gain advanced digital skills, learning to use platforms such as Canva for creating visuals, Timeline for creating interactive timelines and CapCut for editing educational videos.

This means:

- The ability to create engaging educational resources such as infographics, presentations and videos, using these digital tools to facilitate interactive teaching.
- Ability to use digital platforms to share documents, collaborate with students and their peers and monitor their progress in real time.
- Ability to adapt lessons to the needs of students, providing learning pathways personalized and monitoring each student's progress through instant digital feedback.

III. EFFICIENT USE OF DIGITAL TOOLS

IV. DESIGN AND IMPLEMENTATION OF INTERDISCIPLINARY PROJECTS

Description: This competence refers to the ability to create and implement interdisciplinary projects, which integrate concepts and methods from multiple subject areas, providing students with a broad and connected understanding of the topics studied.

This means:

- Ability to identify topics that can be approached from multiple disciplinary perspectives and to create project structures that integrate knowledge from different fields.
- Planning skills: developing a schedule of activities, allocating resources and responsibilities and monitoring project progress.
- Ability to evaluate the progress of the project along the way and adapt the plan according to the results achieved and the feedback received.

V. INTERDISCIPLINARY COLLABORATION AND COMMUNICATION

Description: Interdisciplinary collaboration is essential for the development of projects that integrate knowledge and approaches from different fields. Teachers must be able to work effectively in diverse teams and communicate clearly and effectively to ensure the success of joint projects. Teachers will develop the interdisciplinary collaboration and effective communication skills needed to work in teams and share knowledge from a variety of fields.

This involves:

- Ability to express ideas clearly and understand the needs of colleagues from other disciplines. This

includes the ability to listen actively and contribute constructive solutions.

- Ability to understand how different disciplines can be integrated to create projects educational programs that give students a holistic understanding of a subject.
- Ability to resolve conflicts and manage divergent opinions to ensure a productive and effective collaboration.

VI. DIGITAL LITERACY AND KNOWLEDGE TOOLS

Description: This competency refers to the ability to effectively use digital technologies and to and to understand the functioning and applicability of various digital platforms and tools in the educational environment. In the program, teachers develop technical skills to use various digital applications and platforms such as **Canva**, **Timeline**, **CapCut**, and other modern solutions for educational content management.

This means:

- skills to navigate and use digital platforms effectively.
- skills to create and structure interactive educational materials using digital tools accessible.
- the ability to analyze and evaluate the digital resources they use, i.e. to adapt lessons according to students' needs and to choose the best technological solutions for teaching.

VII. VISUAL COMMUNICATION AND STORYTELLING

Description: Visual communication and storytelling are essential teaching skills, helping to structure lessons and capture students' attention. In this program, participants learn to use visuals and storytelling techniques to convey information in a clear, memorable and engaging way.

This means:

• Ability to use the basics of visual design (color, typography, space) to create effective instructional materials, enhancing the visual impact and clarity of instructional materials.
• Ability to use visual storytelling techniques to construct a coherent narrative, facilitating understanding and retention of information.
• Ability to efficiently structure messages and create visual stories engage students emotionally and make learning more engaging.

VIII. CULTURAL RESPONSIBILITY AND SOCIAL IN DESIGN

Description: This competency requires a deep understanding of the social and cultural impact of design on communities, individuals and society at large. Designers and teachers need to be aware of their responsibility to create materials and projects that respect cultural diversity and promote social inclusion, avoiding stereotyping and trivializing cultural symbols. Participants will learn to create educational materials that respect cultural diversity and promote social inclusion, avoiding stereotyping and trivializing cultural symbols.

This involves:

- The ability to create educational and visual materials that are sensitive and respectful of diverse cultures and traditions. This includes avoiding cultural stereotyping and inappropriate use of traditional symbols or artifacts.
- The ability to create designs that are accessible and inclusive for all users, regardless age, gender, race or ability. Design should reflect human diversity and promote equal opportunities.
- Ability to integrate sustainability principles into their projects, promoting solutions that reduce environmental impact and respect social and moral values.

V. LEARNING OUTCOMES

This curriculum is designed to give teachers the tools they need to prepare students for a dynamic and technological future, stimulating creative thinking, collaboration and inclusion in education.

At the end of this training program, **participants** will be able to:

- ❖ Apply the Design Thinking method in education to create innovative and student-centered lessons pupils.
- ❖ Make effective use of digital platforms such as Canva, Timeline and CapCut to create interactive educational materials.
- ❖ Develop interdisciplinary projects and integrate new technologies (VR, AR, AI) in the process of teaching.
- ❖ Promote cultural and social responsibility in educational design, ensuring that materials are inclusive and accessible.
- ❖ Develop a personal lifelong learning plan, adapting to changes in technology and industry.

Following application and integration into classroom teaching, **students** will be able to:

- Understand and apply design thinking principles in different contexts;
- Make effective use of key digital tools for design and collaboration;
- Create engaging visual content using graphic design techniques;
- Work collaboratively on interdisciplinary projects;
- Demonstrate cultural and social responsibility in design practices;
- Promote cultural and social responsibility in educational design, ensuring that materials are inclusive and accessible;
- Stay abreast of future trends and adapt to changes in the labor market.

VI. CURRICULUM STRUCTURE

Module 1: INTRODUCTION TO THE DIGITALCRAFT PROJECT AND ITS PROBLEMS	❖ Overview of the project objectives, the importance of design thinking and graphic design in VET, industry requirements, case studies, interdisciplinary competences and challenges faced by VET institutions
Module 2: SUMMARY NEEDS ANALYSIS	❖ Summary of needs analysis, identification of skills gaps, prioritization of key competencies, areas for curriculum improvement and implementation strategies.
Module 3: DESIGN THINKING METHODOLOGIES	❖ Principles, historical context, process stages (Empathy, Defining, Idea, Prototyping, Testing), practical exercises, real-world applications and problem-solving tools
Module 4: DIGITAL TOOLS FOR DESIGN AND COLLABORATION	❖ Introduction to tools such as Canva, Google Drive, CapCut, Juxtapose, KnightLab JS, the importance of digital literacy, project assignments and collaborative work
Module 5: COMMUNICATION SKILLS VISUAL	❖ Visual design basics, techniques for creating infographics and marketing materials, visual storytelling and feedback methods and Refresher.

Module 6: IMPLEMENTATION OF INTERDISCIPLINARY PROJECTS	❖ **Project design, collaborative strategies, case studies and best practices for interdisciplinary work**
Module 7: ASSESSMENT AND EVALUATION	❖ **Formative and summative assessment techniques, feedback methods, final and summative assessment criteria certification process**
Module 8: CURRENT TRENDS IN DESIGN AND TECHNOLOGY	❖ **Emerging trends, new technologies in education (VR, AR, AI), future skills, lifelong learning strategies and adapting to industry changes.**
Module 9: RESPONSIBILITY CULTURAL AND SOCIAL IN DESIGN	❖ **Cultural sensitivity, social impact, ethical considerations and projects aimed at social improvement.**

MODULE 1 INTRODUCTION TO THE DigitalCRAFT PROJECT: Enhancing Vocational Skills Through Design Thinking and Graphic Design AND ITS PROBLEMS

The DigitalCRAFT project is an educational initiative that aims to redefine vocational education and training (VET) in design thinking and graphic design.

Recognizing the crucial role that these disciplines play in today's digital and design-oriented job market, the project seeks to bridge the gap between current educational offerings and the skills needed in the modern workplace.

Over a period of 14 months, the project aimed to create a synergy between Italian and Romanian teachers in order to develop a common curriculum that not only reflects contemporary industry practices, but is also proactive in anticipating future market trends.

The DigitalCraft project responds to the needs and objectives of the participating organizations, but also to the identified direct needs of the target groups, by providing VET teachers and trainers with up-to-date knowledge and skills. As these teachers apply the new curriculum and teaching methods, VET school students, who form the indirect target group, will acquire skills relevant for the future labor market, increasing their employability and career prospects.

OVERALL OBJECTIVE

▪ To measurably improve the quality and relevance of vocational education and training in the field of design, innovation and graphic design during the 14-month project implementation period by fostering international collaboration, developing and implementing a common curriculum and training at least 50 VET teachers/trainers from Italy and Romania, with the ultimate aim of improving the employability and career prospects of VET students in the future dynamic job market.

SPECIFIC OBJECTIVES

▪ **Promoting collaboration and knowledge exchange between partners [Un/lab and SLI BACĂU]** to improve education and training, training methods in design, innovation and graphic design.

▪ **Improving the capacity of teachers/trainers and vocational training institutions** to effectively empower students with skills relevant to the future job market by creating a common curriculum integrating design thinking methodologies, design and graphic design techniques into the educational process.

▪ **Enhance the professional development of teachers/trainers and VET institutions** by providing them with access to virtual workshop programs and virtual training sessions designed to improve their understanding and implementation of the new curriculum, teaching methods and graphic design tools.

▪ **To increase the visibility and understanding of the new curriculum among VET teachers/trainers and institutions** by designing and running an awareness-raising campaign, which will use a short video to effectively communicate the benefits of integrating design thinking methodologies and graphic design techniques into VET education.

▪ **Enhance the employability and career prospects of VET students** by providing them with industry-relevant skills through the new curriculum, which integrates design thinking methodologies and graphic design techniques, thus ensuring that they meet the dynamic requirements of the future labor market.

MAIN ACTIVITIES

- **A.1 PROJECT MANAGEMENT**
- **A.2 COMMUNICATION AND DISSEMINATION**
- **A.3 CURRICULUM DEVELOPMENT**
- **A.4 TRANSNATIONAL TRAINING IN ITALY**
- **A.5 NATIONAL TRAINING IN ROMANIA**
- **A.6 AWARENESS RAISING CAMPAIGN**

TARGET GROUP

DIRECT TARGET GROUP:

- **VET teachers and trainers** from partner organizations and countries who will gain knowledge on innovative teaching, innovative methods and tools.
- **Educational institutions and organizations** interested in adopting or adapting the developed curriculum.

INDIRECT TARGET GROUP:

- **Students from VET schools in Italy and Romania** to acquire market-relevant skills labor.
- **Schools in Romania and Italy**, which expressed their interest in the project activities during the design process, were involved in the needs assessment as follows:

SLI BACĂU:

1. Economic College "Ion Ghica" Bacău (100 teachers and 1336 students);
2. Technical College "Dimitrie Ghica" Comănești (88 teachers and 1180 students);
3. Technical College "Gheorghe Asachi" Onești (70 teachers and 823 students).

Un/Lab: VET College "E. Orfini" (53 teachers and 655 students).

The project is particularly significant in its focus on the transformative power of design thinking and graphic design, which have become indispensable tools for innovation, problem solving and creating more value in diverse industries.

MODULE 2: NEEDS ANALYSIS SUMMARY

Through its objectives, the project aimed to better prepare vocational and technical education students for the future labor market and increase their employability.

Under activity A.3 CURRICULUM DEVELOPMENT, the two partners [UnlLAB and SLI BACĂU] were expected to work together to develop a comprehensive curriculum, incorporating design thinking methodologies and graphic design techniques, making it applicable to different sectors and relevant for students in different VET subjects.

In activity A.3.1 Needs assessment, interviews were conducted with teachers, students and VET and industry professionals in the fields of design, innovation and graphic design, based on the interview guides.

The methods and instruments used in the study aimed to collect information to highlight the following types of effects:

- immediate, individual level;

- medium-term, at institutional level;
- long-term effects at both individual and institutional level.

Methods and techniques

- Quantitative research: Questionnaire survey
- Descriptive statistical analysis of data collected in the survey

Interviews and questionnaires were conducted on the following **ASPECTS**:

1.1. Problem solving

Design thinking offers a systematic approach to problem solving. It helps students to think critically and creatively and to develop solutions that are not only effective but innovative. These skills are valuable in any professional context, not just design-related fields.

1.2. Adaptability

The modern labor market is dynamic and requires workers who can adapt to new technologies and methodologies. Design thinking and graphic design skills ensure that VET students are well prepared to embrace change and new challenges in diverse industries.

1.3. Communication

Graphic design skills are essential for effective visual communication. With the growing importance of digital media, the ability to create clear and compelling visual messages is valuable in sectors from marketing and communications to data presentation and user interface design, including unrelated fields such as electrical, mechanical and hydraulic studies.

1.4. The relevance of interdisciplinarity

Design thinking encourages an interdisciplinary approach, combining knowledge from different fields to create holistic solutions. This is increasingly important as the boundaries between traditional roles blur and collaboration between different sectors becomes more common.

1.5. User centricity

Design thinking focuses on the user experience, ensuring that products, services and systems are designed with the end user in mind. The focus on customer experience is crucial to the success of any business.

1.6. Innovation

Both design thinking and graphic design are drivers of innovation. They encourage thinking outside the box and developing new ideas that can lead to breakthroughs in any sector.

1.7. Digital competence

In today's digital age, graphic design skills are intertwined with digital literacy. Understanding the tools and principles of digital design is now a fundamental skill as digital content dominates in communications, marketing and product development.

1.8. Competitive advantage

In a crowded job market, having design thinking and graphic design skills can

differentiate VET students from their peers, giving them a competitive advantage when looking for a job.

1.9. Entrepreneurship

These skills are also key to entrepreneurship. Design thinking helps identify market opportunities and develop innovative business models, while graphic design is crucial for branding and customer engagement.

1.10. Cultural and social empowerment

Design thinking often involves consideration of the cultural and social context of products and services, which is important for socially responsible and culturally sensitive solutions.

A. INTERVIEWS

The interviews were designed to collect specific perspectives to inform the needs assessment phase of the DigitalCraft project, focusing specifically on the perspectives of VET teachers and industry professionals.

A.1. INTERVIEWS WITH VET TEACHERS

The interviews were conducted with 6 teachers from 3 VET education units in Bacău County, so:

- Economic College "Ion Ghica" Bacău;
- Technical College "Dimitrie Ghica" Comănești;
- Technical College "Gheorghe Asachi" Onești.

The aim of the interviews conducted was to gather valuable insights and feedback from VET and vocational teachers and industry professionals in the fields of design, innovation and graphic design. The interviews aimed to identify current gaps and challenges in the existing VET curriculum, understand the evolving needs of the industry and gather suggestions for incorporating digital tools and methodologies. This information will be essential in shaping curriculum development.

The insights gained have helped us to create a more relevant, comprehensive and forward-looking curriculum that meets the demands of the modern workplace and enhances the skills and competences of VET students in these creative areas.

The semi-structured interviews allowed an in-depth exploration of participants while covering the core topics relevant to the project.

The answers provided by VET teachers have been analyzed and are important for identifying trends and the specific needs of their target group. Their responses reveal the following:

1. Some teachers apply the principles of design thinking in the curriculum, in activities

teaching-learning.

In general, the teachers interviewed said that over time they have developed mixed strategies to stimulate inventiveness, imagination, eccentricity, spontaneity, overcoming the fear of breaking theoretical barriers. They believe that students need different channels of communication to get them actively involved and to make connections across different domains.

Teachers stated that they often try to use interactive exercises, both individual and collective, to have debates on certain issues or concepts, to try use new, innovative solutions.

They also try to capture their attention, to motivate them, to come up with new topical subjects, to realize usable products together with the students, working in groups, in teams, to create interactions, to link the concepts/ notions taught to their life, interests, concerns, experiences.

One of the teachers interviewed suggested some **ways in which they could integrate problem-solving exercises related to projective thinking** in the curriculum, namely:

1. creating a dedicated module in the curriculum for learning and applying the principles of projective thinking. This module could include theoretical lessons on the principles of Design Thinking and practical exercises for their application.

2. **Incorporating Design Thinking principles into other subjects** such as economics, marketing, commerce by adapting exercises and projects to promote creative thinking and problem solving. E.g., creating a product catalog for the exercise company.

3. **promoting interdisciplinary projects, which involve using projective thinking to solve complex problems**. These projects could involve students from different classes or subjects working together to tackle a real or simulated problem.

4. **organizing extracurricular activities such as design clubs or innovation competitions where students can apply and develop projective thinking skills in a more relaxed, creative environment**. Currently there are certain activities, such as exercise company fairs, where there is a competition on certain sections, some of them also involving this part of creation and innovation, such as: best website, best commercial, best creative catalog and others.

5. **Providing additional resources and learning materials for students**, such as books, videos and online tutorials, to help them understand and practise design thinking concepts and techniques outside the classroom.

6. **implementing ways of assessing** students' **projective thinking skills**, such as individual or group projects, presentations and design portfolios, followed by constructive feedback to continuously improve their performance.

2. Today, the curriculum is competency-based, aiming to help students develop all the skills they need to become adults, to become great people in a future job.

One of the teachers interviewed, a teacher at an art college, exemplified this

aspect, mentioning the fact that in vocational lyceums, a new subject - computerized image processing has been introduced, the deepening of this subject developing modern technical skills in the use of computers and computer technologies, graphic processing operations. In this subject, students:

- learn tools, various and complex image manipulation techniques.
- develop projects - usable products, e.g. posters, business cards, promotional materials, advertising materials, flyers, banners - functional, practical and aesthetic products that develop their creativity, but also a technical and artistic vocabulary that they can develop further.
- work in teams, learning to document, understand the specific tasks of the project, meet deadlines, collaborate with other team members, give and get feedback.

Also, another teacher, a physics teacher at a VET high school, mentioned that students should not limit themselves to mechanically learning definitions or laws without understanding the phenomena, considering that they should be taught to make connections and to understand and interpret new information they are confronted with.

Another teacher gave a number of examples of how the current curriculum would could prepare students to adapt to technological advances in design, namely:

- **the use of design software** in art, technology or even math classes, where students could learn to use different design software such as Adobe Photoshop, Adobe Illustrator, Corel Draw or even CAD, Computer Aided Design, which are commonly used in the design industry. Through these applications, students can learn how to create and manipulate digital images and models, preparing them for their use in professional practice.

- **Technology-based design projects**, i.e. students could be encouraged to carry out design projects involving the use of modern technologies such as 3D printers, augmented or virtual reality devices or even construction robots. These design projects could be integrated into the modules linked to the firm's Year 11 and Year 12 exercise, giving pupils the opportunity to experiment and understand how technology can be used to create innovative design solutions.

- **Collaboration with industry professionals**, by organizing collaborations between the school and design and technology industry professionals to give students a real insight into how technology is used in professional practice.

These collaborations could include presentations, guest lectures at design offices or advertising creative firms, for example, or even internships for students.

- **Organizing electives or special interest clubs** where students can explore and specialize in specific areas design and technology, such as graphic design, product design, and others. These additional activities would allow students to develop their skills in a more focused environment and explore current technologies and trends in the industry in greater depth.

By integrating these elements into the current curriculum, students will be prepared to adapt to technological advances in design and become competent innovative professionals in their field.

3. It is necessary for students to master a number of theoretical notions - a compositional structure, highlighting a center of interest, methods, color theory, distribution of spaces, the balance between the visual and textual components, dynamism, the power to direct the viewer to the most important point or information in the image

The use of IT equipment in teaching activities, such as, for example, interactive whiteboards to present experiments to students, the graphical, visual part being important for the understanding of the concepts taught.

4. It is very important to encourage students to express themselves freely, to share their opinions, to make associations of ideas, to make diverse connections, to make "fusion" between the arts or between other subjects, to remove preconceived ideas, to remove inhibition, to experiment, not to be afraid to make mistakes, not to be afraid to embarrass themselves.

Interdisciplinarity helps students to use their knowledge from different fields, helps them to discover new things related to certain aspects, to certain areas (e.g. biology, chemistry or physics) and helps them to have a global view of what the phenomenon or substance or lesson is about.

Communication between teachers of different subjects is very important to develop projective design for students.

Encouraging pupils to apply this projective thinking to different subjects or disciplines can be achieved by adopting an interdisciplinary approach and promoting an environment in which creativity, exploration and complex problem solving are encouraged. This could be achieved by fostering an open and collaborative environment between teachers and pupils, between pupils and teachers, by encouraging collaboration between pupils, open dialog and exchange of ideas.

5. The teachers interviewed stated that they try to adapt their teaching style to the level of the students, as there are classes with children at different levels, with more or less knowledge/knowledge, and the teaching style has to be adapted to their level.

Some of them mentioned that they try to do practical work, where students have to

work as a team, communicate, realize the project together, which helps them in their personal development.

The teachers interviewed mentioned that the methods used to teach the importance of projective thinking are those in which the student actively participates in the class. They mentioned brainstorming as a method frequently used in class, in addition to experiments, research and role play. There is more emphasis on questions that are centered on thinking, imagination and less on those that are centered on memory, in order to develop their empathy, their ability to know their target audience.

Another frequently used method, exemplified by the teachers interviewed, was the choice of free, personalized, motivating and motivating topics, topics that really interest them.

The teachers interviewed believe that it is very important that the pupil is encouraged and supported to discover as many things as possible on his own and to realize that he has the necessary knowledge, that he has the possibility to develop a certain theory, to use his own experiences to explain to himself what happens, why it happens

6. Children should be encouraged to use both their intuition and their imagination to understand and explain what is around them. Therefore, teachers encourage pupils to find similarities and differences between the phenomena they encounter every day, so that they can, in practice, build on a previous experience to explain other phenomena that they are perhaps encountering for the first time.

Innovation and creative thinking are promoted through the diversity and complexity of projects. For example: graphic design competitions, either traditional or digital, photography competitions, digital processing competitions or poster section, Olympiads, museum activities, museum visits or study trips, field trips, documentary trips, where students deepen what they have learned and make connections with the real, real-life environment.

The use of graphic design by teachers in the realization of lesson summaries.
For example: making a concept map with students, PowerPoint presentations, etc.

7. The teachers interviewed said that students have a range of digital skills, but,
must be developed.

Overall, they consider students' level competence with digital tools to be average to advanced. Although technology is a part of everyday life, there are many students who are not yet digitally literate or not interested.

As a rule, students use their phones very lightly, using the Internet and, especially, some apps that are more social media related. But even if they have Internet skills, they don't show a lot of skills in using certain programs, especially specialized ones.

In some VET high schools, the subject of "computerized image processing" ensures the acquisition of these skills in the use of computers and information technologies.

School lays the foundations, but the student needs to work, needs individual study, needs independent work, needs interest and motivation.

There are some students, such as those in rural areas, who have not had the opportunity to encounter learning situations in graphic design.

The teachers interviewed consider that it would be very useful if ICT lessons also included concepts from this field - graphic design - in the curriculum

8. The teachers interviewed believe that it is very important for students to develop the habit of working in a team, to understand the distribution of tasks and to work together.

Teachers believe that it is very important that, in addition to theoretical knowledge, pupils acquire certain technical skills at secondary school, for example, how to carry out an experiment, how to use a measuring instrument.

In order to have a competitive advantage on the labour market in workshop work, the interviewed teachers mentioned that they try to develop students' communication skills, open thinking, teamwork, organization, management, use of appropriate work technique, which they can exercise in time, quickly, use their creativity and practical, qualitative rather than quantitative skills.

9. Some vocational teachers interviewed consider that students learn general notions about entrepreneurship, but not applied to the artistic profile, but rather focus on theoretical skills, on practical activities rather than on entrepreneurship. Therefore, they believe that there should be such a course applied to the artistic profile.

Teachers of vocational education mentioned that in the specialized subjects, in grades 11 and 12, students work in so-called practice firms, where they can develop entrepreneurial skills, but they also believe that this component should be further developed.

10. The cultural and social context must be seen in relation to the children's own experiences. They come from different backgrounds, they may or may not be used to working together, they have different attitudes towards school, their peers, the environment they come from (high school) and it is very important that they also emphasize the specificity of the areas they come from. For example, teachers in specialist departments have the opportunity to use the pupils' cultural and social experience in organizing activities in exercise firms, where it can be put to good use.

Collaborative learning is very important, because by learning together, learning from each other, with each other, the learning outcome can be a deep learning, what students learn will ingrained in their minds and can be more easily used in practice

A.2. INTERVIEWS WITH VET PROFESSIONALS

Within the project, interviews were organized with 3 VET and industry professionals in design, innovation and graphic design.

The ' answers showed that design thinking is used in their professional work to address and solve complex problems in

several ways.

The professionals interviewed also provided a number of examples of the application of projective thinking in this process, namely:

1. **Understanding user needs:** Web designers use techniques such as user interviews, observing users in action and analyzing data to gain a detailed understanding of the target audience and the context in which they will interact with the website.
2. **Defining the challenge:** Based on an understanding of user needs, web designers formulate a clear and concise challenge for their project. This challenge serves as a guide for solution development and steers design efforts in the right direction.
3. **Idea generation:** The design team uses brainstorming techniques and other idea generation methods to explore a range of possible solutions to the challenge. At this stage, the emphasis is free and unconstrained idea generation, without evaluating ideas yet.
4. **Prototyping and testing:** Designers create rapid prototypes and iterations of their ideas to test them with end-users. Feedback from the testing is then used to iterate and improve the prototypes before moving forward with final implementation.
5. **Deployment and evaluation:** Once a prototype is deemed satisfactory by users and the design team, it is deployed and launched. However, the design thinking process doesn't end there; designers continue to monitor and evaluate the website's performance against the established goals and make adjustments and improvements based on the feedback received.

As a conclusion, it resulted that, by applying projective thinking in their web design process, web design professionals are able to address and solve complex problems, focusing on the users' needs and developing innovative and effective solutions for these needs.

The professionals interviewed gave the following examples:

1. **adaptability to new technologies through the transition from traditional to digital production**. Professionals mentioned that they have adapted their production strategies to match changes in technology and target audience behavior. This has involved a transition to digital production, such as creating content for websites, online ads and social media campaigns. To do this, they have had to adapt and learn new technologies and methodologies, including new design and photo/video editing programs, understanding algorithms and online platforms for advertising, and adapting workflows to efficiently manage digital production.

2. **The transition from static web design to responsive web design.** Professionals mentioned that they had to take a fresh approach and integrate responsive web design into their practice, including using technologies such as HTML5 and CSS3 to create websites that can dynamically adapt to different screen sizes and resolutions. Adaptability to technological change and evolving design practices has therefore been crucial to success in an ever-changing web environment.

The professionals interviewed believe that graphic design skills can be harnessed to improve visual communication within an organization or with customers in a number of ways.

A number of examples were given:

- **Creating a coherent visual identity:** Graphic designers can develop and implement a set design elements, such as logo, color palette, typography and other graphic elements, that reflect the organization's identity and values. A cohesive visual identity can reinforce brand recognition and create a strong and memorable impression on customers.
- **Marketing materials development:** Graphic designers can create attractive and effective marketing materials such as posters, brochures, catalogues, flyers and other promotional materials that grab the attention of customers and communicate the organization's key messages in a clear and engaging way.
- **Web design:** A well-crafted web design can enhance the user experience on your organization's website or online platforms and make it easier to navigate and interact with content. Graphic designers can create intuitive and attractive interfaces that provide a pleasant and efficient user experience.
- **Social media graphics:** In the digital age, social media graphics are essential attract audience attention and generate engagement. Graphic designers can create engaging and relevant images and videos for social media posts increase visibility and promote engagement.
- **Infographics and data visualizations:** Graphic designers can transform complex data and information into infographics and data visualizations that are easy to understand and interpret. This can make it easier to communicate and understand information, and make your organization's messages more accessible and appealing to your audience.
- **Working with clients:** Graphic designers can work closely with clients to understand their needs and objectives and develop customized and effective design solutions. Clear and effective communication with clients is crucial to ensure the delivery of products and services that satisfactorily meet their needs and expectations.

The professionals interviewed also gave details of a number of projects in which they have been involved were involved, where the interdisciplinary approach was essential:

1. A first example was a web design project on the development of an online educational portal for high school students. This project involved collaboration between graphic designers, web developers, education experts, psychologists and other relevant professionals to create a digital platform that provides an effective and engaging educational experience.

The stages in the realization of this project were:

a) **Understanding user needs:** The design team used projective thinking to gain a deep understanding of the needs and expectations of students, teachers and parents online education. This involved research, interviews and observations to identify key issues and opportunities.

b) **Defining the challenge:** Based on their understanding of user needs, the team was able to define the clear challenge for their project.
c) through brainstorming techniques and collaborative workshops, **ideas** for platform features, educational content, interaction functionalities, etc.
d) **Prototyping and testing:** Designers and developers created rapid prototypes of different elements of the platform and tested them with end-users to get feedback. This feedback was used to iterate and improve the prototypes before final deployment.
e) **Implementation and evaluation:** Once the prototypes were validated and improved, the team implemented and launched the platform. The team continued to monitor and evaluate platform performance and make adjustments based on user feedback and other relevant factors.

2. Another example was the creation of an integrated advertising campaign for the launch of a new food product. This project involved close collaboration between various departments such as marketing, advertising production, graphic design, product research and development and even sales and distribution teams. The professional interviewed gave a number of details on the stages he went through to realize the final product, namely:

a. conducting extensive research to understand consumer needs and preferences, market trends and competition. This research was crucial in guiding all aspects of the advertising campaign, from core messaging to distribution channels.
b. Teams from different departments participated in brainstorming sessions to generate creative and innovative ideas for the campaign. Design thinking methods were used, such as mapping customer experiences and creating characters or stories to better understand how the product could solve consumer problems or needs.
c. Campaign prototypes were created, including publicity materials, advertisements and other visual communication elements. These prototypes were then tested on a group of consumers to get feedback and make adjustments before the official launch.
d. The campaign was implemented across various channels and its performance was constantly monitored and evaluated. Data and feedback received was used to make real-time adjustments and ensure the campaign remained relevant and effective.

The professionals interviewed stated that, in their view, there are several strategies they use to stimulate innovation and creative thinking within the team working on their projects, namely:

1. **Regular brainstorming:** organizing regular team brainstorming sessions where members are encouraged to come up with new and unconventional ideas for web design projects. Here the atmosphere is open and non-judgmental and all ideas are welcome.

2. **Promoting diversity: the** team is made up members with different perspectives and experiences. They believe that diversity within the team can stimulate creativity and bring in new ideas and approaches.

3. **Create an open environment for sharing ideas:** free and open communication within the team is encouraged so that members feel comfortable to share and explore new ideas without fear of criticism or rejection.

4. **Organize workshops and training sessions:** organize workshops and training sessions to explore new technologies, design trends and creative approaches in web design. This can stimulate lateral thinking and inspire team members to approach their projects with a broader perspective.

5. **Challenges and creative games:** running creative games within the team to stimulate innovation and lateral thinking. These activities are fun and challenging while providing opportunities to explore and experiment with new ideas.

6. **Reward and recognize innovation:** team members' innovative efforts and contributions are recognized and rewarded. This may be in the form of public recognition, bonuses or career advancement opportunities to encourage and motivate further creative thinking and innovation.

The interviewees felt that a design and innovation professional can gain a significant competitive advantage in today's market by possessing key skills and qualities such as:

1. **Creativity and innovative thinking:** The ability to generate new ideas and approach problems with a fresh and innovative perspective can differentiate a design and innovation professional. The ability to think outside the box and offer unconventional solutions can bring significant value in a competitive environment.
2. **Technical knowledge and practical skills:** Design professionals need to have a sound knowledge in the use of tools and technologies relevant to their field of work, as well as practical skills in applying this knowledge in practice.
3. **Collaboration skills:** The ability to work effectively in a team and to collaborate with members from different fields and disciplines can contribute to the success of a design and innovation professional. The ability to communicate effectively, listen and share ideas and perspectives can facilitate the process of developing and implementing innovative solutions.
4. **Understanding user needs:** An effective design and innovation professional must have a deep understanding of end-users' needs, preferences and behavior. The ability to put the user at the center of the design process and develop solutions that effectively address these needs can generate significant competitive advantages. The professional who is centered on the needs and experience of the end-user is at an advantage in the marketplace because they can create products and services that effectively and satisfactorily meet the needs and expectations of the end-user.
5. **Adaptability and flexibility:** In an ever-changing environment, the ability to adapt quickly to new technologies, trends and market requirements is crucial to the success of a design and innovation professional. Flexibility in approach and openness to continuous learning can help maintain a competitive advantage in the long term. Flexibility in approaching problems and adopting new technologies and methodologies can lead to innovation and excellence in

design.

6. **The ability to stay up to date with the latest trends and technologies**: essential for long-term success in design and innovation.

Overall, interviewees felt that having these qualities and skills can give a design and innovation professional a strong competitive advantage in today's market, enabling them to create innovative solutions and stand out in a competitive environment.

Interviewees felt that design thinking and graphic design have had a significant impact on entrepreneurial efforts in web design by facilitating the development of web products and services that effectively meet users' needs and expectations.

They also felt that, in the creative process, they take into account cultural and
to ensure they are socially responsible. Thus:

A. <u>before I started creating the design</u>:

- ❖ conducts extensive research to understand the target audience and the cultural and social context in which they are embedded: understanding the cultural values, aesthetic preferences and social sensitivities of the audience.
- ❖ encourage diversity and inclusion in their designs, avoiding stereotypes and negative or discriminatory portrayals of different social groups.
- ❖ include diverse perspectives and experiences in designs to reflect the world multicultural world we live in.
- ❖ promotes positive and inspirational messages that bring value and encourage a positive change in society.
- ❖ avoid content that could be offensive or contribute to the perpetuation of negative stereotypes.

B. <u>While creating designs</u>:

- ❖ consider their impact on the environment. They choose to use sustainable materials and production techniques, promote messages and initiatives that encourage environmental responsibility and protection in all aspects of their advertising campaigns.
- ❖ works with non-profit or social organizations to develop advertising campaigns that support important social causes and provide solutions to problems such as poverty, social injustice or the protection of human rights.

C. <u>After design creation:</u> monitor and analyze feedback to understand the impact of designs on audiences and society at large. This allows them to continuously make adjustments and improve practices to be more socially responsible.

B. QUESTIONNAIRES FOR VET

With regard to VET learners, the purpose of the applied questionnaire was to gather insights and feedback from VET and vocational learners that were essential in shaping the development of the project curriculum.

The questionnaires were administered to a sample of 62 pupils, who are enrolled in grades X - XII, in 3 VET schools in Bacău county, respectively:

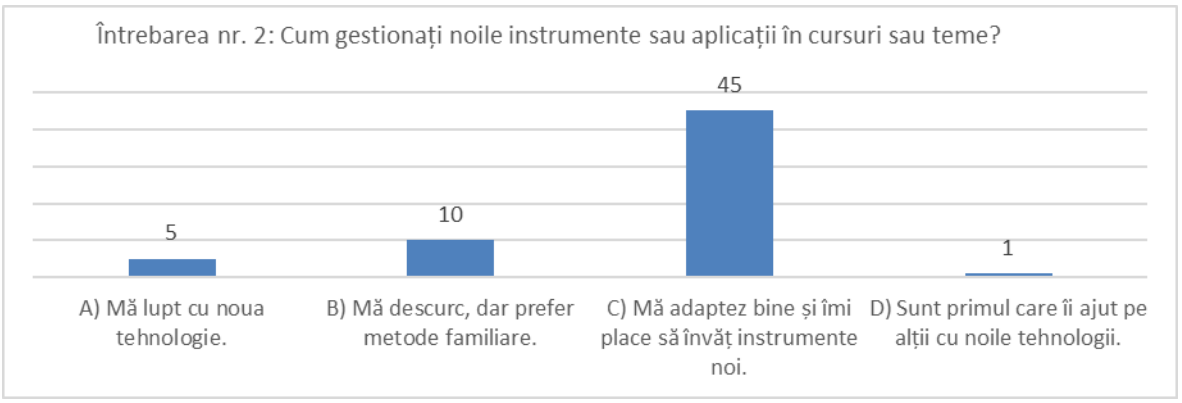
- Economic College "Ion Ghica" Bacău;
- Technical College "Dimitrie Ghica" Comănești;
- Technical College "Gheorghe Asachi" Onești.

Respondents are aged between 16 and 18 and come from both rural and rural areas urban.

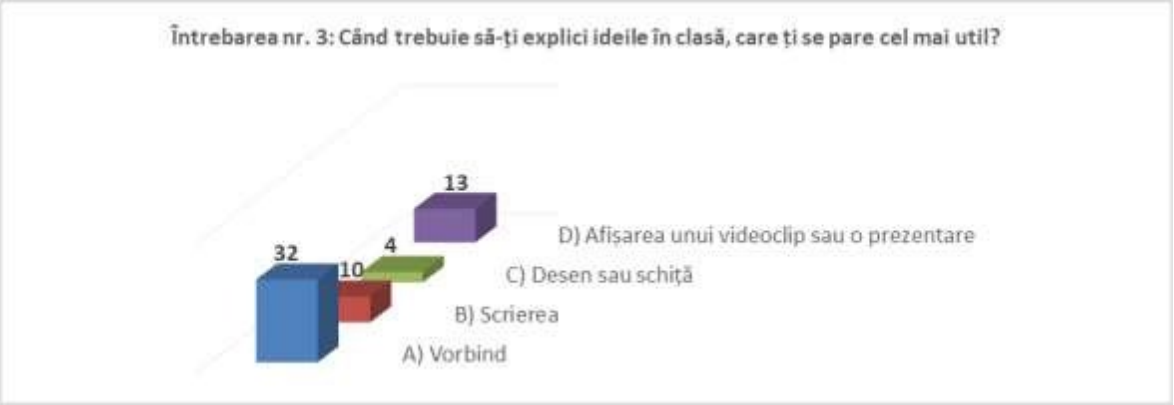
results of the questionnaire used in the research are presented below:

- 26 out of the 62 respondents (41.94%) prefer to ask for help from friends or teachers when faced with a difficult task or project at school, 38.71% of the respondents try different ideas, choosing the best one, and 11.29% try to apply things they have seen/learned previously

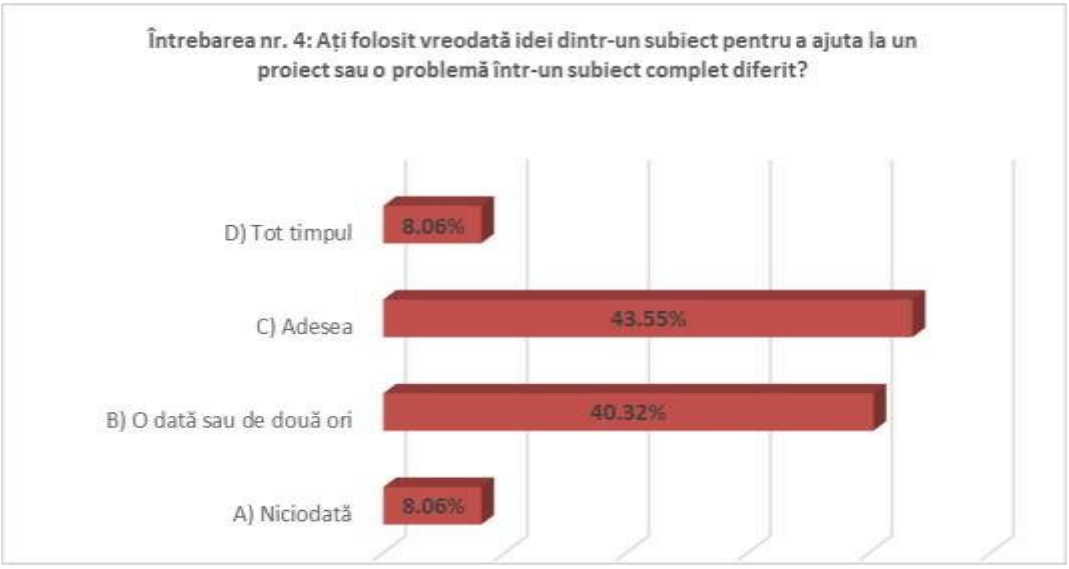
- 72.58% of the respondents (45 out of 59 students) adapt well and like learn new tools or applications in lessons or homework, 16.13% of the respondents cope but prefer familiar methods and 8.06% try to understand new technology



- 32 students out of the total of 62 respondents (51.62%) prefer oral discourse as a method when they have to explain/present their ideas in class, 10 students (16.13%) prefer writing as a method, 4 students (6.45%) chose drawing or sketching and only 13 students (20.97%) chose showing a video or presentation as a method



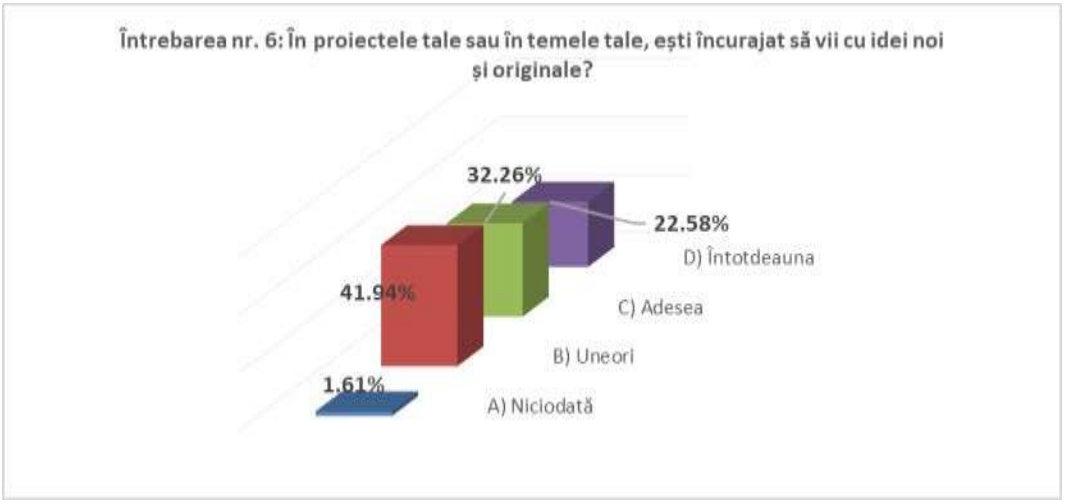
- 43.55% of the respondents (27 students out of 62 students) frequently use ideas from one topic to help with a project or problem in a completely different topic; a rather high percentage of the respondents, i.e. 40.32% (25 students) used ideas from one topic to help with a project or problem in a completely different topic quite rarely (once or twice), with only 8.06% of the students using this method always. It should be noted that 8.06% of students surveyed never used this method



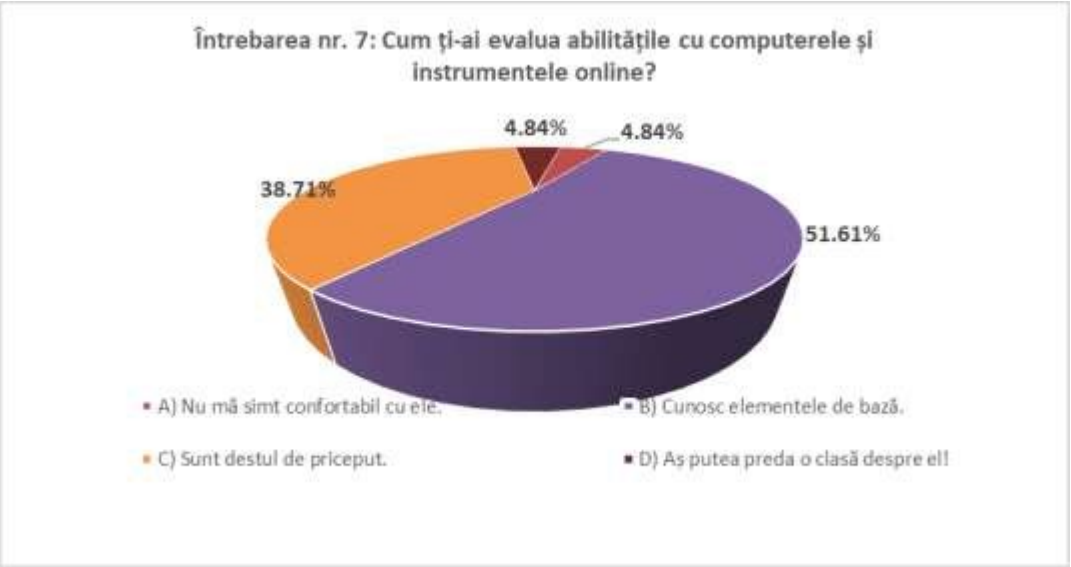
- when working on a group project, for 51% of the respondents (32 out of 62 students), the main objective is to think about what those who will use project would want or need, 26% (16 students)think quite a bit, 21% a little and 2%

at all.

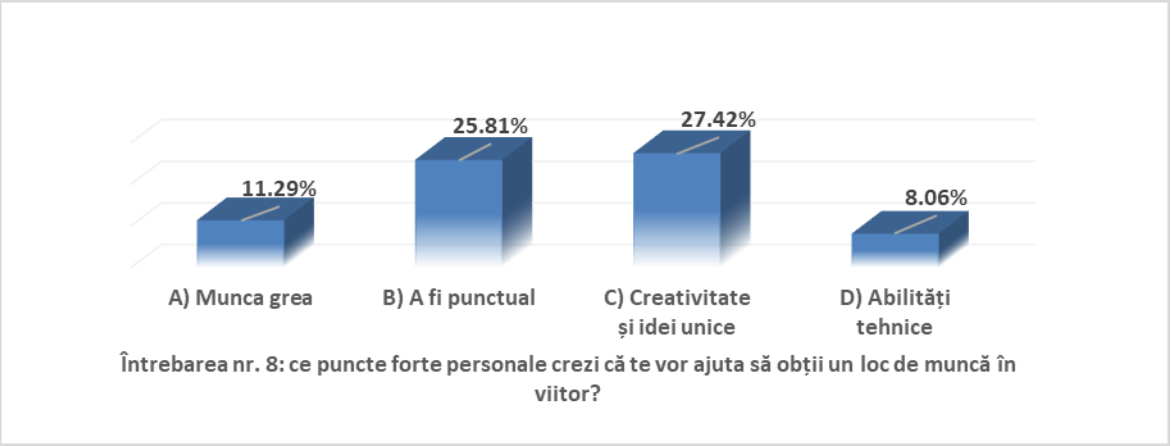
- 32.26% of the students surveyed are often encouraged to come up with new and original ideas, while 41.94% of the students surveyed are encouraged less often and 1.61% not at all.



- More than half of the respondents (51.61%) know the basics of working with computers and online tools, 4.84% consider themselves to be extremely proficient, 38.71% consider themselves to be fairly proficient and 3 out of 62 (4.84%) students do not consider themselves to be proficient in this respect.

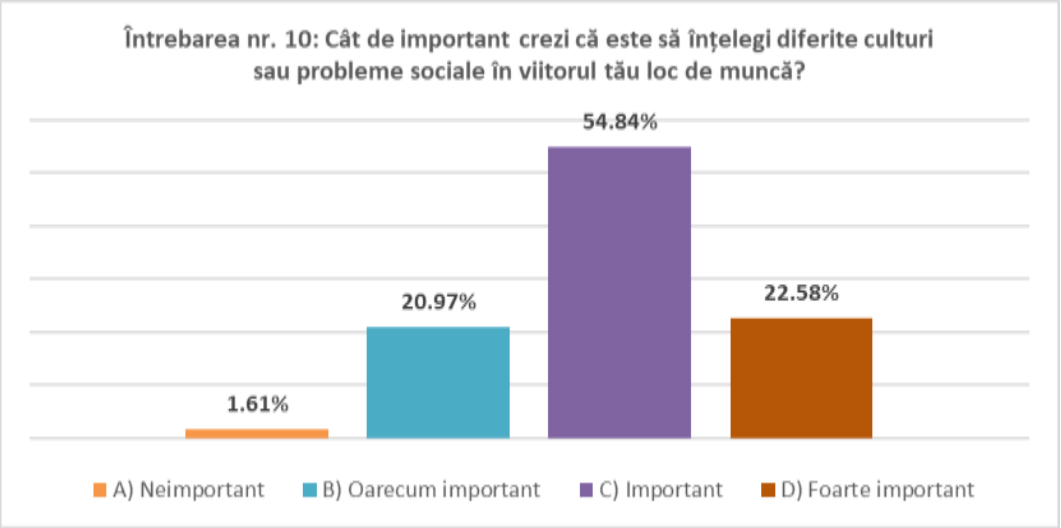


- in terms of personal strengths that could help them get a job in the future, 11.29% (7 students) consider hard work, 25.81% (16 students) - punctuality, 27.42% (17 students) - creativity and originality, and 8.06% (5 students) - technical skills.



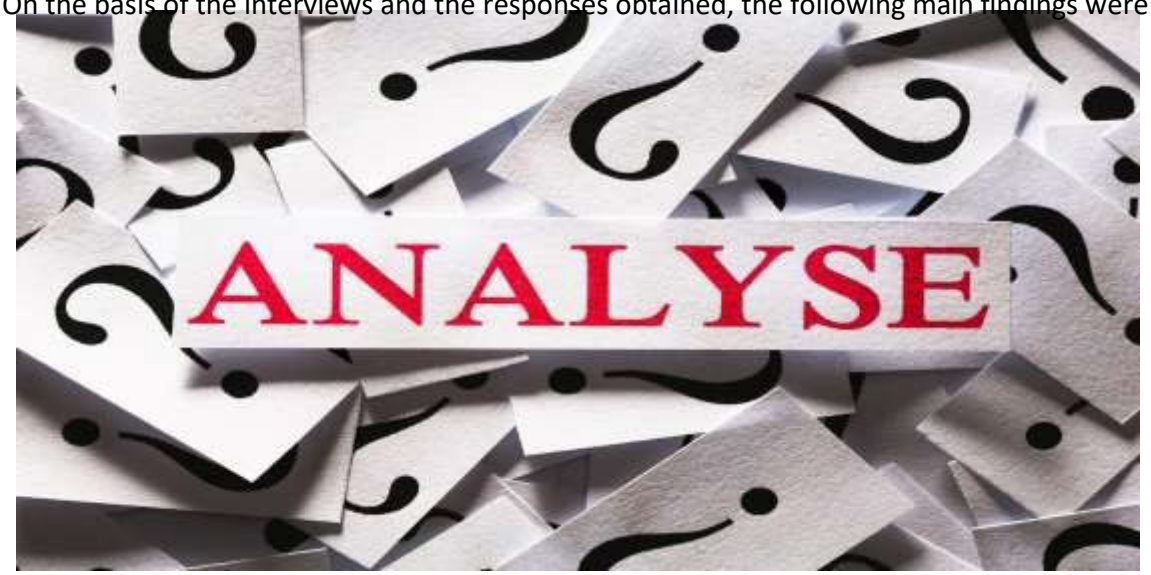
- Question 9 asked about entrepreneurship and the intentions of the students surveyed about starting a business or creating a product to sell. Student responses show that 30 students (48.39% of respondents) have this intention, 22 students (35.48%) are thinking about this option, while 6 students (9.68%) have no such ideas and 4.84% say they have already started planning. Pupils' answers basically confirm young people's entrepreneurial intentions.
- The last question focused on **cultural and social responsibilization -** taking into account the cultural and social context of products and services, which are important aspects for creating socially responsible and culturally sensitive solutions. Thus, students' answers highlighted that understanding different cultures or social issues

is important in the future job is important for 34 students out of the 62 respondents (54.84%), respectively very important for 14 students (22.58%); less important for 13 students (20.97%), while 1.61% of the respondents do not consider this aspect as important.



NEEDS ANALYSIS - CONCLUSIONS

On the basis of the interviews and the responses obtained, the following main findings were identified:



1. **Integrating design thinking into the curriculum**: Teachers use various strategies to integrate design thinking, such as creating dedicated modules, interdisciplinary projects, and extracurricular activities.
Example: a teacher at the Economic College "Ion Ghica" Bacău proposed the creation of a module dedicated to design thinking, its incorporation into subjects such as economics and marketing and the organization of design clubs and innovation competitions.

2. **Adapting to technological advances**: the curriculum includes components such as computerized image processing to develop technical skills
Example: A professor at an art college emphasized the introduction of computer imaging in vocational high schools, where students learn to use graphic design programs and create hands-on projects such as posters and business cards.

3. **Focus on visual communication skills**: the current curriculum includes courses on visual arts, use of design software and projects involving visual artifacts.
Example: Teachers emphasized the importance of visual arts and graphics courses, where students learn design principles and use software such as Adobe Photoshop and Adobe Photoshop.
Illustrator.

4. **Encouraging interdisciplinary approaches**: Teachers encourage students to apply design thinking across different subjects, promoting an interdisciplinary approach.
Example: Teachers encourage communication between different subjects and encourage students to make connections between the arts and other subjects such as biology, chemistry or physics.

5. **User-Centered Design Methods**: Hands-on assignments and customized homework are used to teach the importance of user-centered design.
Example: Teachers frequently use brainstorming, experiments and role-plays to develop students' empathy and their ability to understand their audience.

6. **Promoting innovation and creative thinking**: Innovation is promoted through various projects, competitions and the use of graphic design in revision lessons.
Example: Teachers organize graphic design competitions and field trips to encourage students to apply their creativity and design skills in different contexts.

7. **Developing digital skills**: The curriculum includes digital tools and technologies essential for modern design.
Example: students learn to use design software and tools such as 3D printers and augmented reality devices, preparing them for the digital age.

8. **Emphasis on entrepreneurial skills**: entrepreneurial skills are embedded in the curriculum through practical activities and exercise firms.
Example: Students work in exercise firms in grades 11 and 12, developing skills Entrepreneurship relevant to the artistic profile.

9. **Mainstreaming cultural and social contexts**: Projects take into account cultural and social contexts. to create responsible role models.
Example: Teachers use collaborative learning and students' cultural contexts to

organize activities that highlight the specificity of different areas

The needs analysis provided valuable information on the current situation of VET education in design thinking and graphic design. The findings highlight the need for a curriculum that:

- integrates design thinking methodologies and graphic design techniques.
- addresses identified gaps and aligns with contemporary industry practices.
- enhances the professional development of VET teachers and trainers.
- prepares students with the skills and competences needed for the dynamic labor.

By incorporating these perspectives into curriculum development, the DigitalCRAFT project aims to create a relevant, comprehensive and future-oriented educational program that meets the demands of the modern workplace and enhances the skills and competences of VET students in these creative fields.

Qualitative analysis of the results of the questionnaires administered to pupils revealed the following aspects:

- In school, students are very little encouraged to use their creativity and come up with new and original ideas;
- technical/ digital skills are underdeveloped, despite the digitization/ computerization trends in today's society;
- the knowledge students acquire is not transferable and applicable;

Integrating the principles of design thinking and graphic design into the VET curriculum could aim at developing the personality of students, training and developing both digital competences and the competences necessary for lifelong learning, integrating into a knowledge-based society. It is absolutely necessary to adapt the curriculum to society's expectations, pupils' needs and the traditions of the national school in order to make the transition from education for all to education for everyone, through pupil-centered learning.

Design thinking could be the tool for teachers to use to understand students' needs and provide them with the structure on which they can build their skills - at whatever level they are - and integrate their passions into their learning.

This is why teachers need:

- ❖ to teach students to use projective thinking when working on a creative project to develop empathy, as they should understand their audience or those they are designing for;
- ❖ try to develop their pupils' skills in understanding that it is important to be able to listen to others and understand their needs;
- ❖ be able to work creatively and nurture/develop pupils' creativity and mentality of doing;

- be able to plan, facilitate and evaluate this process to ensure that pupils learn and reach .

The specific tendencies and needs of students may vary according to the specific educational and cultural context. However, in general, there are some relevant issues to consider:

1. **ACCESS TO TECHNOLOGY AND DIGITAL RESOURCES**: Students need access to relevant technology and software to develop their skills. Thus, schools should be equipped appropriate IT equipment and software to allow these pupils to practice and express their creativity.
2. **QUALITY MATERIALS AND EQUIPMENT**: An essential part of learning involves working with quality materials and equipment. It is important that schools provide access to drawing tools, printers, paper and other materials needed to enable pupils to express their ideas creatively and develop practical skills.
3. **MENTORING AND CONSTRUCTIVE FEEDBACK**: Pupils need mentoring and constructive feedback to improve their skills and develop confidence in their own abilities. Teachers should provide support and encourage students to explore and develop their creativity.
4. **PRACTICAL EXPERIENCES AND RELEVANT PROJECTS**: Students need opportunities to work on practical and relevant projects. These may include working with local organizations to create marketing materials or graphic design for school or community events.
5. **FLEXIBILITY AND ADAPTABILITY IN THE LEARNING PROCESS**: Students should be encouraged to be flexible and adaptable in their learning. This may include exploring different techniques, approaches and technologies within their creative process.

In general, it is important that education is geared towards developing pupils' practical skills, creativity and critical thinking, providing them with opportunities to express their ideas and contribute to problem solving in innovative and effective ways.

Integrating design thinking methodologies and graphic design into the school curriculum can bring multiple benefits, helping students to develop essential problem-solving skills, creative thinking and innovation.

This could be a great way to develop creative, technical and communication skills.
communicate to students.

MODULE 3: PRINCIPLES AND METHODOLOGIES RELATED TO DESIGN THINKING AND ITS INTRODUCTION IN THE LEARNING PROCESS

3.1. THE CONCEPT OF DESIGN THINKING - AN APPROACH CENTERED ON INNOVATION AND PROBLEM SOLVING PROBLEM

3.1.1 WHAT IS DESIGN THINKING?

Design Thinking is a creative problem-solving methodology that emphasizes deeply understanding the needs of users (in an educational context, students), generating innovative ideas, prototyping and testing solutions. This process is based on user-centered thinking and involves exploring multiple solutions before arriving at an optimal solution.

Design Thinking is not just a set of steps, but also a **way of thinking** that promotes empathy, collaboration and continuous iteration to tackle complex challenges. Originating in industrial design and technology, this methodology has been adapted for a variety of fields, including education.

It represents a fundamental shift in the way we approach education, moving from a teacher-centered model of teaching to a student-centered model of active learning. By using this methodology, teachers can create innovative lessons that stimulate creativity, engagement and critical thinking, giving students a more relevant and engaging educational experience.

3.1.2. HISTORY:

The origins of the concept of Design Thinking can be traced back to the mid-twentieth century, although the concept and its applicability have evolved over the years.

The beginnings of design thinking lie in architecture and industrial design. In the 1950s and 1960s, theorists such as John Chris Jones and Christopher Alexander began to articulate design as a method or process. They recognized that design is not a purely aesthetic endeavor, but rather a problem-solving tool that can be applied across disciplines.

The term "Design Thinking" was coined in the late 1960s by Nobel laureate Herbert A. Simon, one of the pioneers of artificial intelligence and systems thinking, in his book **"The Sciences of the Artificial"** (1969). Simon proposed the idea of a "design science", in which design was presented as a process or way of thinking, constituting analysis, synthesis and evaluation. Thus the notions of **user-oriented design** and creative thinking in design began to take shape, with **Herbert A. Simon** exploring the idea of design as a problem-solving process, notably in his book. Simon argued that design could be structured as a cognitive process, similar to problem solving in science and engineering. "Everyone designs who devises courses of action aimed at changing existing situations into preferred ones.[1]" (Simon, 1969, p. 55).

In the late 1980s, Design Thinking began to be formalized as a methodology with the evolution of **industrial design thinking**. Personalities such as **Robert McKim** (professor at Stanford University) introduced notions of visual and creative thinking in design, influencing the development of the concept. In his book, **"Experiences in Visual Thinking" (1973)**, **Robert McKim** explores how visualization and visual thinking are essential to the creative process and problem solving. McKim argues that **visual thinking** is an important skill not just for designers, but for everyone involved in the processes of innovation and creation. He emphasizes the importance of **mental visualization** and **rapid sketching** as tools to explore ideas, communicate concepts and find effective solutions. McKim also emphasizes that **visual prototyping** helps to clarify abstract thoughts and test them before implementation[2].

In the early 1990s, Design Thinking as we know it today began to take shape, with design theorists such as Richard Buchanan expanding the application of design beyond simple products to include digital experiences, services and even strategies. Buchanan argued that design could be used to tackle 'hard problems' - complex problems without a clear solution - in a variety of domains.

The 1990s and 2000s saw the popularization and commercialization of the concept of "Design Thinking," thanks in large part to the design consultancy IDEO and Stanford University. **David Kelley**, the founder of the design consulting firm **IDEO**, and his team contributed significantly to popularizing and formalizing the concept of **Design Thinking**. Kelley saw that the creative processes used by designers could be applied to any kind of problem, not just in the design of

[1] "The Sciences of the Artificial", Herbert A. Simon, MIT Press, 1969, pg. 55
[2] Experiences in Visual Thinking, Robert H. McKim, Brooks/Cole Publishing Company, 1980

product. Under the influence of IDEO, Design Thinking has become a systematic, user-centered method that combines creativity and rationality to solve complex problems.

In the 2000s, the concept was strongly influenced by academia, in particular by the collaboration between **David Kelley** and **Terry Winograd**, a professor at Stanford University. They launched the **d.school** (Hasso Plattner Institute of Design) program at Stanford, with Design Thinking being taught as a method applicable in diverse fields, from business to education to health. The d.school program has played an important role in consolidating Design Thinking as a well-defined methodology, accessible not only to designers, but also to entrepreneurs, engineers and other professionals.

In the 2010s and beyond, Design Thinking has gained massive popularity and has been adopted by leading companies around the world, such as **Google**, **Apple**, **SAP**, but also by various non-profit organizations and governments. **Tim Brown**, CEO of IDEO, has been a major promoter of this approach and published the book **"Change by Design"** (2009), which brought the concept of Design Thinking to the global public's attention. Brown highlighted the importance of "people-centred innovation" and how creative thinking can transform organizations.

Design Thinking is now a widely recognized and adopted methodology, not only in the design professions, but also in business, education, health and many other fields. Its basic phases - Empathy, Define, Ideate, Prototype and Test - form a framework for understanding user needs, challenging assumptions, redefining problems and creating innovative solutions. Today, design thinking continues to evolve and adapt to a complex, rapidly changing world, integrating with new approaches and technologies as it helps navigate and address the multifaceted challenges of the 21st century.

"The current scientific literature perceives design thinking as being very closely related to the new concept of creativity, so that we often find a systematic and synonymous association of the terms (Brown, 2008). From the above presentation it can be seen that the approach is very close to the creative one and the phases of the creative process, the emphasis being placed not on generating new, but on solving problems through new, novel answers, adapted to the present (...)"[3].

In the words of Tim Brown - IDEO, "Design Thinking is a human-centered approach to innovation that relies on the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success."[4]

3.1.3. RELEVANCE OF DESIGN THINKING PRINCIPLES IN

Design Thinking brings a paradigm shift in education, focusing on creative and personalized solutions that respond to the real needs of students. Instead of relying on traditional teaching, where the teacher is the "knowledge owner" and students are passive recipients, design thinking promotes active, collaborative learning that transforms teaching and learning into a dynamic, collaborative and learner-centered process, facilitating engagement, creativity and the development of critical thinking.

[3] Enciclopedia of teaching methods, 2nd edition, Ion-Ovidiu Pânișoară (coordinator), POLIROM Publishing House, 2024, pg. 115 - 116
[4] Design Thinking toolbook, Eli Woolery

Through this method, teachers can continuously improve lessons, responding to the unique needs of each student and stimulating creativity and critical thinking. Pupils become active participants in their own education, working together to find innovative solutions to the challenges around them, better preparing them for real-life challenges.

The importance of the design thinking methodology for education can be approached from several practical perspectives, applicable in schools to enhance the learning experience students and to support teachers in their role as guides and facilitators. Thus, this method contributes to a more dynamic, adaptable and relevant learning process by:

1. Stimulating critical and creative thinking

One of the great benefits of **Design Thinking** is that it stimulates critical and creative thinking in both students and teachers. Instead of relying solely on memorization and reproduction, students are encouraged to identify problems, come up with solutions and think innovatively. The methodology enables them to think critically, collaborate, be creative and come up with innovative solutions to real problems. Through this process, students not only memorize information, but also apply it in practical contexts, developing essential life skills such as problem solving and teamwork.

So instead of being passive recipients of knowledge, Design Thinking actively involves students in the learning process.

Practical application:

- **Ideate Stage (Idea Generation):** Teachers can turn a passive lesson into an active learning process by challenging students to find solutions to real-world problems. For example, instead of teaching environmental concepts by simply presenting a text about climate change, the teacher can challenge students to come up with ideas for reducing their school's environmental footprint.
- **Concrete example:** In a biology project, students are challenged to create solutions for recycling school waste. Each team generates ideas, then creates prototypes using recyclable materials, which they test in a pilot project at school. This approach promotes critical thinking and collaboration, encouraging students to apply scientific concepts in practice.

Benefits:

- **Promoting divergent thinking:** students are encouraged to generate as many ideas as possible and explore solutions from different perspectives, which stimulates divergent thinking and creativity.
- **Real-life problem solving:** Design Thinking takes learning beyond theory and focuses on solving concrete, real-life problems. Students learn not only to understand concepts but also to apply them in practical contexts.

Example: In a STEM project, students are challenged to come up with solutions to reduce consumption

energy in school. Through Design Thinking, they prototype solutions, such as installing miniature solar panels or creating an energy-saving system. This process develops their ability to think critically and approach complex problems from an innovative perspective.

2. Active and collaborative learning

One of the biggest benefits of **Design Thinking** is that it encourages creativity and out-of-the-box thinking in both teachers and students. Teachers are encouraged to come up with innovative teaching solutions, and students are stimulated to explore new ideas, not to be afraid of mistakes and to experiment.

Design Thinking encourages collaboration not only between students but also between students and teachers. The process involves open discussion, exchanging ideas and working in teams to find solutions to problems. This collaboration builds a more dynamic learning environment and involves more participants in creating lessons. Collaborative learning also helps students develop leadership, communication and teamwork skills.

Benefits:

- **Active involvement:** Instead of listening to passive lessons, students are directly involved in the learning process, contributing to the creation of solutions and educational materials.
- **Prototyping creative solutions:** Teachers can create opportunities for students to come up with innovative solutions to the problems around them. Students can create prototypes that represent concrete solutions and can experiment with different approaches without fear of failure, since prototypes are meant to be tested and improved.
- **Collaboration through prototyping:** Teachers can implement collaborative projects where teams of students work together to create real solutions. Instead of a traditional approach, the teacher becomes a guide facilitating discussions and guiding teams to success.
- **Developing collaborative skills:** Students work together to solve problems and generate solutions, which develops their essential skills of collaboration, negotiation and collective thinking.

Example:

a. In a literature project, students are divided into groups and asked to create an interactive presentation of a literary work. Each team uses Design Thinking techniques to develop ideas on how to present the book in an engaging way, working together to develop a play or video that illustrates the essence of the literary work.
b. In a history project, students are divided into teams to recreate an interactive timeline using digital applications. Each team researches and adds important events in a Timeline app, working together to

create a coherent visual image of a historical period. This not only enhances their knowledge of history, but also their collaborative skills and use of technology.

c. In STEM education project, students are challenged to design a device to reduce energy consumption at school. After a brainstorming session, students build prototypes from materials available in the science lab, and their solutions are tested and improved through feedback. This promotes a culture of innovation, where every student can put their ideas into practice

3. Continuous improvement through feedback and iteration

Design Thinking encourages an **iterative** process in which solutions are continuously tested, refined and improved. This cycle of testing and improvement is essential to the development of effective solutions in education, as it allows teachers and students to make adjustments along the way, based on feedback and results. Students learn that mistakes are part of the learning process and that every prototype or solution can be improved.

Practical application:

- **Testing and feedback:** Teachers can implement pilot lessons, using prototypes of new lessons, and ask for feedback from students to adjust methods. Rather than using a single teaching method without knowing if it is effective for all students, teachers can constantly adjust teaching materials to make them more effective.

Benefits:

- **Learning from mistakes:** students learn to test solutions, receive feedback and continuously improve what they create, developing a lifelong learning mindset.
- **Adaptability:** Teachers can adjust teaching methods and resources according to the results, ensuring that lessons become increasingly effective.

Example:

a. A teacher tests a new educational game in which students have to solve math equations. After testing the game in a pilot class, the teacher collects feedback from the students and realizes that some students need more explanation beforehand. The teacher adjusts the game to include more preparation exercises, thus refining the educational solution.

b. **Concrete example:** After implementing a new interactive teaching method in a physics lesson, the teacher collects feedback from the students and notices that some do not understand certain concepts. Based on this feedback, the teacher adjusts the teaching method and adds more visuals and additional explanations, thus improving the overall understanding of the concepts by all students.

4. Increasing student engagement and motivation

Design Thinking turns students from passive recipients into active participants in the process

educational. Whether we are talking about participating in group discussions, generating ideas or testing solutions, students are much more engaged and motivated they feel that they have an active role in the learning process. This helps to increase pupils' **intrinsic motivation** and helps them develop a **positive attitude towards learning**.

Design Thinking is essentially a user-centered approach, which in education means that the teaching process and solutions are tailored to the needs and experiences of the students. This methodology encourages teachers to empathize with students, understand their challenges and develop personalized solutions to enhance the learning experience. It shifts the focus from a "one-size-fits-all" approach (the same lesson for all students) to a personalized one, where lessons are tailored to meet students' different needs, interests and learning styles.

Benefits:

- **Active participation:** students are encouraged to contribute to generating ideas and testing solutions, which increases their involvement in learning activities.
- **Adaptation to diverse needs:** Every student learns differently, and through Design Thinking, teachers can adjust instructional methods and resources to meet the needs of each student or group of students. With Design Thinking, teachers begin their process by deeply understanding students' needs. Rather than teaching the same content in the same way to everyone, the teacher can organize interviews, discussions, or observations to understand what challenges and interests students have. For example, in a classroom where students struggle with abstract math, a teacher may discover that some students learn better through hands-on applications or educational games.
- **Increased motivation:** Being directly involved in the learning process makes students more motivated, as they feel that their opinions and ideas matter and are integrated into educational solutions. Personalized lessons are more engaging and relevant to learners, leading to increased motivation and participation.

Example:

a) In a science lesson, students are invited to generate ideas on how they can tackle an environmental problem in their community using the principles of Design Thinking. This approach students feel involved and see the connection between the lessons at school and their everyday life, increasing their motivation to learn.
b) In a history class, the teacher uses Design Thinking to understand what difficulties students have in learning historical events. Through interviews and observations, the teacher discovers that students are more receptive to visual learning and decides to create an interactive timeline that presents historical events in a visually appealing format.
c) The teacher discovers that one group of students is passionate about technology and another group prefers to learn visually. Following this empathization, the teacher creates two sets of activities to teach the same concept: an interactive coding game for the tech-savvy group and a set of visual infographics for those who prefer visuals. This

personalizes the learning process, ensuring that every student has the chance to understand concept in ways that suit them.

5. Adaptability of the method to different subjects and levels of education

Design Thinking is versatile and can be applied in any subject, from science to art, and for all age groups. Teachers can adapt this methodology to teach complex subjects, facilitate interdisciplinary projects and provide creative lessons that connect multiple subject areas.

Practical application:

- **Interdisciplinary projects:** Teachers can create projects involving Design Thinking to integrate different subjects. For example, an architecture project can combine math, science, and art by generating creative ideas, prototyping layouts, and testing student-created constructions.

Example: The art teacher works with the science teacher to create a project in which students use the principles of physics to build stable sculptures from recycled materials. Students use Design Thinking to create their models and test the stability and aesthetics of their designs.

6. Integrating technology and innovation in education

Design Thinking encourages the use of modern technologies and innovation in learning. Students can use digital tools to develop prototypes, visualize complex concepts or create innovative solutions. This approach integrates new technologies in meaningful ways, making lessons more engaging and relevant to the digital generation.

Benefits:

- **Use of technology:** Students can use digital tools (such as Canva, CapCut or augmented reality apps) to create prototypes and innovative solutions to enhance learning.
- **Preparing for the future:** Design Thinking helps students develop essential digital skills for the future, such as computational thinking, prototyping skills, and digital collaboration.

Example: In interdisciplinary science and technology project, students use 3D modeling software to create prototypes of sustainable structures. They develop virtual models of green buildings, applying concepts learned in science and technology classes, learning to integrate technology into their solutions.

7. Preparing for today's society and developing key competences

Design Thinking prepares students for today's society by giving them the opportunity to develop essential skills such as **problem-solving skills**, **collaboration**,

creativity and **critical thinking**. Students learn to approach challenges in a structured but creative way, developing skills that will be useful not only in their academic environment but also in their professional lives.

Benefits:

- **Developing skills for the future:** Through Design Thinking, students develop fundamental skills such as collaboration, problem solving, creativity and critical thinking, all of which are essential for success in their professional and personal lives.
- **Preparation for real life:** Students are prepared to tackle real-life problems and to think strategically and innovatively**.**

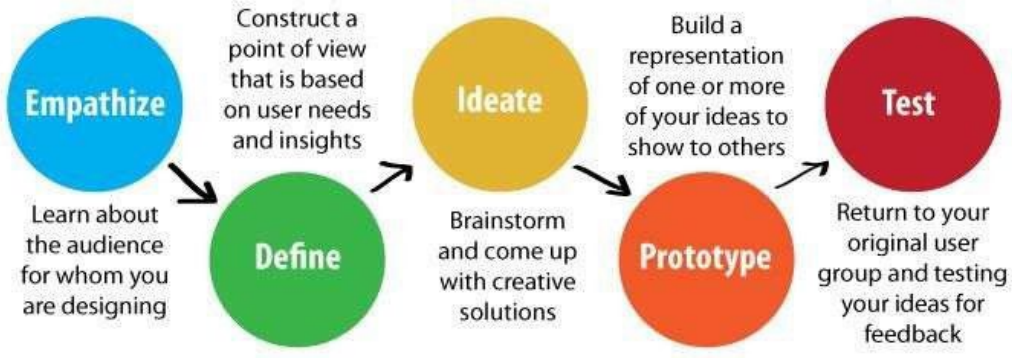
Example: In a final course project, students apply Design Thinking to create solutions to real problems in their community, such as reducing energy consumption or fighting pollution. This process prepares them for the challenges of the future, developing both academic and practical skills.

3.1.4. CONCLUSIONS

Design Thinking is a methodology that can transform education by providing a structured framework for innovation, collaboration and student-centered learning. The benefits of applying Design Thinking in education include increasing student engagement and motivation, fostering creativity and critical thinking, personalizing learning and developing essential life skills.

By actively involving students in identifying problems, generating solutions and testing them, Design Thinking fosters **active** and collaborative **learning**, preparing students for the complex challenges of the modern world. It also helps teachers to create more engaging and relevant lessons tailored to students' diverse needs.

3.2. THE STAGES OF DESIGN THINKING IN AN EDUCATIONAL CONTEXT



The Design Thinking process includes five main steps, which can be iteratively iterated through, providing the opportunity to adjust and improve solutions along the way.

Each stage has a key role to play in developing creative and effective solutions:

1. EMPATHIZE

EMPATHIZE is the first and perhaps the most important stage in the Design Thinking process, as it lays the foundation for all subsequent stages. In this phase, the teacher focuses on deeply understanding the needs, desires, problems and emotions of his/her students in order to create relevant and effective educational solutions.

This stage is based on empathy, which is the ability to put yourself in someone else's shoes and understand how that person feels. In education, empathy allows the teacher to better understand how students perceive the content being taught, what difficulties they have and how he or she might be able to offer solutions tailored to their learning style.

In education, empathy is essential :

1. **Students have different needs:** every student learns differently and may have specific challenges, either because of their personal background or the way they learn. Through empathy, the teacher can understand these individual needs**.**
2. **Create a positive learning environment:** When students feel that they are listened to and understood, it creates a positive learning climate where students are more open and motivated to participate.
3. **Enhances the teacher-student relationship:** Empathy strengthens the bond between teacher and student, making students feel respected and involved. This can lead to better collaboration and engagement in the classroom.

How do we apply the EMPATHIZE stage in education?

In education, **EMPATHIZE** involves activities and methods that help teachers to better understand students from their perspective. It involves gathering information about pupils not only through formal methods (tests and assessments), but also through more open and personal techniques that reveal their difficulties and aspirations.

1. Active observation

Observing students during class time is one of the key ways in which teachers can empathize with students. The observation should be active, with the teacher looking not only at academic performance, but also at students' behavior, how they interact, participate in activities or express frustrations.

Practical application: A teacher observes that a group of students is quiet and uninvolved when traditional face-to-face teaching methods are used. Instead, they become more active and curious when interactive methods such as educational games or debates are used.

Decision: The teacher empathizes with the students and deduces that they prefer a collaborative and interactive learning style. Based on this observation, future lessons are adapted to include more group activities and interactive games.

2. Direct interviews and discussions with students

Another effective way to empathize with students is to have open discussions with them. Interviews or face-to-face discussions allow the teacher to find out what motivates students, what makes them difficult and what kind of teaching methods they prefer**.**

Practical application: At the beginning of the school year, a teacher can organize individual interviews or group discussions with students to ask them how they prefer to learn and what subjects most interest them. They may also be asked what obstacles they encounter in learning and what methods would help them overcome these obstacles.

Example: In a literature class, the teacher learns from interviews that most students find compulsory reading boring. After asking in more detail why they have this perception, the teacher learns that students would like the literary texts to be more related to their daily lives or to be presented in a more interactive way, such as through movie projects, skits, or role-playing.

3. Creating student profiles

After collecting sufficient data, the teacher can create **student profiles** (user personas) that summarize key information about the different categories of students in the classroom. These profiles are summarized descriptions of the needs, challenges and characteristics of the pupils and help to tailor teaching methods to the specifics of each group.

Practical application: After observation and interviews, a teacher can create several student profiles. For example, a group of students who learn better through hands-on experiences could be described in a profile of 'hands-on learners', while another group of students who prefer visual learning could be categorized as 'visual learners'.

Example: A science teacher finds that he has three main types of students: those who prefer hands-on activities (experiments), those who learn best visually (through diagrams and videos) and those who prefer to read and reflect (theoretical students). On the basis of these profiles, the teacher varies the teaching methods to ensure that each group benefits from a method adapted to their learning style.

4. Feedback and reflection activities

Understanding students' needs can also be deepened through **regular feedback**. Teachers can ask for feedback from students after certain lessons or projects to understand what worked and what didn't. This process not only helps students to feel listened to, but also gives the teacher a clearer picture of the effectiveness of teaching methods.

Practical application: At the end of each week, the teacher can ask for anonymous feedback from the students about the lessons, asking them which activities they found useful and which parts of the lessons they found difficult or boring.

Example: After a lesson on physics, students give feedback and say that they had difficulties in understanding a certain theoretical concept, but understood it much better after participating in an experiment

demonstration. Based on this feedback, the teacher decides to add more practical examples and activities in future lessons to support active learning.

5. Needs assessment surveys and questionnaires

Surveys and questionnaires are quick and effective ways to collect data about student preferences and challenges. They can be used to get an overview of classroom needs and can help identify areas that need special attention.

Practical application: a teacher can distribute a simple questionnaire at the beginning of a new chapter to assess students' level of knowledge and their preferences in terms of learning styles (visual, auditory, kinesthetic, etc.).

Example: The teacher distributes a questionnaire in which students are asked to rate how well they understand certain concepts and to express their preferences in terms of teaching style (videos, presentations, hands-on activities). Following the survey, the teacher finds out that most students prefer to watch short videos explaining theoretical concepts and decides to use video resources more often in teaching.

CONCLUSIONS AND BENEFITS OF THE EMPATHIZE STAGE:

1. **Personalized learning:** Through a deep understanding of students' needs, teachers can adapt teaching methods and content to better respond to different learning styles.
2. **Increased engagement:** When students feel that teachers understand and respect their needs, they are more motivated to actively participate in class.
3. **Improving the teacher-student relationship:** Empathy creates a deeper connection between teacher and students, facilitating open communication and a collaborative learning environment.
4. **Creating effective solutions:** By properly understanding the challenges students face, teachers can come up with practical and creative solutions to remove these obstacles.

By actively using empathy in the , teachers become better equipped to create a learning environment in which all students have the chance to excel and feel engaged, supported and motivated.

2. DEFINE

After the Empathize stage, in which teachers have collected and analyzed information to understand students' needs, challenges, and emotions, comes the **DEFINE (PROBLEM DEFINITION)** stage. This is crucial because this is where all the data collected is synthesized in order to identify a clear, well-defined problem to be solved.

In education, this stage is essential in order to move from observing and understanding students' difficulties to formulating a precise educational challenge. The correctly defined problem will guide the whole creative process that follows and ensure that the proposed solutions are relevant and

efficient.

The importance of stage in education:

1. **Clarity in addressing the challenge:** By precisely defining an educational problem, teachers clarify their objectives and set a clear goal for next steps. Without a clearly defined problem, innovation efforts may be misdirected.
2. **Focus on students' needs:** This step helps teachers to ensure that the solutions they develop are centered on students' real needs, and not just on their perceptions as teachers. In this way, teachers avoid the risk of proposing solutions that, although interesting, do not address the real problems of pupils.
3. **Creating a common direction:** Defining the problem correctly also helps to coordinate the whole educational team (teachers, assistants, students) in the same direction, with a common goal well established.

How do we apply the DEFINE step in education?

Once information has been gathered through empathy (observations, interviews, feedback), teachers must organize and analyze this data to identify a common denominator of the problems students face. The problem is then defined in the form of a clearly stated **educational challenge** to be solved in the next steps of the process.

STEPS FOR IMPLEMENTING THE DEFINITION PHASE IN EDUCATION

1. Analysis and synthesis of the collected information

Once the data has been collected in the Empathize stage, the next step is to analyze and synthesize the data to reveal patterns and recurring problems. Teachers need to identify what the most common difficulties are and what is causing frustration or discouragement for students.

Practical application: After a teacher has discussed with students their perceptions of learning mathematics, he observes that many students find the lessons too abstract and don't understand how the concepts apply to everyday life.

Decision: The teacher gathers this data and realizes that the problem is not necessarily related to the students' lack of ability to understand mathematics, but rather that they do not see the practical usefulness of what they are learning. This step is essential to avoid misinterpretation of the problem.

2. Formulate a clear and concise problem

Once the challenges have been identified, they need to be reformulated into a clear problem that is concise and understandable to all involved. The problem should be defined in a way that reflects the needs and perspectives of the students.

The problem is often defined by a **question centered on the user** (in this case, the students), starting with "How could we...?" ("How might we...?".) This question provides an open framework for generating creative solutions without being restrictive.

Practical application: The teacher observes that students have difficulty understanding abstract math concepts. After analyzing the data collected, the problem is defined as follows: "How could we make math lessons more practical and relevant to students' everyday life?"

- **Benefit:** This open-ended formulation invites the generation of multiple solutions, all centered on students' need to connect mathematical concepts to their practical applicability.

3. Student-centered problem definition

The problem should always be framed from the perspective of the students, taking into account their needs and direct experiences. A teacher-centered problem might sound like this: "My students are not paying attention in math lessons." But a student-centered problem would be, "How can we turn math lessons into an experience that more actively engages students and piques their curiosity?"

Practical application: The teacher observes that students have maintaining their attention during history . Instead of defining the problem as related to student discipline, the teacher rephrases the problem as follows: "How could we make history lessons more interactive and engaging for students?"

Benefit: This learner-centered approach makes the solutions more tailored to learners' needs and learning styles, and teachers are guided to find ways to improve student engagement.

TECHNIQUES FOR EFFECTIVE PROBLEM FORMULATION IN EDUCATION

1. The question "How could we?" (How Might We)

The most widely used problem definition technique in Design Thinking is the question "How could we...?". This question creates a basis for creative exploration of solutions because it is open-ended, does not assume a single solution and encourages innovative thinking.

Examples of application in education:

- "How could we make compulsory reading more attractive to students?"
- "How could we integrate more hands-on activities into physics lessons to increase students' understanding?"
- "How could we use technology to make lessons more interactive?"

2. Defining the educational challenge (Problem Statement)

Another effective way to define the problem is by creating a concise Problem Statement. This should describe who the users (students) are, what their problem is and why it is important to solve it.

Practical application:

- **Example 1:** "Eighth graders are failing to understand the real-life applications of equations, leading to a decreased interest in math. How can we make equations more understandable and relevant to their everyday lives?"

- **Example 2:** "Primary school students have difficulty retaining historical concepts because current lessons rely too much on frontal teaching. How can we turn these lessons into a visual and interactive experience?"

THE BENEFITS OF GOOD PROBLEM DEFINITION IN EDUCATION

1. **Solution-oriented and relevant:** A clearly defined problem ensures that the solutions developed subsequently are relevant and respond to the real needs of the learners. Proper definition avoids the risk of implementing solutions that do not solve the underlying problem.

2. **It creates direction and coherence:** When the problem is well formulated, all subsequent actions (brainstorming, prototyping, testing) have a clear direction, which ensures coherence in the educational innovation process.

3. **Fostering collaboration:** A clear problem is easier to understand and discuss by all those involved in the educational process. Teachers, students and other actors in the school community can better collaborate to find innovative solutions.

4. **Adaptability and iteration:** A well-formulated problem is open-ended enough to allow multiple solutions to be tested and iterated if necessary. If new information or feedback is discovered, the problem can be refined and adapted along the way.

Example of application in education

Initial situation: In a primary school, science teacher observes that pupils have difficulty understanding the water cycle, an abstract concept. The students seem disengaged in the lesson and many of them fail to retain information from the textbook.

1. **Empathize:** The teacher conducts short interviews with students and notices that many of them don't understand how the water cycle relates to their daily lives. They think the lessons are too theoretical and they don't see how the process impacts their lives.

2. **Define:** Based on the information collected, the teacher formulates the question, "How could we make the lesson on the water cycle more interactive and relevant for students so that they understand the importance of this process in their daily lives?"

This well-formulated problem will guide the next steps, in which the teacher will develop solutions to transform the lesson into an interactive experience, perhaps through the use of digital applications, hands-on projects or visual experiments.

Conclusions:

The Define step in Design Thinking is critical to the success of the whole process, as it provides clarity and direction for the solutions to be developed. In education, defining problems correctly helps teachers to ensure that their lessons and methods are geared to the real needs of their students, leading to a stronger educational impact.

Using techniques such as "How could we...?" and clear problem statements, teachers can address educational challenges in a structured and innovative way, offering solutions

Personalized, tailored to meet students' diverse needs.

3. IDEATE (IDEA GENERATION)

Once information has been gathered about the students in the Empathize stage and the problem has been clearly defined in the Define stage, teachers move on to the **IDEATE (IDEA GENERATION**) stage. In this stage, the aim is to generate as many ideas as possible to solve the problem defined earlier. The Ideate process is a creative challenge in which teachers and students are encouraged to think freely, without limits, and explore innovative and unconventional solutions.

THE IMPORTANCE OF THE STAGE IN EDUCATION:

In education, the Ideate stage is crucial for:

1. Stimulating creativity: Teachers and students are encouraged to explore new and innovative solutions that could not be discovered by conventional methods. It's an opportunity to think "outside the box."
2. Engaging students in learning: Students become co-creators of educational solutions, which increases their motivation and involvement. Active participation in generating ideas develops their critical and creative thinking.
3. Exploring multiple options: Instead of being limited to one solution, the Ideate process allows teachers and students to explore multiple ways to solve the problem. This encourages openness to innovation and experimentation.

How do we apply the Ideate phase in education?

In education, the **Ideate** stage involves creating a framework in which ideas can be generated freely, without judgment or initial restrictions. Teachers can facilitate individual or group brainstorming sessions with students to come up with multiple solutions to the defined problem. The idea generation process involves several techniques and steps, and teachers need to create an open and safe environment for students so that they feel free to contribute without fear of making mistakes, respectively:

1. Creating the right environment for creativity

Before idea generation begins, teachers need to create an environment where students feel comfortable to participate and share ideas. It is essential to establish ground rules that encourage creativity and acceptance of all proposals, even the seemingly unconventional or 'impossible'.

Practical application: Before a brainstorming session, the teacher explains that there are no wrong ideas and that every contribution is valuable. The atmosphere is relaxed and open and students are encouraged to express their ideas without fear of judgment.

Example: A geography teacher who wants to make lessons on climate change more interactive invites students to share their ideas on how they could present the topic in an engaging way, without even rejecting ideas that seem too bold.

2. Brainstorming: generating as many ideas as possible

Brainstorming is one of the most effective idea generation techniques. It involves all the participants (teachers and/or students) coming up with as many ideas as possible in a short time. There are no bad or too crazy ideas at this stage as the aim is to explore as many options as possible before evaluating them.

Practical application: In a science class, the teacher identifies the problem that students have difficulty understanding the concept of renewable energy. In a brainstorming session, the teacher asks the students to come up ideas on how this topic could be taught in a more engaging and understandable way.

Brainstorming technique: 'Crazy 8s' - Students have 8 minutes to generate 8 ideas, each on a post-it. During this period, there is no discussion or criticism, just the quick generation of ideas.

Example: Students come up with ideas such as building simple models of solar panels out of recyclable materials, creating explanatory videos or even a competition between teams to build the most efficient miniature wind turbine.

3. Divergent and convergent thinking techniques

During the Ideate stage, teachers can use a combination of divergent and convergent thinking. Divergent thinking involves exploring as many ideas as possible, while convergent thinking involves narrowing down options and evaluating them to select the most viable solutions.

Practical application:

- **Divergent thinking:** In a literature class, the teacher asks students to come up with ideas to make the required reading more interesting. Students are encouraged to think of different ways to present the literary texts, such as drama, animated movies, interactive games, or comics.
- **Convergent thinking:** After having generated dozens of ideas, the teacher together with the students narrow down the list to 3-5 ideas that seem most feasible and interesting for most students. Thus, students may decide to organize a play inspired by a literary work and create a vlog about their reading experience.

TECHNIQUES AND ACTIVITIES FOR DEVISING APPLICABLE IN EDUCATION

1. How Might We...?" technique (How could we?)

This technique is extremely useful for stimulating creativity. Teachers or students ask questions like "How could we...?" to explore possible solutions to the problem identified. These questions open the discussion to multiple options rather than focusing on a single solution.

Practical application: After the problem has been defined in the previous step as "Students are not

motivated to read the required literary texts," the teacher could use questions such as "How could we...?" to generate ideas for solutions.

Examples of "How could we...?" questions:

- "How can we make literary reading more interesting and relevant to students' everyday lives?"
- "How could we integrate technology into the reading process?"
- "How could we turn the analysis of literary texts into a group activity more attractive?"

2. SCAMPER technique

SCAMPER is a creative brainstorming method based on using action verbs to stimulate thinking in new directions. SCAMPER is an acronym for:

- **Substitute**
- **Combine**
- **Adapt**
- **Modify**
- **Put to another use**
- **Eliminate**
- **Reverse**

Practical application: The teacher wants to improve a laboratory activity in which students create a model of an electrical circuit. Through the SCAMPER technique, students are encouraged to modify the activity or come up with new approaches**.**

Example:

- **Substitute: What other materials could we use for the circuit?**
- **Combine: How could we combine the activity with video presentation or competition?**
- **Adapt: How could we adapt the model to create a solution to a real problem in the community?**
- **Reverse : How would would work the circuit if we reverse the roles components?**

3. Role-playing

Role-playing is a useful method for students, especially when they are trying to find solutions to problems that require empathy or social involvement. Pupils can take on different roles (teacher, peer, parent) to imagine what it would be like to see a problem from other people's perspective.

Practical application: In a civic education lesson, students are invited to play different roles to understand how they could solve problems in their community (e.g. pollution). One pupil plays the role of an environmental activist, another plays the role of a civil servant, and another plays the role of a citizen who does not want to give up unhealthy habits.

- **Benefit:** Students practice empathy and critical thinking, coming up with innovative solutions from multiple perspective.

Example of application of the Ideate stage in education

Situation: A science teacher notices that his students have difficulty understanding the concept of recycling and the impact of pollution on the environment. Following the Empathize and Define stage, the problem is clear:

"How can we make recycling and pollution more relevant and understandable for students?"

1. **Brainstorming:** The teacher organizes a brainstorming session asking students to come up with ideas on how they could better learn about recycling. She encourages students to come up with unconventional ideas, such as using augmented reality apps, creating a vlog video about a plastic-free day, or workshops in which students build objects out of recycled materials.

2. **SCAMPER technique:** Students use the SCAMPER technique to think of new approaches in which they could integrate recycling into their everyday life. For example, students propose to organize an exhibition at school showcasing objects created from recycled materials, combining the lesson with an art activity and a competition for the most creative project.

3. **Role-playing:** Students play different roles (an environmental activist, a waste producer, an environmental officer from the municipality) and discuss from their perspective what solutions could help reduce pollution. This allows them to see the problem from different angles and better understand the importance of recycling.

Conclusions:

The Ideate stage is essential in the **Design Thinking** for Education process as it allows both teachers and students to explore creative and innovative solutions to educational problems. By creating an open environment in which ideas are valued and encouraged, teachers can stimulate students' creative thinking and actively involve them in the learning process.

Brainstorming, **"How could we...?"**, **SCAMPER** and **role-playing** techniques also help students develop essential skills such as collaboration, critical thinking and creativity, preparing them for complex real-life challenges.

4. PROTOTYPE

After a lot of innovative ideas have been generated in the Ideate stage, the next step in the Design Thinking process is the **PROTOTYPE** stage. This is the process of turning ideas into tangible solutions or preliminary models that can be tested. Prototyping is an essential phase of the innovation process, as it allows the proposed solutions to be tested in practice before large-scale implementation. In education, this stage involves creating educational materials, activities or resources that can be presented to students for feedback and improvement.

THE IMPORTANCE OF THE STAGE IN EDUCATION:

Prototyping is important in education for several reasons:

1. **Testing and refining ideas:** Not all ideas generated in the **Ideate** stage will work as originally conceived. Prototyping allows teachers to test solutions on a small scale, see what works and what doesn't, and make adjustments before final implementation.
2. **Learning from mistakes:** Through prototyping, teachers and students have the opportunity to make mistakes in a controlled environment. These mistakes provide valuable lessons, as they allow solutions to be adjusted and improved.
3. **Student involvement:** Prototyping gives students the chance to see the solutions they have contributed to come to life. It stimulates active involvement and gives them the opportunity to test and refine ideas in collaboration with teachers.
4. **Increased efficiency:** Teachers can experiment with new methods or educational activities without the risk of spending time and resources implementing a solution that may prove ineffective. Prototyping helps reduce uncertainty and risk through small-scale testing.

How do we apply prototyping in education?

In education, prototyping involves creating working models of educational solutions that are tested with students. These prototypes can take many forms, ranging from educational resources, practical projects, group activities to new teaching methods.

The prototyping stage in education can be divided into several essential steps:

1. Selecting ideas for prototyping

Not all ideas generated in the **Ideate** phase will be prototyped immediately. Teachers should select the most promising ideas that they consider feasible, relevant and have the potential to solve the problem defined above.

Practical application: A science teacher generated with students several ideas to make recycling lessons more engaging, including organizing hands-on workshops, creating an educational game or watching a documentary film.

Decision: the teacher and students select two ideas for prototyping: organizing a workshop in which students build objects out of recycled materials and developing a prototype of an educational game on recycling.

2. Quick and easy prototyping

Prototypes must be made quickly and efficiently, without consuming too many resources. At this stage, the aim is to turn the idea into a tangible form that can be tested, not to create a perfect final product.

Practical application: A math teacher wants to test a new method of teaching equations through an educational game. Instead of developing the full game from scratch, he creates a simple prototype using cards with equations and solutions, which students have to match correctly in a group game.

Example: In a recycling workshop, the teacher creates a quick prototype of an object from recycled materials (e.g. a pen holder made from cardboard boxes) and uses it to show a practical example to the students before they create their own projects.

3. Involving students in the prototyping process

Students should be actively involved in creating and testing prototypes. This gives them the opportunity to contribute their input to refining solutions and to understand the creative process behind the realization of an educational activity.

Practical application: In a literature lesson, students work in teams to develop a prototype of an interactive presentation of a literary work. Each team creates a prototype of a skit or video project based on the book studied. The teacher guides the students and helps them materialize their ideas. **Benefits:** Students not only use their creativity, but also learn to collaborate, test their ideas and get real-time feedback.

4. Testing prototypes

Once the prototypes have been created, they need to be tested in a real educational environment with students. Teachers observe how the prototype works in practice and collect feedback from students to identify what works well and what needs improvement.

Practical application: a history teacher tests a prototype of an educational "escape room" activity, in which students have to solve riddles and puzzles related to the Industrial Revolution in order to "escape" from the classroom. The activity is being tested with a small group of students to see how they react and whether they correctly understand the historical concepts included.

Example: In a STEM project, a teacher tests the prototype of a mini-project about building a bridge out of recycled materials. The students test the strength of the bridge they create and provide feedback about difficulties encountered and suggestions for improvement.

5. Collecting and analyzing feedback

After testing prototypes, teachers should collect feedback from students, observing both how they interact with the prototype and their direct comments. Feedback can be obtained through open discussions, questionnaires or direct observation.

Practical application: A computer science teacher tests a prototype mobile app created by students to help classmates organize their time. After testing, the teacher organizes a feedback session where students discuss which features were useful and what improvements they would make.

Example: In a chemistry lesson, the teacher tests a new teaching method using a prototype laboratory experiment. After the lesson, the teacher discusses with the students what worked well and what parts of the experiment were confusing or difficult in order to adjust the methodology.

6. Refining and improving prototypes

Based on feedback, teachers adjust and improve the prototypes. This is an essential step in the prototyping process, as it allows for successive iterations, improving the solution until it becomes optimal for implementation.

Practical application: After testing a math lesson using an interactive game prototype, the teacher receives feedback from students and discovers that the game was too complicated for some students. As a result, he decides to simplify the rules of the game and add additional examples to make the lesson more accessible to everyone.

Example: In an art class, the teacher tested a lesson on collage techniques. Students provide feedback about the difficulty of finding suitable materials, so the teacher adjusts the lesson to include more accessible resources and practical examples.

Types of prototypes applicable in education

1. **Physical prototypes:** Students or teachers create physical objects or educational materials. For example, students may create models or models that illustrate scientific or historical concepts (such as a model of a volcano, a bridge made from recycled materials, etc.).
2. **Digital prototypes:** These include applications or projects made using technology, such as educational games, interactive presentations or explainer videos. For example, a teacher can prototype a digital math lesson using an educational app created by students.
3. **Experimental prototypes:** These are learning activities that are tested directly in the classroom, such as new teaching methods, collaborative projects or group activities. For example, a teacher may prototype a new learning method based on discussion and debate to see how students react.

Example application of prototyping in education:

Situation: A biology teacher notices that his students have difficulty understanding the structure of cells and the functions of each part. Following the **Ideate** phase, it was decided to prototype an interactive group game in which students build models of cells out of simple materials (plasticine, paper, etc.).

1. **Prototyping:** The teacher creates a prototype of the game, where teams of students are given materials and instructions to build models of animal and plant cells.
2. **Prototype testing:** The game is tested in a pilot classroom, where teams of students compete to build correct cells and explain the functions of each part of the cell.
3. **Gathering feedback:** After the game, the teacher talks to the students to find out how they did, what they liked and what they found difficult.
4. **Refining:** Based on feedback, the teacher decides to add more explanations and visual examples to make the game instructions clearer. She also simplifies parts of the game to make it accessible to all students, including those with learning difficulties.

Conclusions:

Prototyping is crucial for implementing innovative solutions in education. By creating tangible prototypes, teachers can test and refine the ideas generated in the previous stages, ensuring that the proposed solutions are effective and well adapted to the needs of students.

Prototyping in education offers teachers and students a safe way to explore new ideas, make adjustments along the way and learn from mistakes. It stimulates creativity, collaboration and

innovation, transforming teaching and learning into a dynamic process, centered on the real needs of students.

5. TEST

The last stage of the Design Thinking process is **TESTING**. Once the ideas have been prototyped and implemented on a small scale, these solutions need to be tested in a real context to see how they work, how they are received by the learners and what adjustments are needed. The testing phase is essential to validate prototypes and refine them based on the feedback and observations collected. In education, testing solutions means checking their effectiveness in the teaching and learning process and adapting them to meet the real needs of students.

THE IMPORTANCE OF THE STAGE IN EDUCATION:

- **Validating solutions:** Testing allows teachers to find out whether the solutions and ideas developed through prototyping really work in the classroom. Not all innovative ideas prove effective on the first try, and testing helps them to be adjusted and improved.
- **Learning from feedback:** Direct feedback from students provides valuable insights into how they perceive and understand proposed solutions. This allows teachers to make adjustments based on students' needs and preferences.
- **Continuous improvement:** The testing phase ensures constant iteration of solutions, allowing teachers to make adjustments as solutions are applied until they become optimal.
- **Adaptability:** Solution testing helps teachers identify unexpected problems or barriers in implementing solutions. In this way, they can adapt methods or resources to better respond to students' different learning styles and levels of readiness.

How do we apply testing in education?

In education, testing involves implementing prototypes in the classroom and observing how they are used by students. During this stage, teachers monitor how the solutions affect the learning process, collect feedback from students and make adjustments to improve the learning experience.

STEPS FOR APPLYING TESTING IN EDUCATION

1. Implementing the prototype in real life

The first step in the testing phase is to implement the prototyped solutions in the classroom or in educational activities. It is important that the solutions are tested in as authentic an environment as possible in order to obtain relevant results.

Practical application:

- Situation:A biology teacher has prototyped a lesson on photosynthesis involving an educational game in which students simulate the process of photosynthesis using different visual and role-playing elements.
- Testing: the teacher implements this activity in a real classroom and observes how students interact with the game, how well they understand the process and how they respond to the new materials.

2. Observation and data collection

Observation is one of the most important components of testing. Teachers need to monitor how students interact with the solutions being tested: how they use the materials, how they engage in the activities, and how well they understand the concepts being taught. Observations can be supplemented with video recordings, notes on student behavior, and direct interactions with students.

Practical application: A history teacher tests an escape room activity in which students have to solve puzzles related to the Industrial Revolution. The teacher observes how each team solves the puzzles, what the difficulties are, and how active the students are in their teams.

Example: The teacher notices that some students quickly understand the historical puzzles, but others have difficulty with some key concepts. This observation allows the teacher to see where the gaps in understanding are and how she could improve the activity for all students.

3. Collect feedback directly from students

Another key aspect of testing is collecting feedback directly from students. This can be done through open discussions, anonymous questionnaires or informal interviews, in which students can provide valuable information about what they have learned, what difficulties they have encountered and what parts of the activity they liked or disliked.

Practical application: Having tested a new method of teaching linear equations through interactive games, the teacher organizes a discussion in which he or she asks the students to express their opinions about the activity: what they liked, what they didn't understand and what they would improve.

Example: Students say that the game helped them to better understand how to solve equations, but they found some sequences too fast. The teacher decides to extend the time allowed for parts of the game based on this feedback.

4. Evaluating the effectiveness of the prototype

In addition to direct feedback, teachers can evaluate the effectiveness of the prototype based on students' academic performance and how well they have assimilated the information. For example, summative or formative tests, final projects or student self-assessments can provide useful data about the impact of the solution.

Practical application: A teacher tests a new method of teaching physics concepts using augmented reality to visualize electromagnetic phenomena. After the lesson, the teacher uses a short quiz to assess how well students understand the concepts.

Example: The teacher finds that students who interacted with augmented reality performed better on the physics test than those who participated in traditional lessons. This shows that the tested method had a positive impact on learning.

5. Refining the solution based on the results

The testing stage is an iterative process, which means that the prototype is not always final after the first test. Teachers use the data and feedback to refine and improve the solutions. Adjustments may include modifications to materials, changes in teaching approach or adding new activities.

Practical application: A teacher tests an interdisciplinary project in which students use math and art to build geometric structures. After testing, the teacher observes that the art work is too complicated for some students and that they don't focus enough on the math.

Example: The teacher adjusts the project for the next round of testing, simplifying the artistic requirements and introducing practical examples to help students better understand the link between geometry and art.

6. Documenting and sharing results

Once the solutions have been tested and adjusted, teachers can document the results and share them with their colleagues or in educational communities. This allows other teachers to learn from their experiences and implement similar solutions, thus improving teaching across the board.

Practical application: A physical education teacher tested a series of educational games designed to encourage physical activity and increase student motivation. After testing, the teacher documents the positive results (increased pupil engagement) and shares details of the games and the feedback collected in a meeting with colleagues.

Example: The teacher writes an article for an educational publication or creates a presentation for a conference, describing how educational games have increased student engagement and the impact they have had on learning.

EXAMPLES OF APPLIED TESTING IN EDUCATION

Example 1: Testing a new method for teaching mathematical equations

1. **Prototype implementation:** the teacher introduces a method of teaching equations using an interactive game in which students have to solve equations to advance in the game.
2. **Observation:** The teacher observes that students are much more engaged than in traditional lessons, but some students still have difficulty understanding specific steps in solving equations.
3. **Feedback:** Students give feedback that they would like more practical examples before starting the game. Also, some students need more time to grasp the concept of an equation.

4. **Adjusting:** the teacher adjusts the method, adding more introductory exercises and giving students visual guides to facilitate understanding**.**

Example 2: Testing an interdisciplinary STEM project

1. **Prototype implementation:** the teacher introduces an interdisciplinary project in which students build miniature bridges out of recyclable materials and calculate their strength using mathematical formulas.
2. **Observation:** The teacher observes that the students are very engaged in the construction part, but have difficulty in applying the mathematical formulas to calculate the strength.
3. **Feedback:** Students say that they don't understand how to apply the formulas correctly and would prefer more guidance during the calculation part.
4. **Adjust:** The teacher adjusts the project, adding additional sessions to explain the math formulas and providing guided examples before beginning the construction project.

The Testing phase is essential in the **Design Thinking** for Education process, as it allows solutions to be validated and improved based on real feedback from students. By testing prototypes in real educational environments, teachers can observe what works and what does not, making the necessary adjustments to improve the effectiveness of teaching and learning.

Testing is not a one-off step, but an iterative process that involves continuous refinement of solutions. In addition, testing encourages collaboration between teachers and learners, giving the latter the opportunity to actively contribute to improving the learning experience.

3.3. APPLICATIONS OF DESIGN THINKING IN EDUCATION

Design Thinking is a flexible and innovative methodology that can be applied in education to improve both teaching and learning. It empathy, collaboration and creativity, providing a structured framework for generating solutions to complex problems and personalizing the educational experience. Design Thinking can be used in a variety of educational contexts, from lesson design, to managing school problems, to creating innovative solutions for student and teacher development, and can transform teaching approaches, relationships between teachers and students, and the development of practical and creative solutions.

Design Thinking has a wide range of applicability in education, from creating interactive and personalized lessons, to developing interdisciplinary projects, solving social problems in schools and integrating technology into teaching. This methodology offers a

structured framework for creatively addressing educational challenges, stimulating critical thinking, collaboration and innovation.

Using Design Thinking, teachers and students can create more relevant and effective solutions tailored to the specific needs of each individual. By applying this method, education becomes more dynamic, engaging and better prepares students for the complex challenges of the modern world.

1. Create interactive and personalized lessons

One of the most obvious applications of Design Thinking in education is the **design of lessons that are interactive** and tailored to the specific needs of students. Design Thinking helps teachers to put their students at the heart of the learning process, starting with empathizing with their needs and challenges and continuing with generating personalized educational solutions. Lessons can be designed to encourage students' active engagement, to stimulate their creativity and critical thinking, and to respond to their varied learning styles.

Practical example:

- **Designing a science lesson:** The teacher can apply Design Thinking to understand students' difficulties in learning complex concepts such as photosynthesis or the structure of the atom. After the **Empathize** stage, the teacher discovers that students need more visual resources and practical examples. So in the **Ideate** stage, the teacher generates ideas to make the lesson more interactive, such as using augmented reality or creating physical models of molecules. In the **Prototype** stage, she tests these solutions with students, collects feedback, and adjusts the lesson to make the concepts more accessible and understandable.
- **Interactive literature lesson:** In a literature lesson, the teacher can use Design Thinking to turn the analysis of a literary work into a collaborative activity. Students are involved in designing skits, video projects or role-playing games that reflect the themes and characters in the text. In this way, students not only read and memorize information, but use their creativity to understand and explore the content of the work in depth.

2. Problem-Based Learning (PBL) projects

Problem-Based Learning (PBL) is a student-centered teaching and learning method that involves exploring and solving complex, real-world problems as a means of developing cognitive, collaborative and practical skills. Design Thinking fits seamlessly into PBL as it provides a structured framework for creatively approaching problems from problem identification to solution implementation.

In PBL, learning is guided by a **central problem**, and students are encouraged to take active roles in finding and applying solutions, rather than passively receiving information from the teacher.

In PBL projects, students work together to define problems, generate solutions and test ideas, which develops both academic and social skills. This approach promotes active, hands-on learning rather than passive, theory-based learning.

Key features of PBL projects:

1. **The problem is the starting point for learning:** Instead of starting with theory or abstract concepts, the teacher presents a real, open-ended problem that requires investigation and solution. The problem is often complex and requires the integration of multiple knowledge and skills to find a solution.
2. **Active and collaborative learning:** Students often work in teams to analyze problems, formulate questions and propose solutions. In this way, they learn to collaborate, share ideas and argue their points of view.
3. **The role of the teacher is facilitator:** In PBL, the teacher does not provide direct solutions, but acts as a facilitator, guiding discussions, providing resources and supporting students in directing investigations. The teacher helps students structure their learning and develop critical thinking.
4. **Integrated learning:** the problems addressed in PBL are often interdisciplinary, which means that students have to integrate knowledge and skills from several domains (science, math, arts, etc.) to solve the problem.
5. **Developing problem-solving skills:** Students develop essential skills of critical thinking, analysis and creativity. They learn to identify key problems, collect relevant information, evaluate options and test solutions.

Stages of a PBL project:

1. **Problem definition:** The teacher introduces the problem, which should be realistic and relevant to the students. Students discuss to understand the problem in detail and to clearly define the objectives to be achieved.
2. **Generating ideas:** Students hypothesize and discuss possible solutions. At this stage, each team member contributes ideas and tries to analyze different perspectives on the problem.
3. **Investigation and information gathering:** Students investigate the problem, using a variety of resources (books, internet, experiments, interviews). They search for relevant information and try to better understand the causes and effects of the problem.
4. **Developing solutions:** After collecting data and evaluating them, students propose solutions and argue them. At this stage, prototyping, simulations or presentations can be used to test ideas.
5. **Presentation of solutions:** Each team presents its proposed solutions to colleagues or teachers. The presentation can take the form of a written report, an oral presentation or even a working prototype.
6. **Reflection and evaluation:** After presenting solutions, the teacher and peers provide constructive feedback. Students reflect on the learning process, the proposed solutions and teamwork to learn from the success or failure of their solutions.

Practical example:

- **STEM Project:** Students are challenged to develop a solution to reduce pollution in their school. In the **Empathize** phase, students investigate specific pollution issues by talking with peers, teachers, and custodial staff. In the **Define** phase, they identify the root source of the problem, such as excessive use of plastic or lack of an effective recycling system. In the **Ideate** phase, they generate ideas such as creating waste sorting system or organizing recycling workshops. Prototypes are tested and adjusted based on feedback from the school community.
- **Interdisciplinary geography and technology project:** Students can use Design Thinking to develop solutions to environmental problems, such as managing water resources in a water-scarce area. Students learn about the geography of the region and technologies that can be used to save water. In the end, students create working prototypes of solutions, such as automatic irrigation systems or water filters, which they test and improve based on the results.
- **Science project**: Students have to come up with solutions to the problem of pollution of a local water. They analyze the sources of pollution, study the effects on the environment and the community, and propose solutions reduce pollution, such as recycling programs or water cleaning technologies.
- **Interdisciplinary Project**: A problem that can combine mathematics and economics might be creating a sustainable financial plan for a local non-profit organization. Students investigate the organization's budget, financial resources, and propose strategies to raise funds and reduce costs.
- **Health project**: Pupils explore poor nutrition in schools. They collect data on the eating habits of their peers and propose a plan to improve menus, including nutrition education.

The benefits of PBL:

- **Stimulating critical thinking and creativity.**
- **Experiential learning and real-life problem solving.**
- **Developing collaboration, communication and teamwork skills.**
- **Integration knowledge interdisciplinary, providing o perspective holistic perspective on problems.**

Problem-Based Learning (PBL) projects provide a dynamic and applied framework for learning in which students are presented with real-life challenges and are challenged to develop critical thinking and problem-solving skills. PBL encourages autonomous learning, collaboration and the integration of diverse knowledge and skills in an effective and practical way, preparing students for real-life challenges.

3. Solving social problems at school

Design Thinking is an excellent methodology to address **social** or behavioral **problems** in schools, such as bullying, lack of student engagement or difficulties in team collaboration. Instead of taking punitive or conventional measures, teachers and counselors can

use Design Thinking to address these issues through an empathetic and collaborative approach.

Applying Design Thinking to tackle social problems in schools can bring about significant changes in the way challenges related to **bullying**, **social exclusion**, **absenteeism** or **cultural diversity** are tackled.

In this context, the **Empathize** process helps teachers to understand the students' perspective and identify the causes of problems, while the **Ideate** and **Prototype** stages are used to develop and test effective and innovative solutions.

Design Thinking steps for solving social problems in schools:

1. Empathize - Understanding social problems

The first stage of Design Thinking involves deeply understanding the perspectives and emotions of everyone involved. In the school context, this step involves:

- Observing social interactions between pupils and identifying areas of tension or conflict (such as bullying or excluding groups).
- Interviews with students, teachers and parents to get a full insight into causes of social problems.
- Anonymous questionnaires or open discussion sessions with pupils to understand how they feel and what difficulties they face in the social environment of the school.

Example: In a bullying situation, teachers can talk to victims, witnesses and perpetrators to understand the dynamics of the conflict and how to prevent such situations.

2. Define - Defining the social problem

After gathering the information, the next step is to formulate a clearly defined problem. This is a crucial step because the correct formulation of the problem will guide all subsequent steps. The problem statement should be oriented to the needs of the learners and accurately describe the social context.

Example of a defined problem: "How can we create a more inclusive environment for pupils in lower grades who face social exclusion due to cultural differences?"

3. Ideate - Generating innovative solutions

Once the problem has been defined, teachers, students and other members of the school community can participate in brainstorming sessions to generate innovative ideas and solutions. It is important that this process is open and collaborative so that all parties are involved.

Examples of potential solutions to social problems:

- Student-to-student mentoring programs: Upper grade students can become mentors to younger students, giving them emotional support and helping them better integrate into the community.
- Empathy workshops and activities: Creating interactive sessions to help students understand diversity and develop empathy and collaboration skills.

- Anti-bullying campaigns: visual projects, videos or student-led discussions to raise awareness of the negative impact of bullying and to promote mutual respect.

4. Prototype - Developing solutions

After identifying possible solutions, it is time to create prototypes to test the solutions in a practical way. Prototypes should not be final solutions, but simple versions of them that can be quickly applied in the school to observe the results.

Examples of prototypes:

- Piloting a mentoring program in a class or small group of students to see how they react to the concept of mentoring and integration.
- Create anti-bullying posters and leaflets and put them up in a corner of the school to see how pupils react to the messages.
- To run empathy workshops for a week, with practical activities (role-playing, role-play scenarios), to assess whether students are becoming more open to diversity**.**

5. Testing - Testing and adjusting solutions

The final stage involves testing the prototypes in school and collecting feedback from students and teachers. Depending on the reactions and results, solutions can be adjusted and improved.

Test example:

- Evaluating the effectiveness of the mentoring program: after a few weeks of implementation, teachers and student mentors can talk to the students involved to see if they feel more socially integrated.
- Feedback from empathy workshops: Students and teachers can provide anonymous feedback about how they perceived these sessions and what changes they noticed in their peers' behavior.

Practical example:

- **Combating bullying:** A school counselor can use Design Thinking to develop anti-bullying solutions. In the **Empathize** phase, the counselor conducts discussion sessions with students who have been affected by bullying and those who have participated in bullying to understand their experiences. After identifying the causes (such as the need for social recognition or the influence of peer groups), in the **Ideate** phase, the counsellor and the students generate ideas such as emotional education workshops, creating videos about empathy or setting up support clubs. These ideas are tested in the **Prototype** phase and adjusted based on feedback.
- **Creating a more collaborative school environment:** Teachers can apply Design Thinking to improve student collaboration. In the **Empathize** phase, teachers learn that many students have difficulty working as a team because of communication problems. In the **Define** phase, the problem is framed: "How can we improve communication and collaboration skills among students?". Proposed solutions may include group projects that require collaboration, role-plays to develop social skills or leadership workshops. Solutions are tested and successful activities are implemented on an ongoing basis.

Benefits of using Design Thinking to solve social problems in schools:

1. **Student centered:** Design Thinking emphasizes the real needs of students, which leads to customized, effective and applicable solutions.
2. **Creating an inclusive environment:** By involving students directly in the process of generating solutions, they become an active part of change, feeling more valued and responsible for building a positive environment.
3. **Iterative and flexible approach:** solutions are not rigid, but can be adjusted and refined based on feedback collected from students and teachers, allowing continuous adaptation**.**
4. **Developing social skills:** Students develop skills such as empathy, critical thinking, collaboration and problem-solving, which are essential in their personal and professional lives.

Using Design Thinking to solve social problems in schools enables the development of a more inclusive, creative and responsible learning environment. This process emphasizes a deep understanding of students' problems and the development of innovative and practical solutions that contribute to improving the school climate and reducing social conflict.

4. Developing digital and technical skills

Design Thinking can be successfully applied to **develop** students' **digital competences**, especially in today's context where technology plays a central role in education. Teachers can use this method to develop cross-curricular projects that combine technology with other subjects such as science, arts or mathematics.

Through its user-centered approach and creative problem solving, Design Thinking helps to **develop** the **critical thinking**, **digital skills** and **technical competencies** needed for success in an ever-changing digital society.

By using digital tools such as Canva, CapCut, 3D modeling or augmented reality applications, students develop both technical and creative skills.

How does Design Thinking contribute to the development of digital and technical skills?

1. Empathize - Understanding the needs of digital users

The first step in developing digital skills through Design Thinking is to understand the needs and challenges of those who will be using the technology. At this stage:

- Students or professionals are encouraged to identify what digital and technical knowledge they lack and what skills they want to develop.
- It collects feedback from users on the challenges they face in using technology, such as data security, efficient use of software or difficulties in navigating digital platforms**.**

Example: In a training program, teachers may learn that students have difficulties in managing online safety and protecting personal data. This becomes a solid basis for

define which competences need to be developed**.**

2. Define - Formulate a clear digital competence problem

Once the needs and challenges have been identified, it is important to define a clear problem that participants need to solve. This stage helps to focus attention on the most urgent digital and technical skills to be developed.

Example of a defined problem: "How can we help students to use the internet in a safe and secure way? efficiently while developing their skills in using collaborative digital platforms?"

3. Ideate - Generating solutions for skills development

At this stage, teams (students, teachers or trainers) work together to generate creative ideas and solutions to solve the defined problem. This can include different methods and techniques for developing digital and technical skills.

Examples of solutions:

- Digital literacy workshops, where participants learn how to use different platforms and technologies such as Google Drive, Microsoft Teams or Canva.
- Practical simulations to learn basic programming or use of technical software such as code editors (e.g. HTML, CSS).
- Collaborative projects, where students use digital platforms to work together and to improve their teamwork skills.

4. Prototype - Creating digital solutions and materials

After generating ideas, solutions are transformed into prototypes or working models that can be tested and used to develop digital and technical skills. This stage involves creating educational resources or interactive environments to support learning.

Examples of prototypes:

- Interactive online modules where participants learn how to use design software graphics or digital collaboration.
- Educational simulations and games that help users develop their programming skills or of using project management platforms.
- Prototypes of apps or websites created by students, where they learn to use digital technologies and apply them in a practical way.

5. Test - Evaluating and adjusting solutions

Once the prototypes are developed, the next step is to test the solutions and adjust them based on the feedback received. Through testing, the effectiveness of the solutions for developing digital and technical skills can be verified and necessary adjustments can be made to improve the learning process.

Test examples:

- Organize feedback sessions with participants to understand how they have applied the digital skills they have acquired and what challenges they have encountered.

- Assess the impact through practical tests, such as carrying out projects involving the use of digital technologies or creating simple applications.

The benefits of developing digital and technical skills through Design Thinking:

1. **User-centered approach:** Design Thinking focuses on the specific needs and abilities of each user, personalizing the learning process to match the digital needs of students and professionals.
2. **Developing practical skills:** the prototyping and testing methodology allows users to immediately apply their knowledge, learn from mistakes and adjust solutions based on feedback.
3. **Boosting creativity:** Design Thinking encourages creative and innovative thinking, helping participants to develop their technical skills in a more open and collaborative way.
4. **Integrating technology into real-life activities:** Through practical projects, users learn to use digital and technical tools in an applicable way, learning how to tackle real problems in different fields.

Practical example:

- **Creating digital content:** Arts or language teachers can use Design Thinking to develop projects in which students create digital content (presentations, videos, posters) related to the topics they are studying. For example, in a literature project, students can create animated videos using **CapCut**, illustrating key scenes from a book or presenting literary characters in a modern and attractive format.
- **STEM projects with 3D modeling:** In an interdisciplinary math and engineering project, students can use **3D modeling applications** to create prototypes of green buildings or complex geometric structures. By using Design Thinking, they develop design skills, test and adjust prototypes, learning through experimentation and collaboration.

Developing digital and technical skills through Design Thinking enables a creative and practical approach to learning, giving users the opportunity to improve their skills in a needs-centered and real-life way. By going through the steps of the Design Thinking methodology (Empathize, Define, Ideate, Prototype and Test), students and professionals can develop digital competences essential for their success in today's digital and technological environment.

5. Creating innovative learning spaces and teaching materials

Design Thinking can also be applied to **redesign learning spaces** and develop innovative learning materials that respond to the real needs of students and teachers, promoting a more engaging, adaptable and interactive learning environment. Teachers, together with students, can use Design Thinking to create interactive and flexible classrooms that support diverse learning styles and stimulate creativity. Teaching materials can also be prototyped and tested before large-scale implementation, ensuring they are relevant and effective.

Thus, Design Thinking Design Thinking helps to transform traditional and classrooms and resources.

making them more effective and student-centered.

Design Thinking steps for creating educational spaces and teaching materials innovative

1. Empathize - Understanding the needs of students and teachers

The first step in Design Thinking is empathy. At this stage, it is essential to understand the needs and challenges of those who will be using the educational spaces and learning materials, i.e. the students and teachers. This can be achieved by:

- Observing student behavior in classrooms to understand how they interact with the space and materials available.
- Interviews and questionnaires to collect feedback from pupils and teachers about what works well and what should be improved in the learning environment.
- Identify specific needs for different groups of pupils, including pupils with special needs, to ensure an inclusive learning environment.

Example: In a traditional classroom, some students may have difficulty concentrating or actively participating. Through observation and interviews, it may be discovered that the space is too rigid, does not allow for collaboration and does not encourage creativity.

2. Define - Defining issues related to educational space and teaching materials

After gathering information in the empathy stage, the next step is problem definition. In this phase, a clear problem statement should be formulated describing the key needs and current obstacles in the educational environment.

Example of a defined problem: "How can we create a flexible learning space and interactive teaching materials that support student collaboration and enable active learning?"

Clear problem definition will guide the development of creative solutions for spaces and teaching materials.

3. Ideate - Generating innovative ideas and solutions

At this stage, teachers, students and educational designers can collaborate to generate creative and innovative ideas. Brainstorming is essential to explore diverse solutions to meet defined needs.

Examples of solutions for innovative learning spaces:

- Flexible and modular furniture: benches and chairs that can be easily moved to allow the classroom to be reconfigured according to the type of activity (collaborative, individual, group).
- Interactive areas in the classroom: dedicated project corners, small labs or spaces where students can work on hands-on projects or hands-on activities.
- Integrated digital spaces: using interactive screens, tablets or augmented reality (AR) to provide an interactive and digitized environment that connects theoretical and practical learning.

Examples of solutions for innovative teaching materials:

- Digital teaching materials: interactive lessons, simulations and educational games, which can be accessed on mobile devices or computers, personalized according to the level of each student.
- Collaborative worksheets: Materials that encourage collaboration between students, such as group projects based on Design Thinking, where students have to solve real problems by applying concepts from different fields.
- Multisensory materials: resources that engage different senses (visual, auditory, tactile) to help students with different learning styles better understand concepts**.**

4. Prototype - Prototyping educational spaces and teaching materials

After generating ideas, it is time to create prototypes or working versions of the proposed solutions. Prototypes allow testing solutions in a simplified form to see how they work in reality.

Examples of prototypes for innovative learning spaces:

- Create a mini-lab for flexible learning in one part of the classroom, including modular furniture and collaborative workspaces.
- Setting up a digital corner, equipped with tablets and interactive devices, to test how students respond to technology-integrated lessons.

Examples of prototypes for teaching materials:

- Testing interactive worksheets that allow students to collaborate in small groups to solve problems.
- Developing digital simulations to illustrate complex scientific concepts, such as natural phenomena, in a virtual and interactive format**.**

5. Testing - Testing and adjusting prototypes

The testing phase involves implementing the prototypes in classrooms or learning activities and collecting feedback from students and teachers to see how the solutions work in practice. Based on the results, prototypes can be adjusted and improved.

Test examples:

- Monitor students while using a new flexible learning space to see if they change their behavior and become more engaged.
- Evaluating the effectiveness of digital or multi-sensory teaching materials through open discussion and questionnaires to find out which elements were most helpful in understanding the concepts.

Practical example:

- **Reconfiguring learning spaces:** Students and teachers can work together to design a more flexible and collaborative learning space. In the **Empathize** phase, teachers learn that students are not comfortable working at traditional desks, but would prefer to have more options for furniture arrangements depending on the type of activity (e.g., discussion circles or team tables). In the **Define** phase, they formulate the question, "How can we create a learning space that is flexible and encourages collaboration?" After

testing prototypes such as flexible furniture arrangements, these are adjusted in based on student feedback.

- **Personalized learning materials:** Teachers can use Design Thinking to develop learning materials tailored to the specific needs of their students. For example, in a math class, the teacher can prototype a series of **visual guides** to help students better understand abstract concepts such as equations or geometry. After testing the guides in class, the teacher collects feedback and adjusts the materials to make them clearer and more accessible.

The benefits of creating innovative learning spaces and teaching materials through Design Thinking:

1. Flexible and adaptable spaces: Design Thinking allows the creation of spaces that can quickly adapt to different educational needs, from individual learning to team collaboration, stimulating student engagement.
2. Personalized and interactive materials: learning materials created through Design Thinking are tailored to cater for varied learning styles and allow students to learn actively and interactively.
3. Improved learning experience: Students benefit from a more engaging and functional environment that promotes creativity, collaboration and hands-on learning.
4. User-centered approach: Design Thinking actively involves both teachers and students in the process of creating solutions, leading to the development of spaces and materials that truly reflect their needs and desires.

By applying the Design Thinking methodology, education can be transformed through the creation of innovative learning spaces and interactive learning materials that stimulate active student engagement and improve learning outcomes. The user-centered process ensures personalized and adaptable solutions that can be tested and adjusted according to the real needs of the educational community.

6. Teacher professional development

Design Thinking is not only useful for students but also for the **professional development of teachers**. They can use the methodology to improve their own pedagogical skills and to collaborate with colleagues to develop innovative teaching methods that better meet the needs of their students. Through Design Thinking, teachers can analyze and solve problems they face in the classroom, test new approaches and learn from their mistakes and successes.

This methodology helps teachers not only improve their teaching skills, but also become more flexible, adaptable and innovative in the classroom.

Stages of Design Thinking in teacher professional development

1. Empathize - Understanding teachers' professional needs

The first step in the Design Thinking process is Empathy. In this step, one must put

focus on understanding teachers' needs, challenges and professional goals. This assumes:

- Interviews and questionnaires with teachers to understand the difficulties they face in teaching and what improvements they would like to make.
- Observation during lessons to analyze the ways they interact with students, using technologies or implementing teaching methods.
- Create learning profiles for each teacher based on teaching style, subject area and level of experience.

Example: In a school, teachers may express a need to improve their digital skills as students increasingly demand the integration of technology into lessons. This becomes a starting point in the development process.

2. Define - Defining professional development challenges

At this stage, information from observations and interviews is synthesized to clearly define the challenges teachers face in their professional development. A clear problem statement will help focus on solutions that directly address these needs.

Example of a defined problem: "How can we help teachers to integrate digital technology into lessons in a way that improves interaction with students and facilitates active learning?"

This will help to identify the most relevant solutions and resources for the teachers involved.

3. Ideate - Generating creative solutions for lifelong learning

Once the challenge has been clearly defined, the brainstorming phase moves on to generate solutions to meet teachers' needs. In this phase, teachers, principals, mentors and other educational stakeholders can get involved in proposing innovative and practical solutions.

Examples of possible solutions for teachers' professional development:

- Practical workshops on the use of educational technology, such as digital platforms, interactive resources or distance learning applications.
- Mentoring between teachers: Teachers experienced in certain methods (e.g. technology-enhanced teaching) can become mentors for less experienced colleagues.
- Continuous training through microlearning: short and interactive programs that allow teachers to develop their skills in a short time, without interrupting their daily work.
- Interdisciplinary collaborative projects: Teachers can collaborate on interdisciplinary educational projects, learning from each other and developing new teaching methods.

4. Prototype - Developing prototype solutions

After generating ideas, prototypes or working versions of the proposed solutions are created. These prototypes are simplified solutions that can be tested in practice to see how they work.

Examples of prototypes for professional development:

- Creating an interactive online course for teachers, focusing on the use of digital technologies in

teaching.

- Organize a one-day pilot workshop where teachers can test new teaching methods by technology and get instant feedback.
- Mentoring programs: Launch a pilot mentoring program where teachers Experienced teachers guide their less tech-savvy colleagues**.**

5. Testing - Testing and adjusting proposed solutions

The last stage involves testing the prototypes in real learning environments, collecting feedback from teachers and fine-tuning the solutions. This allows training programs to be improved to make them more effective and better tailored to teachers' needs.

Test examples:

- Teachers who have participated in the training or mentoring workshops are invited to provide feedback on the effectiveness of the methods they have learned and to suggest improvements.
- Monitor the impact of the new skills acquired by teachers on their interaction with pupils and their teaching performance.

The benefits of Design Thinking for teachers' professional development:

1. **Teacher-centered approach:** Design Thinking involves teachers at every step of the process, ensuring that the proposed solutions truly meet the needs and challenges they face in their teaching.
2. **Personalized and interactive training:** teachers benefit from customized solutions tailored to their teaching style and areas of interest, instead of generic training solutions.
3. **Innovation and Collaboration:** Design Thinking encourages collaboration between teachers and stimulates creative thinking, leading to innovations in teaching and improving the educational experience for students.
4. **Flexibility and continuous adjustment:** The solutions developed through Design Thinking are flexible and can be adjusted based on constant feedback, which ensures continuous adaptation to teachers' changing needs.

Practical example:

- **Improving teaching methods:** Teachers can use Design Thinking to analyze teaching difficulties and come up innovative solutions. For example, a mathematics teacher can apply Design Thinking to improve his or her methods of teaching equations, testing different approaches (from educational games to teaching by example).
- **Collaborative projects between teachers:** Design Thinking can also be used in **professional development workshops** for teachers. They can work together to generate ideas and solutions to common problems they face in teaching, thus developing a culture of collaboration and innovation in schools.

Design Thinking teacher professional development offers an innovative and collaborative approach centered on the real needs of teachers. It enables teachers to improve their skills in a flexible, interactive and practice-oriented way, helping to transform the way they teach and increase educational performance. Through the use of empathy, creative thinking and continuous testing, teachers become better prepared for modern educational challenges.

MODULE 4: DIGITAL TOOLS FOR DESIGN AND COLLABORATION

This module aims to equip participants with practical skills in the effective use of digital tools essential to the process of design, planning and team collaboration in both educational and professional contexts. The module is centered on the exploration and application of technologies that facilitate creative thinking, interdisciplinary collaboration and project management, directly following the principles of Design Thinking methodology.

MODULE OBJECTIVES

1. **Develop skills to use essential digital tools for collaboration and design, such as project management, team collaboration and prototyping platforms.**
2. **Improve digital collaboration skills through the use of applications and software that enable remote teamwork, resource sharing and progress evaluation.**
3. **The application of Design Thinking methodology in the management of educational and collaborative projects, using technology to facilitate all stages of the creative process (empathy, definition, ideation, prototyping, testing).**

MODULE CONTENT

4.1.1. Introduction to digital design and collaboration tools

- **Google Drive: using this platform for sharing resources, collaborating real time and document management.**

4.1.2. Digital design through apps

- **Canva: Create visuals and prototypes for educational or design**
- **TimelineJS: creating and using timelines for educational projects and visual**
- **Cupcut: Creating and editing video content for educational and visual projects**

4.1.3. Creating interactive visual comparisons

- **Juxtapose: Create educational and collaborative projects, helping visualize changes and compare two images or scenarios in an interactive way.**

4.1.4. Real-time collaboration and feedback

- **Google Docs: Use this tool to facilitate ongoing team communication, real-time feedback and collaboration on shared documents.**

4.1.5. Applications for project submission and evaluation

- **PowerPoint: Use this tool to create interactive and engaging presentations highlighting the results of each project.**

4.1.1. INTRODUCTION TO DIGITAL DESIGN AND COLLABORATION TOOLS

- **Google Drive: using this platform for sharing resources, collaborating real time and document management.**

Google Drive is an important storage, sharing and collaboration tool. By using it, participants will be able to collaborate effectively and have constant access to the resources they need, facilitating learning and the creation of innovative educational materials.

Google Drive facilitates real-time collaboration between participants. In both hands-on modules and group projects, teachers can work together on the same document or project, sharing ideas and feedback in a secure and accessible environment.

Application examples:

- Participants can create collaborative educational posters and presentations in Google Drive, working simultaneously on the same document and giving each other real-time feedback.
- When creating an **educational project based on Design Thinking**, teachers can share prototypes and initial sketches in Google Drive, collecting comments and suggestions from colleagues.

Real-time evaluation and feedback:

Google Drive offers the possibility to add comments and feedback directly to documents, images, videos or presentations. This allows trainers to effectively evaluate the materials created by participants, offering suggestions for improvement or appreciation as projects evolve.

Instant feedback through Google Drive encourages collaborative learning and continuous improvement of educational projects.

Examples of using Google Drive in the curriculum:

1. **Canva module:**
   - Participants will create and save presentations, posters and infographics in Google Drive, giving colleagues access to collaborative feedback.
2. **Timeline module:**
   - Teachers can share created timelines and collaborate to improve them based on suggestions from colleagues or the trainer.
3. **CapCut module:**
   - The videos created and edited will be uploaded to Google Drive, allowing for easy sharing and evaluation by trainers and colleagues.

Benefits of using Google Drive in the context of this training program:

- **Accessibility:** Participants can access materials and resources from anywhere, eliminating physical and logistical barriers.
- **Effective collaboration:** integrated collaboration tools facilitate teamwork and exchange ideas in real time.
- **Organization:** All projects and materials are organized and stored centrally, facilitating management and access to resources.
- **Continuous feedback:** Evaluation and feedback can be provided directly on stored materials, encouraging continuous improvement.

4.1.2. DIGITAL DESIGN USING INNOVATIVE APPLICATIONS

- **Canva: Create visuals and prototypes for educational or design.**
- **TimelineJS: Creating and using timelines for educational projects and visual**
- **Cupcut: Creating and editing video content for educational and visual projects**

GENERAL OBJECTIVE:

This module has as its aim the development of teachers' competences in using **Canva**, **TimelineJS and Cupcut** platforms.

The module is structured to provide both basic knowledge and advanced design , enabling learners to develop creative skills essential in visual communication.

A. CANVA: CREATING VISUAL MATERIALS AND PROTOTYPES FOR EDUCATIONAL PROJECTS OR DE DESIGN

In this sub-module, participants will learn how to use Canva to create presentations, infographics, posters, social media content and other educational or professional visual materials that enhance the learning experience for students through visual design and interactive resources.

SPECIFIC OBJECTIVES:

1) **Familiarization with the basic and advanced Canva platform interface and functions** - participants will learn to navigate the Canva interface, understand the main functionalities and use the existing templates.
2) **Developing visual materials creation skills** - learners will learn to create posters, infographics, presentations and other visual materials, adapted for different educational or professional contexts.
3) **Customizing visual materials** - participants will learn how to customize Canva templates, incorporate brand elements and adapt materials for specific needs.
4) **Collaborate in Canva** - use the collaboration feature to create visuals in teams, facilitating feedback and improving projects.
5) **Integrating Canva into the Design Thinking process** - applying Design Thinking principles to generate innovative visual solutions and support team projects.

CANVA is a graphic design platform used for social graphics, presentations, posters, documents and other visual content. Although it is mainly used in marketing, to promote products, events, etc., it can become a valuable tool for teachers to create presentations that meet, to some extent, the high expectations of students: less text, dynamic, with quality images, sound and color.

The platform includes templates that users can use, grouped into several areas: presentations, social media, video, print, marketing, office. We can create free, simple and affordable everything from CVs, brochures, flyers, postcards, business cards, bookmarks, greeting cards, invitations, letters, to audio presentations, videos and lesson plans. The platform provides presentation or lesson templates, image library, music, video collection, but you can also upload your own materials. At the same time, you can also give others (students, colleagues) access to the materials you have created, the materials can be presented directly on the platform or can be downloaded in several formats: PNG, JPG, PDF, Mp4 videos, etc.

Website: https://www.canva.com/

Content:

1. Introduction to Canva

- **The Canva interface**: Overview of the interface and navigation through the main functionalities. Participants will learn how to create an account, access templates and manage projects.
- **Basic tools**: How to use the basic functions of the platform, such as images, shapes, text and other graphics. They will explore the Canva library, where they can find free and premium images, illustrations, icons and other graphic resources.
- **Templates and customization**: using predefined templates for different types of projects

(presentations, infographics, posters, brochures) and customize them to meet the specific needs of educational projects.

2. Visual design techniques in Canva

- **Infographic design**: How to create attractive and informative infographics that present complex data and information in an easy-to-understand and visually engaging way.
- **Creating presentations**: How to use Canva to create professional presentations that combine text, images and interactive elements, keeping your audience's attention and enhancing visual impact.
- **Posters and promotional materials**: How to create effective posters and visual promotional materials using design techniques to attract attention and communicate key messages.
- **Harmonizing design elements**: using color elements, fonts and formats visuals in a coherent and aesthetically pleasing way to create professional visuals.

3. Customizing visual materials

- **Incorporating visual identity and brand elements**: How to customize materials to an organization's or project's visual identity. This includes selecting color palettes, fonts, and graphic elements consistent with the brand.
- **Editing and adjusting visuals**: How to resize, adjust and customize visuals according to the specific needs of educational or professional projects.
- **Creating unique visuals**: How to create your own graphics or images from scratch, using Canva's advanced tools.

4. Collaboration in Canva

- **Collaborative editing**: How to collaborate with other team members in real time, using Canva's sharing feature to enable collaborative editing of projects.
- **Feedback and review**: How to use comments and notes in Canva to provide feedback to colleagues and improve visual projects collaboratively.
- **Managing teams and joint projects**: How to manage multiple projects within the team, assign specific tasks and monitor progress in Canva.

5. Export and publish your projects in Canva

- **Export formats**: how to export the created materials in different formats (PDF, PNG, JPG, MP4) and how to optimize the files for print or digital platforms (social media, websites, presentations).
- **Publishing online**: How to directly share your Canva-created materials on platforms social media, blogs or using the platform's direct sharing function.
- **Preparing for Print**: How to set up files for professional print use, including setting the correct margins and resolution sizes.

6. Integrating Canva in Design Thinking projects

- **Applying Canva in the visual prototyping process**: How to use Canva to create simple and attractive visual prototypes to present to colleagues or the public for testing and feedback.
- **Creating visuals for the ideation and testing phases**: how to use Canva

to generate innovative visual solutions in the ideation stage of Design Thinking and how to present them effectively in the testing process.

- **Documentation and visual presentation of projects**: how to use Canva to document each stage of Design Thinking projects and to create visual presentations that explain the final solutions.

Practical activities in the Canva module:

1. **Creating an educational infographic**: Participants will learn how to create an educational infographic on a topic relevant to their work, using data and information presented visually in an attractive and easy to understand way.
2. **Collaborative project in Canva**: Teams will collaborate to create a set of visuals (posters, infographics, presentations) for an educational or social project, working together in real time on the Canva platform.
3. **Presentation of a final project**: each team will present the materials developed in Canva, explaining how they have been integrated in the Design Thinking process and how they support the solutions developed.

SUBMODULE EVALUATION:

❖ Evaluation will be based on the materials created (poster, infographic, presentation) and participants will receive detailed feedback on the visual content, organization of information and effective use of multimedia elements.

NECESSARY RESOURCES:

- Laptops/tablets with internet access.
- User accounts on the Canva platform.
- Previously prepared materials to be turned into posters/infographics/presentations.

SKILLS acquired by completing the Canva sub-module:

- **Visual design skills**: participants will learn to create professional-quality visual materials using design techniques tailored to different educational and professional needs.
- **Digital collaboration skills**: learners will learn to collaborate effectively in a **digital** environment digital, using Canva to develop visual team projects.
- **Integrating visual thinking into educational and design processes**: learners will learn how to use visual design to effectively communicate solutions and ideas, both in educational projects and in other professional contexts.

B. TIMELINE: CREATING AND USING TIMELINES FOR EDUCATIONAL PROJECTS AND VIZUALE

The **Timeline submodule** aims to develop skills in creating and using timelines

timelines for educational, visual and collaborative projects.

Timelines are a powerful tool for the chronological organization of information and events, helping to clearly present evolutions, changes and time sequences, whether in educational, historical, social or design development.

This module provides participants with essential knowledge and skills for the use of lines time for teaching, managerial or creative purposes.

Website: https://timeline.knightlab.com/

TIMELINE SUBMODULE OBJECTIVES:

1. **Familiarization with timelines and their applications** - participants will learn what timelines are, what they are used for and how they can be integrated into educational and professional projects.
2. **Develop timeline creation skills** - participants will learn how to use various digital tools to create interactive and personalized timelines.
3. **Integrating timelines into the educational process** - participants will learn how to use timelines to structure complex lessons, presentations and educational projects, providing a clear and engaging chronological perspective.
4. **Using timelines in team and collaborative projects** - participants will explore how they can use timelines in collaborative activities to organize tasks and track progress within teams.

THE CONTENTS OF THE TIMELINE MODULE:

1. Introduction to timelines

- **What is a timeline**: An overview of the concept of a timeline, explaining how it organizes and visualizes events in chronological order, aiding in the sequential understanding of events or processes.
- **Educational and professional applications of timelines**: how timelines are used to present the evolution of a historical event, the unfolding of an educational project, time management in team projects and other applications in various fields.

2. Digital tools for creating timelines

- **Online applications and dedicated software**: participants will explore and learn to use different digital tools for creating timelines, such as:
    - **TimelineJS**: A popular tool for creating interactive timelines that allows the integration of images, videos, text and other media sources to create a dynamic visual experience.
    - **Precedence**: A software for creating detailed and structured timelines, commonly used in project management.
    - **Microsoft PowerPoint** and **Google Slides**: How to use the simple timeline functionality in these popular applications.

- **Customizing Timelines**: How to customize the look and feel of timelines to clearly visually reflect important information and developments. Participants will learn to add colors, fonts and styles to make the timeline attractive and easy to understand.

3. Creating and using timelines in educational projects

- **Creating an educational timeline**: How to create a timeline to present historical events, sequences of a science project or stages of a natural phenomenon (e.g. evolution of species, climate change).
- **Integrating timelines into lessons and presentations**:How to use timelines to organize and structure lessons or presentations in a narrative form that helps to understand and retain information in a chronological way.
- **Practical examples**: creating a timeline about the history of a topic you are studying, such as the great
  scientific discoveries or key events in a historical period.

4. Timelines as a project management tool

- **Task management in educational projects**: how to use timelines to plan and track the stages of a collaborative project, highlighting deadlines, milestones and intermediate goals.
- **Tracking Progress**: How to create timelines to track the progress of a project, highlighting key milestones and remaining steps. Participants will learn how to use these timelines to assess team progress against deadlines and goals.
- **Example use**: Creating a timeline for an educational design project, including all stages from research, ideation, prototyping and testing.

5. Using timelines in Design Thinking projects

- **Planning the Design Thinking process**: how to use timelines to structure the stages of the Design Thinking process (Empathize, Define, Ideate, Prototype, Test), ensuring clear team coordination and effective progress tracking.
- **Documenting project evolution**: how to use timelines to document the evolution of a Design Thinking project, tracking iterations and adjustments made along the way, as well as test results and feedback.
- **Examples of use**: Participants will create a timeline to describe the complete development process of a prototype, illustrating how solutions evolved as they were tested and improved.

How to use a Timeline in educational and design projects

A **timeline** or **timeline** - a visual tool used to chronologically represent a series of events or activities in a sequential order - helps to organize and visualize events, ideas or processes in a clear and understandable way. Within educational projects and the **Design Thinking** process, timelines are extremely useful for planning projects, managing milestones and documenting their progress.

They can also be used to present complex information in an engaging way
and affordable.

Using a **timeline** is a great way to organize and communicate effectively

chronological events or project milestones in a visual format. Whether used in education, for project management, or for viewing historical data, a well-structured and customized timeline can turn a simple project into a clear and engaging presentation. Choosing the right tool and using it effectively will help achieve the visual and educational objectives of each project.

Steps for using a Timeline

1. Setting the purpose and objective of the timeline

Before creating a timeline, it is essential to clearly define its **purpose and objective**.

This means asking yourself:

- What events or milestones do I want to present?
- What is the time period I want to cover?
- How will this timeline be used (educational, professional project, presentation, documentation)?

Example: If you are working on an educational project on the **History of Scientific Discoveries**, the purpose of the timeline will be to present scientific discoveries in chronological order, from ancient to modern, to help students understand the evolution of science.

2. Collecting and organizing information

Once the purpose is established, it is necessary to **collect the information** you want to represent chronologically. At this stage, you need to select the relevant events, dates and additional information to be included in the timeline.

- **Identify key events**: which moments are important to present? For example, in an educational project, these events might be important discoveries, inventions, or major developments in a particular field.
- **Organize events chronologically**: Put events in a correct chronological order, clearly establishing the beginning and end of the period covered.

Example: in the case of the timeline on the **History of scientific discoveries**, the key events could be: Galileo's invention of the telescope (1609), Newton's discovery of gravity (1687), the discovery of the structure of DNA (1953), etc.

3. Selecting a digital tool for timeline creation

There are several apps and software that make it easy to create an interactive and engaging timeline. Some of the most popular include:

- **TimelineJS**: A free online tool, developed by Knight Lab, for creating interactive and multimedia timelines. Users can add images, text, videos, maps and links to create a dynamic visual experience.
- **Canva**: A graphic design platform that provides templates for creating timelines. While not as interactive as TimelineJS, Canva is easy to use and offers attractive visual options.
- **Google Slides/Microsoft PowerPoint**: Both platforms allow the creation of timelines simple, using graphics, shapes and text.

Example: If you need a multimedia and interactive timeline, **TimelineJS** would be an ideal option. If you want a static and quick to use format, **Canva** or **PowerPoint** can provide simple and effective solutions.

4. Creating the timeline in the application of your choice

Depending on the application selected, the timeline creation process can vary slightly. Below are some applications and steps for creating a timeline.

a. Creating a timeline in TimelineJS

TimelineJS is a free online application that allows you to create interactive timelines using a Google Sheets file for data input.

Steps for creating a timeline in TimelineJS:

1. **Visit TimelineJS** at https://timeline.knightlab.com/.
2. **Download the Google Sheets template** provided by TimelineJS. This is a pre-formatted document containing fields for entering timeline event data.
3. **Enter event details**: Fill in each column in the template with event details such as date, title, description, links to images or videos, etc.
    - **Event date** column: Enter the specific date or time period.
    - Column for **event title and description**: Titles and descriptions must be concise but informative.
    - **Media** column: You can add links to images, videos or other media to accompany your events.
4. **Publish Google Sheets document**: After filling in the template, publish the file on the web (Google Sheets option), then copy the public link.
5. **Enter the link in TimelineJS**: After publishing the document, enter the link in the specified on the TimelineJS website, which will automatically generate an interactive timeline.
6. **Embed timeline**: TimelineJS provides embed code to embed your timeline on websites, blogs or educational platforms.

b. Creating a timeline in Canva

Canva is a graphic design platform that provides timeline templates. While not as interactive as TimelineJS, Canva allows you to create visually attractive timelines.

Steps for creating a timeline in Canva:

1. **Go to Canva**: Start by logging into your Canva account and select "Create a Design".
2. **Search for a timeline template**: Depending on your project, search the template library using the term "Timeline".
3. **Choose a template and customize it**: Select a timeline template and start adding the necessary information about events, dates, titles and images.
4. **Customize the design**: You can add custom shapes, lines, text and colors to match the theme of your project and make your timeline more visually appealing.
5. **Export the timeline**: Once finalized, you can export the timeline as a PDF, PNG or JPEG, in

depending on your preferences.

c. Create a simple timeline in PowerPoint or Google Slides

PowerPoint and **Google Slides** are simple and effective tools for creating a simple and effective line visual timelines in a presentation.

Steps for creating a timeline in PowerPoint/Google Slides:

1. **Open PowerPoint or Google Slides** and create a new presentation.
2. **Use "Insert SmartArt"** (in PowerPoint) or add shapes manually in Google Slides. In PowerPoint, select the "Process" option in the SmartArt gallery, which includes different timeline formats.
3. **Enter** key event **information**, adding the dates and titles of each event to the timeline.
4. **Customize the design**: You can add colors, fonts, images or other graphics to make your timeline more visual.
5. **Timeline presentation**: Once finalized, the timeline can be used in a presentation educational or project, either by projection or exported as an image.

5. Showing and using the timeline

Once the timeline is finalized, it can be used in various ways:

- **Educational presentation**: Timeline can be used to present a timeline to students a clear explanation of a topic (e.g. historical events or scientific developments).
- **Project management**: Timelines are useful in Design Thinking projects for planning and tracking development milestones.
- **Online publishing**: If you use a tool like TimelineJS, the interactive timeline can be published to websites or e-learning platforms.

Practical activities in the Timeline module:

1. **Creating an interactive timeline**: Each participant will create a timeline about a topic relevant to their educational or professional work (e.g. evolution of a scientific concept, major historical events). Participants will use digital tools such as TimelineJS to create an interactive timeline, integrating images, text and links.
2. **Timeline collaborative project**: Participants, organized into teams, will collaborate to create a detailed timeline illustrating the stages of a team project or complex phenomenon. Teams will use the timeline to organize tasks, track progress, and evaluate the impact of each stage.
3. **Presentation of a final timeline**: Each team will present the timeline they have created, explaining how it helps to understand the chronology of events or to manage a project. This timeline will be used as part of the final team project presentation.

SKILLS acquired through the Timeline Module:

- **Chronological and visual organization skills**: participants will learn how to organize

present information chronologically and present it visually in a way that facilitates sequential understanding of a topic.

- **Developing time and project management skills**: Participants will learn how to use timelines to plan and track complex projects, managing deadlines and resources effectively.
- **Integrating timelines into teaching**: Learners will learn to use timelines to structure lessons and educational presentations, facilitating active learning and chronological understanding of topics.
- **Effective team collaboration**: Participants will develop digital collaboration skills by using timelines as team and project management tools.

C. CUPCUT: CREATING AND EDITING VIDEO CONTENT FOR EDUCATIONAL PROJECTS AND VIZUALE

The CAPCUT submodule is an essential component of the **Design Thinking-focused** curriculum, which develops the video editing skills needed to create impactful visual content in educational and professional contexts. CapCut is a free and affordable video editing application that offers a wide range of features for editing and enhancing videos. In this module, participants will learn how to use CapCut to create compelling videos, add transitions, special effects, filters and music to create educational, promotional or presentation video projects.

Website: https://www.capcut.com/my-edit?start_tab=video

OBJECTIVE:

1. **Familiarization with the CapCut interface and basic functions** - participants will learn how to navigate the CapCut interface, understand the main editing tools and how to import videos, images and other multimedia files.
2. **Develop video editing skills** - participants will learn how to cut, splice, trim, adjust and edit videos to create high-quality visual content for educational and professional projects.
3. **Using special effects and transitions** - participants will learn how to add smooth transitions, filters and special effects that enhance the visual quality and impact of their videos.
4. **Creating interactive and engaging videos** - participants will learn how to add interactive elements to videos, such as text, subtitles and audio effects, to make the content more engaging and informative.
5. **Integrating videos into educational projects** - participants will learn how to use CapCut to create instructional videos, video tutorials and visuals to support teaching and learning.

Content:

1. Introduction to CapCut and its interface

- **CapCut interface**: An overview of the CapCut user interface, including editing area, timeline, resource panel, and main tools.
- **Importing multimedia**: How to import videos, images, audio and video files other graphics in CapCut to start the editing process.
- **Exploring basic functions**: How to use the app's basic functions, such as adding video clips, trimming and merging them, and managing the audio track.

2. Basic and advanced video editing in CapCut

- **Cutting and splicing videos**: How to cut unwanted sections out of a video and splice clips together to create a visually fluid and coherent narrative.
- **Adding transitions between clips**: How to apply transitions between different video segments to improve smoothness and visual coherence. These transitions can include effects such as fade-in, fade-out, slide, zoom, etc.
- **Managing the audio track**: How to edit and adjust the sound, including adding background music, adjusting the volume, and synchronizing the audio track with your video.
- **Using the speed adjustment function**: How to create slow motion or timelapse effects, adjust the playback speed of your videos to emphasize key moments.

3. Adding special effects, filters and visuals

- **Applying filters and color corrections**: How to improve the visual quality of your videos by applying filters, adjusting contrast, brightness and saturation to get a more vibrant and eye-catching picture.
- **Adding special effects**: How to add visual effects such as glitch, zoom, animated transitions and distortion effects to make your video more dynamic and attractive.
- **Creating overlays**: How to overlay images or graphics on videos to add additional visual elements to complete the story.

4. Integrate text, subtitles and animations into videos

- **Adding text and subtitles**: How to add customized text and subtitles to videos to make your messages clearer and improve the accessibility of your videos.
- **Text animations**: How to animate text using different effects such as fade, slide or bounce, to create greater visual impact.
- **Creating titles and intro sequences**: How to create intro or ending sequences using text and graphics to give your video a clear and professional structure.

5. Using audio effects and sound synchronization

- **Adding music and sound effects**: How to add background music, sound effects and other audio elements to enhance the atmosphere and intensify the emotions conveyed by your video.
- **Synchronizing sound to video**: How to synchronize sound effects and music with visual scenes so that the sound perfectly matches the transitions and highlights in the video.
- **Using the voice-over feature**: How to record and add voice-overs to

explain concepts or narrate educational videos.

6. Creating educational and presentation videos

- **Videos for teaching and tutorials**: How to create educational videos that include explanations, diagrams, subtitles and voice-overs to help students understand complex concepts in a visual way.
- **Interactive video projects for students**: How to involve students in creating their own videos to develop creativity and improve visual presentation skills.
- **Professional video presentations**: how to use CapCut to create promotional or project presentation videos, using all available features to create a quality end product.

7. Export and share videos created in CapCut

- **Export settings**: how to export videos created in CapCut in different formats and resolutions, depending on the final purpose (for social media, educational platforms or presentations).
- **Optimizing for social platforms**: How to adjust video formats to your videos optimize for social media platforms like YouTube, Instagram or TikTok.
- **Sharing videos**: how to share videos created directly from CapCut on digital platforms or upload them to learning platforms for use in educational projects.

CapCut offers a wide range of functionality, including cutting and merging clips, applying transitions, visual effects and filters, adding text, subtitles and music.

Steps for using CapCut:

1. Downloading and installing the app

To get started with CapCut, the first step is to download the app to your mobile device (available on Google Play and Apple App Store). Once installed, open the app to start working on your first video project.

2. Creating a new project

Once you open the app, follow these steps:

- Click the 'Project' button on the main screen.
- Select the videos and photos you want to edit from your device's gallery. You can select multiple media files and then arrange them in the desired order.

3. CapCut interface and basic functions

The CapCut interface is intuitive and organized, making it easy to navigate between editing functions. Once you have uploaded videos or photos for your project, you will see the following sections:

- Timeline: This is where the videos you edit are arranged. Depending on

During the duration of each clip, they will appear on the timeline and can be adjusted by trimming and
joining.

- Toolbox: Below the timeline you'll find various editing tools, such as Cut, Split, Effects, Text, Audio and more.
- Preview Window: This allows you to preview your edits as you work on your project.

4. Basic video editing in CapCut

a. Cutting and joining clips

- Trimming clips: Tap a clip in the timeline to select it. Then click the "Split" option to cut the clip at the desired point. You can repeat to cut unwanted sections.
- Join clips: Once you've trimmed your clips, you can drag and arrange them on the timeline in the desired order. If you want to merge two different clips, simply remove the spaces between them, and CapCut will seamlessly transition between the two segments.

b. Resize clips

- Tap on a clip in the timeline, and at the top of the screen you'll see handles that let you resize or shorten clips. Drag their edges to adjust the duration of the video.

5. Adding transitions between clips

CapCut offers a wide range of transitions that can be applied between two clips to ensure visual fluidity between sequences.

- Tap the line separating two video clips on the timeline.
- Then select the "Transition" option. A new window will pop up with several types of transitions, such as fade-in/fade-out, slide, glitch, and more.
- Choose a transition and adjust its duration, depending on how fast or slow you want the transition to go.

6. Adding special effects and filters

CapCut includes numerous **visual effects and filters** that can completely transform the atmosphere of a video.

- To add visual effects, click on a clip in the timeline and then select the **'Effects'** option in the tool panel.
- You can choose from different effects such as **blur**, **distortion**, **glitch**, and more.
- To apply a **filter**, tap the **"**Filters**"** option and select a filter to adjust the contrast, saturation and colors of your video.
- Once you've selected the desired effect, adjust the intensity to achieve the result desired.

7. Adding text, subtitles and text animations

Educational or presentation videos can be enhanced by adding **text** and **subtitles**, which provide additional information and make the video more accessible.

- Click the **'Text'** button in the tool panel and select **'Add text'**. You can then enter the desired text (e.g. titles, descriptions, subtitles).
- You can adjust the font, size, color and position of text on the screen.
- To add **text animations**, select the text in the timeline and choose the option **"Animation"**. Here you can choose effects like **fade in**, **slide**, or other dynamic transitions for text.

8. Adding music and audio effects

CapCut offers a library of **music** and **sound effects**, but you can also upload your own audio files.

- Click on **the 'Audio'** option in the instrument panel and choose to add music from the CapCut library or load an audio file from your device.
- Once you've added the audio track, you can drag it onto the timeline to synchronize it with video clip.
- Adjust the volume and duration of music or sound effects to match the moment important visual.

9. Using speed adjustment (Slow Motion or Timelapse)

To create captivating visual effects such as slow **motion** or **timelapse**, CapCut offers a playback speed adjustment function.

- Tap a clip in the timeline and select **the 'Speed'** option.
- You can choose between two options:
  - **Normal Speed**: Adjusts the overall clip speed.
  - **Curves**: Create a variable speed effect, where certain sections of the clip can move faster or slower.

10. Export video

Once you've finished editing, you're ready to **export your video** to share or use.

- Click **Export** button in the top right corner.
- Choose your export settings, including **resolution** (480p, 720p, 1080p or 4K) and **framerate** (frames per second).
- Once you select the settings you want, click **"Export"** and the video will be saved in the gallery your device.

Practical applications of CapCut:

CapCut is extremely useful in different areas:

1. **Education**: Teachers and trainers can use CapCut to create engaging educational videos that include visual explanations, text, and animations to facilitate learning.
2. **Social Media**: CapCut is optimized for creating videos for social media platforms such as **TikTok**, **Instagram** and **YouTube**, offering fast video editing and formatting features

platform-specific.

3. **Presentations and visual projects**: CapCut can be used to create presentation videos for projects, displaying smooth transitions and effects between different visual sections and explanatory text.

With all its features, CapCut is an affordable tool for anyone who wants to create high-quality videos without advanced editing skills. With its intuitive features like trimming and merging clips, adding special effects, text and music, CapCut allows you to create professional videos for education, social media, presentation projects and more.

4.1.3. CREATING INTERACTIVE VISUAL COMPARISONS

2. Juxtapose: Create educational and collaborative projects, helping to visualize changes and compare two images or scenarios in an interactive way.

JUXTAPOSE is a free online tool, developed by Knight Lab, that allows you to create interactive visual comparisons between two images or other media sources. Juxtapose is often used to illustrate changes before and after an event, the temporal evolution of a place or object, and to compare two different versions of a work or situation.

"Juxtapose helps storytellers compare two similar media elements, including photos and GIFs. It is ideal for highlighting 'then/now' stories that explain changes over time or 'before/after' stories that show the impact of dramatic events."

Ideal for educational projects, research, design or presentations, it is a simple yet powerful tool that makes visual comparisons easily accessible and interactive.

Website: https://juxtapose.knightlab.com/

Main features of Juxtapose:

1. **Compare two images**: Users can upload two images that will be placed on top of each other, and with an interactive slider, end users can drag between the two to see the differences.
2. **Compare two videos**: Juxtapose also allows the use of videos, offering an interactive way to compare two video sequences, such as a before and after.
3. **Interactive slider**: The slider is the central element of Juxtapose, which allows users to swipe left to right to visualize the changes between two images or videos.
4. **Responsiveness**: Juxtapose is optimized to work on a variety of devices, including computers, tablets and mobile phones, while maintaining the same interactive functionality.
5. **Easy integration**: After creating a visual comparison with Juxtapose, users can easily embed the widget on , blogging platforms or in educational projects through automatically generated embed codes.

Uses in education:

Juxtapose is an important tool for education as it can be used for:

- **Visualize historical developments**: Comparing an old image with a contemporary image to highlight geographical, architectural or social changes.
- **Comparing works of art**: comparing two works of art or two versions of the same work to study different styles and techniques.
- **Differences in scientific experiments**: visualize a change in laboratory experiments or in the evolution of a plant/organism during a biology project.
- **Climate change analysis**: Comparing before and after images of landscapes affected by climate change or human intervention.

How does Juxtapose work?

1. Uploading images: Users upload two images to be compared. These can be photographs, maps, diagrams or any other relevant visual material.
2. Juxtapose creates a transition bar between the two images, which the user can move from left to right to see the gradual transition between the two images. This allows clear observation of differences and changes.
3. Publishing the project: After configuration, Juxtapose generates embed code, which can be included on websites, blogs, presentation platforms or online educational materials.

STEPS FOR USING JUXTAPOSE:

1. Access the Juxtapose platform

To get started with Juxtapose, visit the official Juxtapose website at: **https://juxtapose.knightlab.com.**

Juxtapose is a web-based tool, which means you don't need to install anything on your device. You can create comparisons directly in your browser, and Juxtapose will generate code to embed the comparison on a website, in a blog or in a presentation.

2. Preparing images for comparison

Before using Juxtapose, you need to prepare two images that you want to compare. The images can be photos, diagrams, screenshots or any other type of graphic file. It is important that both images are the same size so that the transition between them is as smooth as possible.

Example of use:

- Before and after comparison: You can compare a photo of a place before and after a renovation.
- Temporal evolution: comparing an image of a forest before and after deforestation.
- Comparing two works of art: You can illustrate the differences between an original work of art and a restoration.

3. Uploading images online

For Juxtapose to access your images, they must be hosted online. There are several options to do this:

- Google Drive: Upload the images to Google Drive and set the viewing permissions to public. Copy the image link to use in Juxtapose.
- Dropbox: Similar to Google Drive, you can use Dropbox to upload images. Make sure image links are public.
- Flickr: If you use photo platforms such as Flickr, you can upload your images there and copy the link directly to the images.
- Personal host: If you have your own website or hosting server, you can upload images to it and use direct links.

4. Creating a comparison in Juxtapose

Once you've prepared your images and uploaded them online, follow the steps below to create the visual comparison:

1. Access the Juxtapose interface at https://juxtapose.knightlab.com.
2. Fill in the fields for the two images:
    - In the Juxtapose interface, you will see two fields where you need to enter the URL for each of the two images you want to compare.
    - Image URL 1: In this field, enter the link to the first image.
    - Image URL 2: Enter the link to the second image in the appropriate field.
3. Add optional titles and descriptions:
    - Left Label and Right Label: These are the labels that will appear on either side of the visual comparison. For example, if you're doing a "before and after" comparison, you might label the first image "Before" and the second "After".
    - Credit: You can add sources or authors of images in the credits section.
    - Optional links: Juxtapose also allows you to add additional links to external sources for more details.
4. Customize your transition style:
    - Starting Position: This is the setting that allows you to decide where the comparison bar should be placed at the beginning (e.g. in the middle or closer to one of the images). You can adjust this using a percentage.
    - Mode: Juxtapose provides a transition bar that users can move from side to side to explore the differences between images. This mode can be adjusted to have a smooth transition between the two images.

5. Preview visual comparison

Once you have filled in all the required fields and added the image links, click the Preview button to view the final result. This will show you what the interactive visual comparison will look like.

At this stage, you can adjust the starting position of the comparison bar or change titles and descriptions until you get the result you want.

6. Publishing and sharing the comparison

Once you have completed the comparison and are happy with the result, follow the steps to publish and share the comparison:

1. Copy the embed code: Juxtapose will automatically generate an HTML embed code that you can use to embed the comparison on your website, blog or other platforms that support embed code.
2. Share the link: If you don't need to embed the comparison on a website, you can use the link generated by Juxtapose to share the comparison directly with colleagues or on social networks.

❖ **Video instructions for using the program:**

https://www.youtube.com/embed/uA8pCT32j7s
https://www.youtube.com/embed/G6JrdTw4ulU
https://www.youtube.com/embed/G6JrdTw4ulU

Practical applications of Juxtapose:

1. History education

Comparisons before and after a historical event: Juxtapose can be used to illustrate the visual changes of a place before and after an important event, such as a battle, reconstruction or natural disaster.

Example:

a. Compare a pre-World War II photograph of Berlin with a post-war image to illustrate the devastating effects of war on infrastructure**.**
b. A history teacher can use Juxtapose to compare two images of a city: one from the past (in the 1900s) and one from the present. Pupils can drag the slider to see how buildings, streets and the urban environment have changed, making an interactive analysis of the city's evolution.

2. Geography and environment

Illustrating geographical or environmental change: Juxtapose is an excellent tool for showing changes in natural landscapes or the built environment over time.

Example: Using Juxtapose to compare a rainforest deforestation map from 20 years ago with an updated map to highlight the effects of climate change and human activities on the environment.

3. Design

Evolution of a product or building: Juxtapose can be used to show how product or design has evolved from the initial concept to the final product.

Example: comparing the initial sketch of a building with a photograph of the completed building to show changes in design and execution.

4. Arts and culture

Comparing artwork: Juxtapose can be used to compare art styles or to illustrate changes to a work over time.
Example: Comparing an original Renaissance artwork with a modern restoration to show how details and colors have been preserved or changed.

5. Documenting social change
Changes in urban architecture: Teachers or researchers can use Juxtapose to show the visual transition of an urban area over the years, reflecting socio-economic changes.
Example: Comparing a street photo from the 1960s with a recent photo to illustrate urbanization and infrastructure changes.

How it can be integrated into the curriculum:

- **Interactive projects**: Teachers can encourage students to create visual comparisons for projects that require observing changes over time.
- **Visual teaching**: Juxtapose can be integrated into interactive lessons to engage students through clear and interactive visualizations.
- **Interdisciplinary lessons**: can be used in joint history, geography projects, biology and visual arts.

Advantages of using Juxtapose:

- **Interactivity**: Juxtapose allows users to interact directly with the images, giving them a clearer understanding of the differences between the two situations being compared.
- **Simplicity**: It's very easy to use, requiring no advanced technical knowledge or installing software.
- **Easy sharing**: Once created, the comparison can be easily embedded in web pages or shared directly via links.
- **Accessibility**: You can use Juxtapose on any device with internet access, be it from a computer or mobile device.

Juxtapose is an easy-to-use tool ideal for anyone who wants to create interactive visual comparisons between two images. It is particularly useful in education, research, design projects and environmental initiatives. By creating intuitive visual comparisons, Juxtapose helps users to clearly illustrate the changes, evolutions and differences between two states or situations, making learning and visual communication more engaging.

Juxtapose is thus an excellent tool to add an interactive visual component to educational projects and classroom presentations, facilitating more dynamic and engaging learning.

4.1.4. REAL-TIME COLLABORATION AND FEEDBACK

- **Google Docs: Use this tool to facilitate ongoing communication in teams,**

provide real-time feedback and collaborate on shared documents.

Google Docs is an essential tool for digital collaboration and design, providing a flexible, accessible and interactive environment for creating, sharing and editing documents in real time.

Google Docs is a free online word processor from Google that allows users to create, edit and share documents in real time from anywhere and from any internet-connected device. It's part of the Google Workspace suite of apps and is known for its collaboration features, which facilitate teamwork by sharing documents and editing by multiple users simultaneously.

It plays an important role in facilitating collaboration, continuous feedback and effective management of educational projects and materials, namely:

1. Real-time collaboration

Design Thinking places a strong emphasis on team collaboration and the continuous exchange of ideas. Google Docs allows teachers and participants to create and edit documents simultaneously, eliminating the need to email files and providing instant access to all team members. Each participant can add, correct and comment directly in the document, facilitating fluid collaboration regardless of geographic location.

Example application: In a Design Thinking project, teams can use Google Docs to document the stages of each project (Empathize, Define, Ideate, Prototype, Test), to gather feedback and to develop solutions together.

2. Effective feedback and review

A central element of Design Thinking is iterative feedback and continually adjusting solutions based on this feedback. Google Docs allows users to leave comments in the document, suggest changes and review proposals in a transparent and organized way. Teachers can provide feedback directly in the documents to participants, highlighting strengths and areas for improvement, and participants can respond to comments and improve proposed solutions.

Application example: After a team creates a prototype of an educational project, teachers or mentors can use the comments function in Google Docs to provide constructive feedback, allowing the team to adjust the proposed solution.

3. Centralizing documentation and organizing projects

Google Docs provides a centralized space for storing and organizing all educational materials and team projects. This is essential in Design Thinking, where teams manage many ideas, prototypes and intermediate steps. Documents created can be automatically saved to Google Drive, where all team members have easy access to project files.

Example application: project teams can use Google Docs to create a project journal to document every stage of the Design Thinking process, from empathy to testing, keeping all the information in one accessible place.

4. Easy sharing of teaching resources and materials

Teachers and trainers can use Google Docs to create and distribute interactive learning materials to participants. These materials can include worksheets, lesson plans, presentations or tutorials, which participants can access and edit directly in Google Docs. This encourages a participatory learning process, where each learner can add input and work collaboratively.

Application example: Teachers can create a Google Docs document with a case study to explore a social problem. Participants will collaborate in the document to generate solutions and discuss possible prototypes, all in real time.

5. Version tracking and transparency in the process

Google Docs keeps a history of changes, allowing participants and teachers to keep track of who has added or changed certain information. This transparency is useful for understanding the evolution of thinking and contributions in the team and is in line with the Design Thinking principle of continuous iteration.

Application example: In a collaborative project, participants can use the change history feature to review changes to a document and see how the idea or solution has evolved over several stages.

Features:

- **Collaborate with comments and suggestions**

Anyone with access to a document can add comments to provide feedback or clarification. This is a very useful feature for teams working on collaborative documents or for teachers reviewing homework and projects.

Instead of editing the document directly, users can use the Suggesting feature, which causes all changes to appear as suggestions, similar to the "Track Changes" mode in Microsoft Word. The document author can approve or reject suggestions made by other users.

- **Revision History function**

Google Docs automatically saves every change made to the document, allowing users to access the full history of edits through the Revision History feature. From here, you can go back to previous versions of the document or see what changes have been made and by whom. This feature is very useful in team projects or when repeated adjustments to the document are needed.

- **Voice collaboration and voice typing**

a) Voice Typing: Google Docs has built-in voice recognition that allows users to dictate text directly into the document. This can be activated from the Tools > Voice Typing menu, and is particularly useful for users who prefer to dictate rather than type, or for people with disabilities.
b) Google Meet integration: Google Docs integrates with Google for team collaboration

Meet, allowing users to initiate video meetings directly from the document.

❖ **Spelling and grammar check function**

Google Docs includes a built-in spelling and grammar checking system that automatically flags mistakes in your document. Suggestions for correction are displayed as you type, and users can accept or reject proposed changes.

❖ **Adding images and illustrations**

Google Docs makes it easy to insert images from a variety of sources: upload directly from your device, search the web (using the Google search engine), Google Drive, Google Photos or URLs. Images can be resized and easily positioned in the document.

❖ **Format and collaborate on tables and charts**

You can create and edit tables in Google Docs documents, allowing you to organize data efficiently. You can also integrate charts from Google Sheets (spreadsheets), which will be automatically updated in the Google Docs document as data is modified in Sheets.

❖ **Adding links and bookmarks**

Google Docs allows you to add hyperlinks that can be used to navigate between sections or redirect the reader to external sources. The bookmark function allows users to create reference points in the document so that they can quickly navigate between different sections, useful for long documents such as reports or case studies.

Specific applications of Google Docs in the training curriculum :

1. Team documentation for the "Empathize" stage: Participants can use Google Docs to collect observations and research about users (students, community, etc.) during interview and research sessions, centralizing all the information in one place accessible to the team.
2. Creating a Problem Statement (Define): Google Docs can be used to collectively discuss and develop a clear problem statement, ensuring that all team members contribute to its formulation.
3. Team brainstorming (Ideate): Google Docs can serve as a brainstorming space where all participants can add ideas and solutions, then organize them into a manageable and easy-to-discuss document.
4. Prototype: Teachers can use Google Docs to guide teams in creating conceptual prototypes and to centralize all sketches and ideas to be tested later.
5. Collecting feedback in the "Test" phase: Google Docs can be used to document the feedback received during the testing of prototypes, encouraging a detailed and organized evaluation of the proposed solutions.

Uses and benefits of Google Docs

1. Education

- Teacher-student collaboration: Google Docs is extremely popular in education because it allows teachers to give real-time feedback and students to work on projects together. Teachers can track the progress of students' work, make comments and

suggests changes.
- Group projects: Students can work on projects together, regardless of location, using the collaboration and commenting options in Google Docs.

2. **Professional and business environment**
   - Shared documents: In the business environment, Google Docs makes it easy for teammates to collaborate, especially when writing reports, developing project plans or business presentations. Changes are immediately visible and everyone involved can contribute in real time.
   - Document management: Thanks to automatic saving in Google Drive, documents are well organized and data loss is minimized.
3. **Collaborative writing projects**
   - Google Docs is a great tool for authors who write collaboratively, offering a platform where several people can work together on a manuscript or article, each with access to different sections and instant feedback.
4. **Accessibility and integration with other applications**
   - Google Docs integrates seamlessly with other applications in the Google Workspace suite, such as Google Sheets, Google Slides, Google Forms, and Google Drive. This integration enables easy document management and quick access to the data needed for collaboration.

How to use Google Docs: Basic steps

1. **Creating a document**
   - To create a new document, open Google Drive or go directly to Google Docs. Click the Blank Document button to start a new document. Alternatively, you can use one of the available templates.
2. **Document sharing**
   - Once you've created a document, click on the 'Share' button in the corner top-right of the page.
   - Choose who you want to share the document with, either by entering an email address, either by creating a shareable link.
   - You can set access levels (View, Comment or Edit).
3. **Editing and formatting text**
   - Enter the text you want and use the options in the toolbar to adjust font, size, style (Bold, Italic, Underline), alignment and other formatting options.
4. **Adding visual and media elements**
   - From the Insert menu, you can add images, links, tables, graphs or charts to enhance the look of your document.

With its benefits, Google Docs is an indispensable tool for collaboration, transparency and efficient management of educational projects. Using this tool

contributes to improving participants' collaborative skills, organizing documentation efficiently and facilitating iterative feedback, which are fundamental to creative thinking and innovation.

4.1.5. APPLICATIONS FOR PROJECT SUBMISSION AND EVALUATION

- **PowerPoint: Use this tool to create interactive and engaging presentations highlighting the results of each project.**

Microsoft PowerPoint is one of the most popular applications for creating **visual presentations** and is part of the Microsoft Office suite. It is widely used in fields such as education, business, conferences and training to create **dynamic and interactive presentations** that combine text, images, graphics, videos and animations. PowerPoint offers a rich set of features that enable users to design engaging presentations and enhance visual communication.

The role of PowerPoint in the training curriculum

1. **Presentation of the stages of the Design Thinking process**

PowerPoint is an ideal tool to visually present each stage of the Design Thinking process (Empathize, Define, Ideate, Prototype, Test). Trainers and participants can use presentations to document progress and effectively communicate results to colleagues or other teams.
Application example: Teams can use PowerPoint to create presentations that illustrate the research and observations from the Empathize stage, highlighting insights about user needs and problems.

2. **Visualizing and communicating ideas and solutions**

Design Thinking encourages the creation of innovative solutions, and PowerPoint allows ideas to be visualized and organized in a coherent and engaging way. Presentations can include diagrams, images, infographics and sketches, helping teams to clearly communicate proposed solutions, including details of prototyping and testing.
Example application: After the "Ideate" stage, participants can use PowerPoint to present the ideas generated, using diagrams to show the logic behind each solution and how they meet the needs of the users.

3. **Visual prototyping and explaining the process**

Within the curriculum, PowerPoint can be used to present the prototypes developed in teams. This allows teams to visualize their solutions before moving on to implementation, and also to communicate them clearly to receive feedback from peers and trainers.
Application example: participants can use PowerPoint to create visual sketches or mock prototypes, highlighting how the proposed solutions will work and what the implementation steps are.

4. **Feedback and evaluation**

In Design Thinking, iterative feedback is an essential component. PowerPoint presentations provide a structured platform to present the results of solution testing and to collect feedback from colleagues or teachers. These presentations can be improved as feedback is received and solutions are refined.

Applicative example: during the "Test" phase, teams can use PowerPoint to present the results of the testing of their prototypes and to collect feedback, using dedicated sections to highlight the necessary improvements.

5. **Final presentations and pitches**

The final presentations of projects developed through Design Thinking are an important part of the process, and PowerPoint provides a flexible and attractive format to structure these pitches. Presentations can include a description of the problem, the research conducted, the proposed solutions, the prototypes tested and the team's conclusions.

Applicative example: at the end of the project, teams can create a PowerPoint presentation with a final pitch including a summary of the whole process, from problem definition to the final prototype and the results of the testing.

How PowerPoint can be used at every stage of the Design Thinking process

1. Empathize: PowerPoint can be used to organize and present user research and interviews. Teams can use slides to show what needs and problems they have identified in users.
2. Define: PowerPoint presentations can help clarify the problem statement by using graphs or charts to organize information and show how the central problem has been stated.
3. Ideate: In the idea generation phase, teams can use PowerPoint to structure and present possible solutions, comparing and evaluating them visually.
4. Prototype: PowerPoint presentations can include visual sketches or simulations of prototypes created by the team, giving a clear picture of how the solutions will work.
5. Test: After testing the prototypes, PowerPoint can be used to present the results and add suggestions for improvement based on the feedback received.

Main features and functionality of Microsoft PowerPoint:

1. **Intuitive and user-friendly interface**
    - **PowerPoint's user interface** is simple and well-organized, with menus and toolbars that provide quick access to all the features you need to create and customize presentations. Users can access basic functions from the top toolbar and quickly navigate between slides using the left navigation area.
2. **Creating slides**
    - **Slides** are the centerpiece of PowerPoint presentations. Each slide can contain a combination of text, images, tables, charts, diagrams, video and audio clips. PowerPoint provides a set of predefined templates that allow users to

quickly create professional presentations.

- **Inserting predefined layouts**: PowerPoint includes slide layouts that make it easy to quickly add elements such as titles, images, text and graphics. These layouts can be further customized according to user needs.

3. **Formatting text**
   - PowerPoint allows users to format text in a similar way to other applications in the Office suite (e.g. Microsoft Word). You can change **the font**, **size**, text **color** and apply **styles** such as bold, italic and underline. Text can also be aligned according to the user's visual preferences.
   - **Numbered and bulleted lists**: To clearly structure information, PowerPoint includes options to create bullet points and numbered lists.

Advanced features of Microsoft PowerPoint:

1. **Insert images and multimedia**
   - PowerPoint lets you insert images from local files, online or directly from ClipArt. Images can be resized and positioned on the slide, and users can add special effects (such as shadows or reflections) to enhance the visual impact.
   - Inserting videos and audio: In addition to images, PowerPoint allows you to add videos and audio files to your presentation. Videos can be played automatically when you open the slide or with a manual click, and audio files can be used to create narration or add background music.
   - Screenshot: PowerPoint has a built-in screenshot feature that allows users to capture images from other applications and quickly integrate them into their slides.

2. **Insert and customize tables and charts**
   - Tables: PowerPoint allows you to create and customize tables that can be used to organize and display data in a structured format. Tables can be customized by changing border styles, colors, and cell formats.
   - Graphs and charts: PowerPoint includes a variety of options for creating graphs and charts (bar graphs, line graphs, pie charts, etc.). These charts can be created directly in PowerPoint or imported from Excel. Users can customize the colors, labels and sizes of the charts to correctly reflect the data presented.
   - SmartArt: PowerPoint includes the SmartArt feature, which allows you to create advanced visual diagrams, such as process diagrams, hierarchies, and organizational charts. This is a quick way to turn plain text into dynamic graphics.
3. **Animations and transitions between slides**
   - Animations for slide elements: PowerPoint offers a wide range of animations for text, images, graphics and other elements. These animations can be used

to make text appear gradually, images move or graphics build as the presentation progresses.

- Transitions between slides: PowerPoint allows the use of transitions to make moving between slides more engaging. Transitions can include effects such as fade, wipe, slide, or zoom, and their duration and speed can be adjusted.
- Advanced animations: users can use advanced animation options to perfectly synchronize visual and audio elements to the timings in the presentation.

4. **Hyperlinks and interactive navigation**
   - Hyperlinks: Users can add hyperlinks to other slides, web pages or external files. This allows the creation of interactive presentations, where the audience can navigate between different sections of the presentation according to their needs.
   - Action buttons: PowerPoint provides predefined action buttons that can be used to navigate in the presentation or to trigger certain events, such as playing a video or accessing an external link.
5. **Presenter notes and viewing modes**
   - Presenter notes: PowerPoint includes a dedicated section for presenter notes, which allow users to add additional comments or explanations for each slide. These notes are visible only to the presenter and help provide additional information without cluttering the slides with too much text.
   - Viewing Modes:PowerPoint offers multiple viewing modes to enable efficient editing and presentation of material. Slide Sorter View allows users to view all the slides in the presentation in a single window and rearrange them via drag-and-drop. Reading View allows the presentation to be viewed in full screen, similar to presentation mode, without entering the actual presentation mode.

Collaborative and advanced features in PowerPoint

1. **Real-time collaboration and sharing**
   - Collaborative editing: With Microsoft 365, PowerPoint enables real-time collaboration between multiple users. This means that all users who have access to a document can simultaneously edit the presentation and changes are visible in real time. The collaboration feature is similar to that offered by Google Slides and is extremely useful for teams working on joint projects.
   - Share presentations: PowerPoint presentations can be shared with other users via email, direct links or uploaded to platforms such as OneDrive or SharePoint, allowing easy access to files from anywhere.
2. **Presentation and registration**
   - Presentation mode: PowerPoint offers a presentation mode that allows you to project your presentation on a large screen or share it through conferencing

online. In presentation mode, the user can access the presenter's notes and control the transition between slides with keyboard shortcuts.

- Record the presentation: PowerPoint allows users to record a narrated version of the presentation, including audio comments and transition times between slides. These narrated presentations can be saved as video files (e.g. in MP4 format) and shared later.
- Broadcast your presentation: PowerPoint also allows you to broadcast your presentation to an online audience through webcast options and integration with platforms such as Microsoft Teams or Skype for Business.

Specific applications of PowerPoint :

1. Team presentations: Each team can create visual presentations that document and explain each stage of the project, facilitating discussion and exchange of ideas with the rest of the participants.
2. Interactive presentations: By using interactive elements in PowerPoint (such as dynamic transitions or hyperlinks to external resources), participants can make presentations more engaging and add interactivity for the audience.
3. Final project presentations: PowerPoint can be used to structure the final presentations of projects developed through Design Thinking. These can include a combination of text, images, graphics and videos to make the solutions more understandable and attractive.
4. Communicating visual feedback: teachers can use PowerPoint to provide visual feedback to teams, using diagrams, images and practical examples to help refine the solutions developed by participants

The benefits of using PowerPoint in teaching:

1. **Visual clarity and organization**: PowerPoint allows for **clear and logical structuring** of information, which facilitates effective communication of ideas within teams or to teachers and mentors.
2. **Accessibility and interactivity**: PowerPoint is **easy to use** and accessible to all participants, offering interactivity options and dynamic presentations.
3. **Flexibility**: PowerPoint can be used for short presentations, **quick pitches** or
   More complex presentations with detailed diagrams and visual prototypes.
4. **Integration with other platforms**: PowerPoint can be integrated with other digital tools used in the curriculum, such as **Google Drive**, **Canva** or **Juxtapose**, allowing the inclusion of external resources and interactive materials.

PowerPoint is a versatile tool, making it easy to present ideas, solutions and projects in a clear and visual way. Using PowerPoint, participants can effectively communicate their solutions and receive constructive feedback, improving their critical thinking, collaboration and visual communication skills.

MODULE 5: VISUAL COMMUNICATION SKILLS

5.1. VISUAL DESIGN BASICS

The BASICS OF VISUAL DESIGN sub-module is an essential component within the training curriculum, which focuses on developing fundamental skills needed to create effective, attractive and functional designs that clearly communicate a visual message.

Participants will learn the basic concepts of visual design, including aesthetic principles, techniques for organizing information, and effective use of visual elements.

At the end of this sub-module, participants will be able to create coherent visual compositions and apply basic design rules in various professional and educational contexts.

SPECIFIC OBJECTIVES:

1. Understanding the fundamentals of visual design - participants will learn basic theoretical concepts such as contrast, balance, visual hierarchy, alignment and white space.
2. Applying these principles to create eye-catching visuals that clearly convey the intended message - participants will learn how to effectively use colors, typography, shapes and images to create visually pleasing and coherent designs.
3. Using visuals to guide perception and optimize learning and retention

Information - participants will carry out practical projects to put into practice the principles they have learned, working with simple visual materials such as posters, presentations or infographics.

CONTENTS:

A. FUNDAMENTAL PRINCIPLES OF VISUAL DESIGN

Visual design is based on a set of fundamental principles that guide how visual elements should be organized and presented to communicate a clear and aesthetic message. These principles include:

a. Contrast

- **Contrast** is the visual difference between the elements of a composition and is a crucial factor in attracting attention and highlighting important information. Contrast helps to **emphasize** certain parts of the design and create a **visual hierarchy**. It can be achieved through variations in color, size, shape or texture.

Elements of contrast:

- **Color:** Using complementary or contrasting colors to highlight key elements.
- **Shapes:** Contrasting different shapes (e.g. circles versus squares) creates visual diversity.
- **Size:** Variation in the size of elements to emphasize the importance or hierarchical order of information.

Practical activities:

- Participants will edit an infographic using color and size contrasts to highlight the most important information. They will analyze how contrast improves readability and visual impact.
- Using a big, bold headline with smaller body text creates contrast and helps your audience quickly identify key information.

b. Balance

Balance refers to the even distribution of visual elements in a design so that to be stable and harmonious. **Types of balance:**

- **Symmetrical balance:** The elements are arranged equally on either side of a central axis, creating a sense of stability and order.
- **Asymmetrical balance:** Elements are distributed unevenly, but in a way that creates a sense of harmony and visual interest. This type of balance is more dynamic and often more appealing.

Practical activity:

- The participants will create an educational poster applying both types of balance (symmetrical and asymmetrical) and discuss which one is more effective for certain types of educational content.

c. Visual hierarchy

- **Visual hierarchy** is the organization and arrangement of elements in such a way that it is clear to the viewer which information is most important. This is achieved through variations in size, color, font and positioning.

Practical activity: In an infographic, the main headline should be larger than subheadings, and secondary information will be written in smaller font or more neutral colors.

d. Align

- **Alignment** refers to the placement of visual elements in an orderly manner so that there is a logical relationship between them. Proper alignment creates order and organization, improving the readability of the design.
- **Hands-on activity**: Align the title, text and images left, right or center to create a tidy and easy-to-follow composition.

e. White Space

- **Negative space**, or **white space** refers to the empty areas around or between design elements. This is not just 'empty', but an essential element that allows visual breathing and directs attention to important content.

The role of white space:

- It improves visual clarity and makes the material easier to follow.
- Allows the reader to focus on the important information.
- Create a sense of elegance and simplicity.

Practical activity:

- Participants will design an educational poster or webpage, paying particular attention to the use of white space. They will experiment with crowding versus distributing white space to see how it influences visual perception.

B. VISUAL DESIGN ELEMENTS

In addition to the principles underlying composition, visual design is built on a set of fundamental **elements** that are used to create shapes, images and visual messages.

a. Color

Color is one of the most powerful elements of visual design, having a strong emotional impact on viewers and the ability to convey emotions and guide public perception. An understanding of **color theory** (color wheel, complementary, contrasting colors, etc.) is essential to create harmonious and visually pleasing compositions.

Color theory:

- **Complementary colors:** Opposite colors on the color wheel that create a strong contrast and draw attention (e.g. blue and orange).
- **Analogous colors:** close colors on the color wheel that visual harmony (e.g. shades of blue and green).
- **Neutral colors:** Colors like white, black, and gray, used to accent other brighter elements.

Hands-on activity**:** Participants will create a color scheme for an educational visual campaign, using complementary and analog palettes. They will explore how colors influence the perception and impact of the message.

b. Typography

Typography refers to the art of choosing and arranging fonts in a way that is functional and aesthetically pleasing. Typography is a crucial element in clearly communicating your message, and choosing the right fonts is important to express the right tone and style.

Choice of fonts:

a. **Sans-serif fonts** for crisp, modern text that is easy to read on screens.
b. **Serif fonts** for more formal or traditional text, often used in books or printed materials.
c. **Combining fonts:** How to use two complementary fonts (e.g. one font for headlines and one for body text) to create contrast and a clear hierarchy.

Practical activities:

- Using a serif font to give a traditional and formal look to a written work or a sans-serif font for a modern and clean design.
- Participants will create a slideshow presentation using font combinations to clearly structure the hierarchy of information, with a focus on headings, subheadings and main text.

c. Shapes and lines

Shapes (geometric or organic) and lines are used to create the structure of a design and direct the viewer's attention to different areas of the page.

Practical activity: using geometric shapes such as squares and circles to create points focal points in a presentation design.

d. Images and illustrations

Images play an essential role in visual design, adding context and emotion to a message. It is important to choose relevant, quality images that enhance visual communication, not distract.

Practical activity: choose a high-resolution photo that thematically matches the added text to reinforce the overall design message.

EVALUATION:

- Module evaluation will include practical activities that demonstrate the correct application of visual design principles. Each participant will present a project (poster or presentation) that applies all the concepts discussed, and peers and the trainer will provide feedback.

EXPECTED RESULTS AT THE END OF THE MODULE:

At the end of this module, participants will understand the fundamental principles of design

and apply them to create visually pleasing and visually effective visual materials.
see communicative.
They will be able :

- Apply the principles of balance, contrast, white space, typography and color to create balanced and effective visual compositions.
- Develop visual materials that are visually pleasing, clear and easy for students to understand.
- Understand how visual design influences perception and learning.

SKILLS acquired by completing the sub-module BASICS OF VISUAL DESIGN:

1. **Understanding fundamental design principles**: Participants will gain a clear understanding how basic design principles influence visual perception and effective communication of a message.
2. **Practical visual organization skills**: learners will learn to apply theoretical concepts to real projects, developing skills to visually organize information in a coherent and aesthetic way.
3. **Ability to use colors and typography effectively**: learners will learn how to choose and apply colors and fonts correctly according to the context and visual objectives of their projects.

5.2. TECHNIQUES FOR CREATING INFOGRAPHICS AND MARKETING MATERIALS

The sub-module is essential for participants who want to develop their visual communication skills and learn how to effectively convey information and messages in an engaging way. Infographics and marketing materials are very powerful visual tools, capable of synthesizing complex data and capturing the attention of the audience.

This submodule will introduce participants to basic and advanced techniques for creating engaging visuals using color, shape, typography, and strategic organization of information.

Objectives:

1. **Understanding the importance of infographics and marketing materials** - participants will learn why these visual materials are useful for communicating complex information quickly and effectively.
2. **Technical skills for creating infographics** - participants will learn the basic techniques and rules to create clear, informative and aesthetic infographics.
3. **Develop technical skills to create effective marketing materials** - participants will learn how to use visual design to attract and hold the attention of their target audience by creating engaging posters, leaflets and digital materials.
4. **Application of design techniques in practical projects** - participants will create visual materials incorporating concepts learned, working with tools such as Canva and PowerPoint.

Content:

1. Introduction to infographics and marketing materials

In this introductory section, participants will learn:

- What an infographic is and how it works: an infographic is a visual communication tool that combines text, images, graphics and symbols to explain and simplify complex information.
- Types of infographics: Participants will discover the main types of infographics, including:
  - List infographics: Organize information in the form of a visual list.
  - Chronological infographics: Present information in chronological order, illustrating a process or sequence of events.
  - Statistical infographics: Focus on visualizing data and statistics.
  - Comparative infographics: allow a visual comparison between two or more elements.
- Marketing materials: these include a variety of visual materials, such as posters, leaflets, flyers, banners and social media images, used to communicate a specific message to the target audience and entice them to take action (buy a product, attend an event, etc.).

Essentials for creating infographics

To create successful infographics, participants will learn how to use the following elements effectively:

a. **Visualized data and statistics**

- Participants will learn to select relevant data and visualize it in a clear and accessible way using graphs, charts and icons. The aim is to quickly convey essential information without overloading the viewer.
- Practical example: Present percentages as pie charts or bar graphs to show proportions.

b. **Pictograms and symbols**

- Pictograms simplify the visual message and help improve understanding. They can replace text in some cases, saving space and making the infographic easier to navigate.
- Practical example: Using phone, email or map icons instead of text to indicate your contact details.

c. **Maps and locations**

- Infographics about locations or geographic data can include customized maps to provide context. Maps are useful for showing the geographical distribution of data or to indicate locations of interest.
- Practical example: Using a map of the city to indicate the locations of different points of interest, such as subsidiaries a company.

Techniques for creating marketing materials

Marketing materials are designed to attract attention and motivate viewers to act.

Marketing materials need to combine text and visuals in an attractive and functional way in order to attract and hold the attention of the audience.

For this, participants will learn**:**

a. Structuring the message

- **Headlines** are the first thing your audience sees, so they need to be concise, relevant and attractive. Subheadings help to detail the main message and structure the information. This is achieved by visually organizing the text in well-defined blocks and placing the most important information (headlines, offers, CTAs - Call to Action) in visible places.
- Practical example: In an event poster, the title and date should be the first pieces of information observed, followed by additional details**.**

b. Using the color palette to attract attention

- Colors should be chosen strategically to highlight key messages and reflect brand identity. Warm colors (red, orange) attract attention and stimulate action, while cool colors (blue, green) convey professionalism and calm.
- Practical example: Using the color red for a "Book Now" button will attract attention and encourage the user to take action.

c. Call to Action (CTA)

- **Call to Action (CTA)** is a key element in marketing materials, representing the desired action from the audience. CTAs should be clear, visible and provide a direction for action and should be clear, visible and specific (e.g. "Buy now", "Sign up", "Contact us").
- Practical example: A CTA strategically placed at the bottom of a poster, such as "Learn more on our website", draws attention to a next action**.**

d. Images and impact graphics

- Images and graphics are essential to attract visual attention and communicate complex messages in an easy-to-understand way. High quality and relevant images add value to marketing materials.
- Practical example: In a brochure to promote a product, including a large, clear image of the product will be more appealing than a text description.

e. Typography and fonts

- The choice of fonts and typographic style are key to conveying the tone of the message (serious, dynamic, professional, etc.) Large, bold fonts are ideal for headlines, and simpler ones for body text.
- Practical example: for an educational event poster, a serif font for the title could give a serious air and a simple sans-serif font for the description improves readability.

3. Writing techniques for marketing materials

Effective writing is the key to a clear and persuasive message. Some essential techniques include:

a. Audience-oriented writing

- The message should be tailored to the target audience and structured around their needs and wants. Using friendly and personalized language can improve receptiveness.
- Practical example: For a leaflet promoting a summer camp for teenagers, the language should be energetic and dynamic, appealing to an interest in adventure.

b. Benefits before features

- In most marketing materials, it is more effective to highlight the benefits of a product or service before presenting technical features. The audience will be more interested in what benefits it can bring.
- Practical example: in a brochure for a new laptop, the phrase "Superior performance for efficient multitasking" will attract more attention than "Intel Core i7 processor".

c. Clear and concise language

- Marketing materials should use simple and clear language, avoiding jargon and complicated phrases. The message should be easy to understand and not overload the audience with unnecessary detail.
- Practical example: instead of "Our app will facilitate a process to optimize your time," use "Save time with our app".

Design strategies for different types of marketing materials

a. Advertising posters

- Posters need to be visible and get the message across clearly and quickly. They should include a catchy headline, a powerful image and a clear CTA. Colors should be chosen to match the theme and highlight key elements.
- Practical example: A poster for a concert could have a background image of the band and a bold headline, with the details limited to the date, location, and a CTA such as "Buy tickets now."

b. Brochures and leaflets

- Brochures and leaflets offer more space to detail information about a product, service or event. Their structure should be clear, with an introductory section, a section for details and a conclusion with a CTA.
- Practical example: A brochure for a new personal care might have an introductory section about the benefits of the product, then an overview of the ingredients and instructions for use, ending with a promotional offer and a CTA for purchase**.**

c. Online banners and ads

- Online banners need to be concise and visually appealing, as users have only a few seconds to understand the message. In a banner, image, headline and CTA are the most important elements.
- Practical example: An online promotional banner could have a headline such as "Discounts from Black Friday - Up to 70% discount" with a "Learn more" button.

Tools and practices for producing infographics and marketing materials

Participants will learn how to use a variety of design tools to quickly create engaging infographics and marketing materials.

a. Canva

- Canva is an easy-to-use graphic design platform that provides templates for infographics and marketing materials. Participants will learn how to use Canva to create engaging visuals without advanced design skills.
- Practical example: Use a predefined infographic template in Canva, customizing the colors and text to match your brand or project theme.

b. PowerPoint

- PowerPoint is a useful tool for creating simple infographics and visual presentations. Participants will learn how to use shapes, lines and diagrams to create basic marketing materials.
- Practical example: creating a poster for an event using geometric shapes, text and custom colors.

Practical activities:

1. Create a personalized infographic: Each participant will choose a specific topic and create an infographic that includes visuals and data organized in a clear and aesthetically pleasing way.
2. Making a promotional poster: Participants will create a poster for an event or campaign, using design elements such as contrast, color palette and white space to draw attention to the main message.
3. Creating a promotional leaflet: In this activity, participants will create a promotional leaflet for a fictional or real organization, applying the basic visual principles learned in this module.

Skills acquired through the sub-module:

1. **Visual organization skills: Participants will know how to structure and present information in a clear and attractive way, using visual elements such as colours, shapes and typography.**
2. **Knowledge of creating marketing materials: learners will learn how to design posters, leaflets and promotional materials that effectively communicate the desired message and attract the attention of the target audience.**
3. **The ability to create infographics: Participants will learn how to create infographics that convey complex information in a simple and aesthetically pleasing way using data visualization techniques.**
4. **Using graphic design tools: Learners will acquire practical skills in using graphic design tools, such as Canva and PowerPoint, to quickly create professional visuals.**

5.3. VISUAL STORYTELLING

Visual storytelling, also known as **VISUAL STORYTELLING**, is the art of conveying a message, idea or story through visual elements such as images, graphics, videos, infographics and other forms of visual media. In a world where audiences' attention is increasingly fragmented, visual storytelling is becoming an essential tool for communicating complex ideas quickly and effectively, while capturing the attention and interest of the audience.

OBJECTIVE:

1. **Capturing the audience's attention** - Visual storytelling relies on the immediate impact of images, which can convey emotions and messages in a very short time, grabbing and holding the audience's attention.
2. **Simplifying complex information** - Visuals help present complex concepts or data in a clear and accessible way. This is crucial in education, marketing and business presentations.
3. **Generating an emotional connection** - Through visual storytelling, the audience can develop an emotional connection with the story being told, which increases engagement and memory of the message.
4. **Improve understanding and retention of information** - Studies show that people retain information better when it is presented visually. Visual storytelling combines text with relevant images to improve both understanding and retention.

CONTENTS:

FUNDAMENTALS OF VISUAL STORYTELLING

In order to create an effective visual story, you need to understand a few key elements that contribute to the structure and impact of the visual narrative.

1. Characters

- Characters are essential to visual storytelling because the audience can identify with them and develop an emotional relationship. These characters do not necessarily have to be people; they can also be objects, abstract concepts or even brands.
- Practical example: In a marketing campaign, the character can be the consumer using the product or service, highlighting how it solves their problems and improves their life.

2. Message or Theme

- Any visual story must have a clear message, a central theme that it conveys to the audience. This message must be coherent and reflected in all the visual elements of the narrative.
- Practical example: In a visual story about environmental protection, the theme can be linked to the need to conserve natural resources, and the images will reflect this message through natural landscapes and symbols of sustainability.

3. Emotion (Emotion)

- Emotion plays a crucial role in visual storytelling because it determines how the audience will connect with the message. Stories that evoke strong emotions - whether positive or negative - are more memorable and more effective at stimulating action.
- Practical example: A visual campaign that uses emotive images, such as happy children playing in a park or a family reunion moment, can trigger strong emotions and stimulate audience engagement.

4. Narrative (Narrative Arc)

- As with classic storytelling, visual storytelling must have a narrative arc, involving a beginning (introducing the context), a middle (developing the action) and an end (resolution or conclusion).
- Practical example: In an infographic explaining a production process, the story starts with the raw material, continues with the steps in the manufacturing process and ends with the finished product ready for consumers.

5. Voltage (Tension)

- Tension is what keeps the audience interested and curious. In visual storytelling, tension can be created through contrast, unexpected changes or powerful images that provoke emotion.
- Practical example: A visual story about climate change can start with idyllic images of nature, followed by disturbing images of areas affected by natural disasters, creating a tension between what is and what could be.

VISUAL STORYTELLING TECHNIQUES

To create a compelling visual story, you need to use certain visual techniques that enhance the impact and clarity of your message.

1. Using powerful and symbolic images

Images are the building blocks of visual storytelling. They must be relevant to the message and evoke emotion. In addition, the use of symbols can add depth to the story and communicate subtle meanings.

Practical example: In a health awareness campaign, an image of a bright red apple can symbolize health, while an outstretched hand can suggest help or support.

2. Sequential order and visual flow

Effective visual storytelling requires a logical flow of visual elements to guide the viewer's eye from one part of the narrative to another. The sequential order helps to maintain clarity and build a coherent narrative.

Practical example: In an infographic about the steps of a journey, the sequential order of the images (e.g. from booking a flight to arriving at your destination) helps the audience to clearly understand the process.

3. Color and contrast to accentuate the message

Colors play an important role in visual storytelling because they can communicate emotions and highlight certain elements. Contrast helps create a focal point in the story, drawing attention to the most important elements.

Practical example: Using the color red to mark a hazard in a safety at work graph

The workplace can highlight issues that need to be avoided or corrected.

4. Typography and font choice

Typography can amplify the message of visual storytelling. Choosing the right fonts for headlines, subheadings and text is crucial to keep the narrative coherent and add visual impact. Practical example: In a visual story about a humanitarian cause, a simple, easy-to-read font can communicate the clarity and seriousness of the message, while bolder fonts can draw attention to critical issues.

5. Using white space

White space, or negative space, is the clear area around visual elements that helps organize and clarify the story. Proper use of white space can make visual storytelling easier to follow and more aesthetically pleasing.

Practical example: In a complex infographic, the use of white space between different sections of the graphic helps to separate information and avoid visual clutter.

Applications of visual storytelling

Visual storytelling can be applied in a variety of fields, each with its own specificities, but all with the same goal: to communicate a clear and captivating message.

1. Education

In education, visual storytelling is a powerful tool to make lessons more engaging and help students retain information more easily. Images, infographics and educational videos are examples of visual storytelling in action.

Practical example: A teacher can use a visual story in the form of a concept map to explain how an ecological system works, using images of plants, animals, and natural resources to illustrate processes.

2. Marketing and branding

In marketing, visual storytelling helps brands communicate their values and identity in an authentic and memorable way. Visual campaigns that tell a story succeed in creating an emotional connection with consumers and boost brand loyalty.

Practical example: A cosmetics company could create a visual campaign that aims to transform a person who uses their products by emphasizing the benefits of the product in a visual, progressive way.

3. Visual journalism and interactive storytelling

In modern journalism, visual storytelling is used to present news and features in a more interactive format. Infographics, image galleries and narrative videos help bring complex information closer to the audience.

Practical example: An online newspaper could use visual storytelling to illustrate the impact of a humanitarian crisis, with images and data showing how the situation has evolved over time and what action has been taken.

4. Presentations and business projects

In the business world, visual storytelling is used in presentations to communicate strategies, results and visions in an engaging way. Using images and graphics helps to clarify

key points and supporting data in a memorable way.
Practical example: An investor presentation could use visual storytelling to show a company's financial performance, using growth charts, team photos and product images.

Skills:

- **The ability to create compelling visual narratives**: participants will learn how to build a coherent and interesting visual story, using techniques that will grab and hold the audience's attention.
- **Skills in using imagery and typography for maximum impact:** learners will acquire the knowledge to select and integrate powerful and relevant imagery and choose the right typography for each visual message.
- **Improving communication through visuals**: Participants will learn how to use visual elements to communicate complex ideas in a simple and accessible way.
- **Practical skills to implement visual storytelling in educational, business and marketing projects**: learners will be able to apply visual storytelling in their field of activity, be it education, branding or journalism.

PRACTICAL ACTIVITY:

- Participants will create a **visual story** about an educational topic, using a sequence of images and text to illustrate an educational idea or concept (e.g. the evolution of a scientific discovery, the process of resolving a conflict in the classroom).

EXPECTED RESULTS:

Participants will learn how to create captivating visual stories that engage students emotionally and convey educational messages in a memorable way.

Visual storytelling is a powerful tool to communicate effectively and engagingly in a world where audiences are increasingly bombarded with information. By using the right design techniques, powerful imagery and a clear narrative structure, visual storytelling can transform complex information into accessible, memorable and compelling messages.

5.4. FEEDBACK AND IMPROVEMENT METHODS

Feedback and refinement methods are essential for developing visual communication skills and continuously improving the quality of visual materials. In this sub-module, participants will learn how to collect, give and use feedback to optimize their visual designs and presentations. They will also learn how to self-evaluate their own work and use specific tools and techniques to refine their work in order to develop clearer, more engaging and more effective materials.

OBJECTIVE:

- **Develop skills to receive and give constructive feedback** - participants will learn the principles of constructive feedback and how to offer clear and beneficial suggestions to improve visual communication.
- **Use feedback to optimize visual projects** - participants will learn how to apply feedback to improve their visual materials and increase their impact.
- **Acquire techniques for self-assessment and continuous improvement** - participants will learn how to identify weaknesses in their own work and how to implement changes and adjustments to achieve high quality results.

CONTENTS:

1. The importance of feedback in visual design

Feedback is an essential tool in the visual creative process as it provides new insights and helps to improve the quality and effectiveness of materials. Through feedback, designers can better understand the perception of their audience and adjust the design to better meet their needs.

- Types of feedback: Feedback can be internal (from colleagues, teachers or collaborators) or external (from the target audience or customers).
- Purpose of the feedback: It is important that the feedback is aimed at improving the project and not criticizing the person who carried it out, in order to promote a constructive and collaborative environment.

2. Principles of constructive feedback

To ensure valuable and constructive feedback, participants will learn some principles key:

a. Specificity of feedback

- The feedback should be specific and oriented to concrete details. Instead of general statements such as "it should be better," it is important to identify the exact aspects that can be improved (e.g. "it would be more effective if the headline was bigger").
- Practical example: In an infographic, specific feedback might recommend the use of a more visible font for subheadings or improving the contrast between background and text for better readability.

b. Objectivity and neutrality

- Feedback should be objective, focused on the project and not on the person who created it. This helps to maintain a climate of trust and collaboration and feedback easier to accept.
- Practical example: Instead of saying "this design is wrong", it is more effective to say "image positioning can be adjusted to better balance the composition**".**

c. The balance between praise and suggestions for improvement

- Constructive feedback contains both praise for things done well and suggestions for improvement. It helps participants understand what aspects need to be

maintained and in need of adjustment.

- Practical example: "The colors you choose are great for grabbing attention. However, you might improve the readability of the text if it were larger."

3. Techniques for giving and receiving feedback

Giving and receiving feedback are skills that can be developed through specific techniques, as well:

a. Sandwich method

- This method involves giving constructive feedback between appraisals. It starts with a positive remark, followed by a suggestion for improvement and ends with another positive note. This makes the person receiving the feedback feel appreciated and more open to suggestions.
- **Practical example**: "I really liked the choice of fonts, they give a friendly tone to the presentation. However, the background could be lighter in color to increase contrast. Overall, the layout is very attractive!"

b. Questions for clarification

- To better understand the intentions behind the design, participants can ask open-ended questions such as "What was the main idea behind this image?" or "How did you choose this color palette?" These questions help elicit additional details and give the author the opportunity to explain the choices made.
- **Practical example**: "What did you want to highlight with this color contrast? Is there something specific you want the audience to notice?"

c. Ask before you tell' technique

- Instead of directly offering suggestions for improvement, the evaluator can ask "Is there anything you would like to adjust or improve?" This approach helps to involve the designer in the improvement process and makes them reflect on their own design.
- **Practical example**: "How do you like the contrast between image and text? Are you satisfied with the legibility?"

4. Self-evaluation and continuous improvement of visual projects

In addition to external feedback, it is important for participants to develop self-assessment skills and continually refine their visual designs. Self-assessment allows them to notice their weaknesses and improve on the necessary aspects even before receiving feedback from others.

a. Objective analysis of the project

- Participants should analyze their own work with a critical eye, try to see the design from the target audience's perspective and identify elements that are not effective.
- Practical example: After making an advertising poster, participants can analyze their design to see if the message is clear, the text is legible and there is a well-defined visual hierarchy.

b. Using evaluation checklists

- Creating an evaluation checklist including key elements such as clarity

message, color harmony, alignment and readability, can help participants check whether the project meets all the quality criteria.

- Practical example: the checklist can include questions such as "Is the CTA visible?", "Is there enough white space?" or "Are the fonts consistent with the design theme?"

c. Multi-stage project review

- Dividing the refinement process into stages helps participants to review and improve each design component separately (e.g. reviewing colors, then fonts, then the arrangement of elements).
- Practical example: After an initial review color and contrast, learners can make adjustments and move on to evaluating text and typography.

5. Digital tools for feedback and improvement

There are several tools and platforms that facilitate the process of feedback and refinement of visual projects. Some of these include:

a. Google Docs or Slides for collaborative comments

- These apps allow users to comment directly on projects and suggest changes. Participants can upload visual designs and invite colleagues to add feedback in the form of comments, highlighting exactly where the problem lies or what can be improved.
- Practical example: An infographic created in Google Slides can be commented by colleagues and suggestions can be implemented in real time.

b. Visual feedback platforms such as InVision and Adobe XD

- These platforms specialize in providing visual feedback and allow users to upload designs, and collaborators can add comments directly on specific elements. InVision and Adobe XD are widely used in graphic design and UX for collecting structured feedback.
- Practical example: An interactive presentation created in InVision can be uploaded to receive feedback from the marketing team and changes can be adjusted based on their recommendations.

c. Design prototyping and testing tools such as Canva and Figma

- Both Canva and Figma are graphic design and prototyping tools that allow collaborative work and offer options to add comments. Figma, in particular, is very popular for collaborative projects and allows for quick revisions with detailed feedback and real-time changes.
- Practical example: A design made in Figma can be shared with colleagues who will add feedback on dimensions, positioning or fonts used.

Practical activity:

- ❖ Collaborative feedback session: participants will work in teams to give and receive feedback on previously created visual projects. Each participant will offer constructive suggestions to colleagues and learn how to implement the feedback received.
- ❖ Self-assessment of your own visual project: each participant will analyze their own project using the self-assessment checklist and identify possible improvements. Finally,

participants will implement the necessary changes.

- ❖ Refining a design in several steps: Participants will take a simple design and apply feedback and adjustments in three different steps (colors, typography, visual hierarchy). At the end, they will present the final version and discuss the implemented improvements.

Expected results:

Participants will learn how to apply constructive feedback to improve the visuals they create and understand how to provide feedback to support design refinement.

The Feedback and Improvement Methods sub-module is essential for anyone who wants to improve their visual communication skills through constant feedback and self-assessment. By applying the techniques learned, participants will be able to create high quality visuals, collaborate effectively and continuously refine their projects.

MODULE EVALUATION:

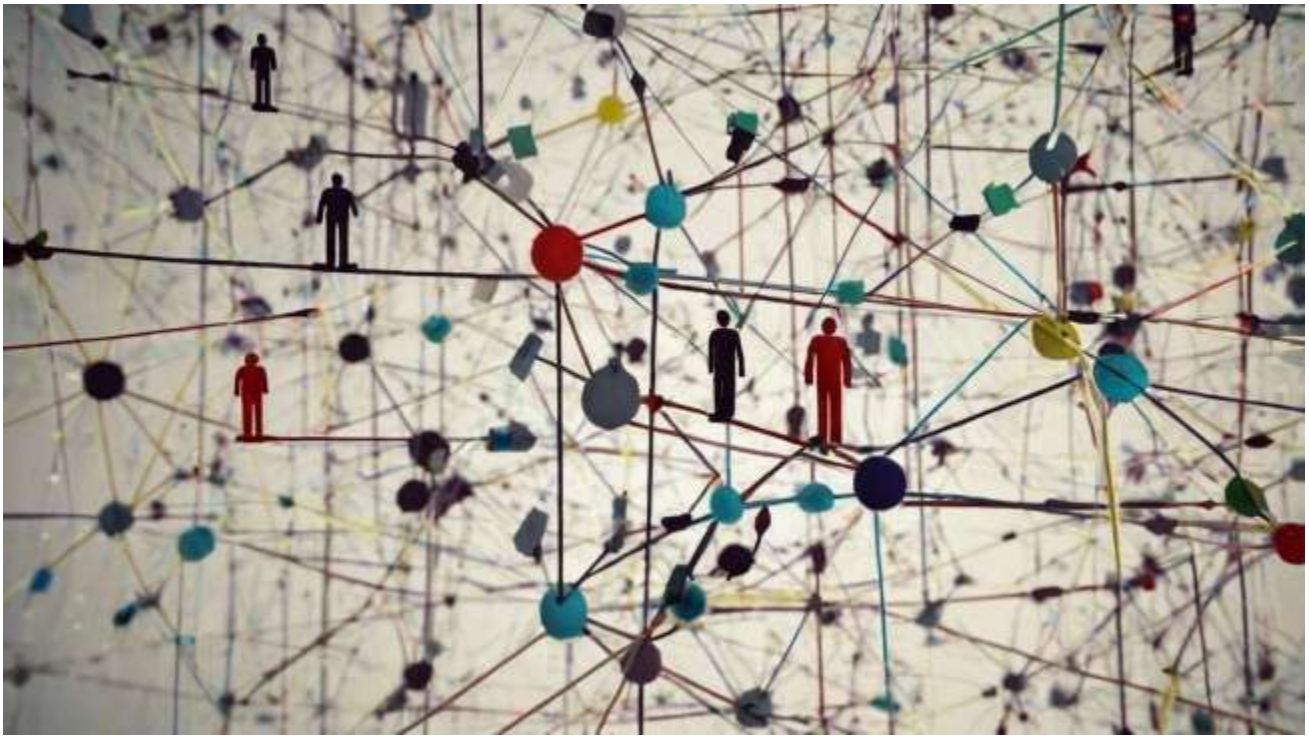
- Assessment will be based on the visual materials created during the practical activities (infographics, marketing materials, visual stories) and the feedback received and applied will be part of the assessment process.

EXPECTED RESULTS AT THE END OF THE MODULE:

At the end of this module, participants will be able :

- Create effective visuals such as infographics and posters.
- Use visual storytelling to make lessons more engaging.
- Get constructive feedback to continuously improve your visual design.

MODULE 6: IMPLEMENTING INTERDISCIPLINARY PROJECTS



GENERAL OBJECTIVE:

This module aims to develop participants' skills in designing, collaborating and implementing interdisciplinary projects in education. Teachers will learn how to create projects that integrate multiple disciplines, how to collaborate effectively with colleagues from other subject areas and how to implement these projects in the classroom. Through case studies and examples of good practice, participants will understand the challenges and opportunities of interdisciplinary work and how it can enhance learning for students.

SPECIFIC OBJECTIVES:

1. Familiarization with the stages of designing an interdisciplinary project, from the identification of the topic to the detailed planning of activities.
2. Learning strategies for collaboration between teachers from different disciplines to ensure effective integration of knowledge and teaching methods.
3. Analyzing case studies and examples of good practice to identify the factors that contribute to the success of an interdisciplinary project.
4. Development of a complete interdisciplinary project, which participants can then implement in your own school.

6.1. PROJECT DESIGN

Interdisciplinary projects involve the integration of knowledge and skills from more than one field to tackle a complex theme or problem.

The "Designing Interdisciplinary Projects" sub-module teaches participants how to plan, structure and implement such projects, with an emphasis on collaboration between different subject areas and a creative approach to learning. The aim of this sub-module is to help participants to create learning projects that motivate learners to apply knowledge from multiple disciplines while developing transferable skills such as critical thinking, collaboration and communication.

OBJECTIVE:

- **Understanding the concept of interdisciplinarity** - participants will learn the basic principles of interdisciplinary approaches and their benefits for learning and personal development.
- **Planning and structuring an interdisciplinary project** - participants will learn how to set project objectives and outcomes, integrate different domains and plan activities to create a coherent learning experience.
- **Developing collaboration and communication skills** - participants will learn how to collaborate effectively with teachers from other subjects and facilitate collaboration between students.
- **Applying the learner-centered approach** - participants will learn how to create projects that put learners at the center of the learning process, promoting autonomy, responsibility and active involvement.

CONTENTS:

1. The concept of interdisciplinarity and its advantages in education

First, participants will understand what interdisciplinarity means and why it is important in modern education.

- **Definition of interdisciplinarity**: Interdisciplinarity involves two or more disciplines working together to tackle a complex problem across traditional disciplinary boundaries.
- **The benefits of interdisciplinary projects**: they contribute to the development of critical thinking, creativity and problem-solving skills, as students learn to apply knowledge and methods from more than one subject area.
- **Practical example**: A project on "Climate Change" can integrate knowledge from geography (climate studies), biology (effects on ecosystems), economics (economic impacts of climate change) and social sciences (community implications).

2. Steps in designing an interdisciplinary project

In order to design an effective interdisciplinary project, participants will learn how to follow a

series of steps:

a. Setting the project's theme and purpose

- Choosing a relevant and engaging theme is essential to stimulate students' interest. The theme should be complex, so as to allow the integration of several subjects.
- Practical example: A topic such as "Cities of the Future" can cover urban planning, ecology, technology and sociology.

b. Identification of learning objectives and expected outcomes

- At this stage, participants will learn how to define the learning objectives for each discipline involved and establish the final outcomes of the project. These objectives should be clear, measurable and oriented towards interdisciplinary competences.
- Practical example: In the project "Cities of the Future," objectives may include the development of technical skills (e.g., urban planning), collaborative skills and critical thinking.

c. Creating an activity plan and timetable for implementation

- Planning project activities involves dividing the project into stages and allocating time for each activity, including research, teamwork and final presentation.
- Practical example: The timeline may include a first research phase (one week), followed by a solution design phase (two weeks) and an evaluation and presentation phase.

d. Integration of educational resources and materials

- Participants will learn how to identify and integrate educational resources and materials relevant to each discipline to facilitate interdisciplinary learning.
- Practical example: In the "Cities of the Future" project, resources could include research articles on green cities, climate change documentaries and case studies.

3. Collaboration between teachers and students in interdisciplinary projects

Interdisciplinary projects involve close collaboration between teachers and students from different disciplines. Participants will learn to create a collaborative working environment and use methods to facilitate collaboration.

a. Establishing an interdisciplinary team of teachers

- In order to design a successful interdisciplinary project, it is important that teachers from different fields to collaborate and contribute their unique knowledge and experience.
- Practical example: For the "Cities of the Future" project, the team could include a natural science teacher, a history teacher and a technology teacher.

b. Students working together in diverse teams

- Participants will learn techniques for forming teams of students so that they are as diverse as possible and encourage collaboration between students with different abilities and perspectives.
- Practical example: Students can be divided into teams that include both technically and creatively skilled people to create an integrated approach.

c. Using digital collaboration tools

- Digital tools (such as Google Drive, Microsoft Teams, Miro or Padlet) facilitate communication and sharing of materials and are particularly useful for complex projects that

requires continuous collaboration.

- Practical example: Teams of students and teachers can use Google Drive to share relevant documents and files or Padlet for brainstorming ideas.

4. Activities and teaching methods specific to interdisciplinary projects

To keep students engaged and motivated, participants will learn to create varied and interactive activities that develop interdisciplinary skills.

a. Project-Based Learning (PBL)

- PBL is a method in which students actively learn by working on a real project that integrates several subjects and allows them to apply their knowledge in practical situations.
- Practical example: In a project on "Renewable Energy," students can work on a prototype solar energy system, applying knowledge from physics, economics and technology.

b. Inquiry-Based Learning (IBL)

- In this method, students are encouraged to ask questions and investigate a topic to find solutions. The method promotes critical thinking and autonomy in learning.
- Practical example: in a project on "The impact of waste on the environment," students can collect data on recycling and propose solutions to reduce waste in their community.

c. Case studies and real scenarios

- The use of case studies and real-life scenarios helps students to understand how theoretical concepts are applied in real life, promoting a deeper understanding of the subject.
- Practical example: A case study of a green city in Europe can provide inspiration and practical ideas for the "Cities of the Future" project.

5. Evaluation and presentation of the results of interdisciplinary projects

Assessment is an essential part of the interdisciplinary learning process and participants will learn to create assessment methods that reflect the diversity of competences developed in the project.

a. Formative and summative evaluation

- Formative evaluation involves monitoring progress throughout the project through continuous feedback and adjustment of activities. Summative evaluation takes place at the end of the project and measures the overall results.
- Practical example: During the project "Cities of the Future," teachers can provide feedback on the research and design stages, and at the end, evaluate the presentation and the realized prototype.

b. Assessment of interdisciplinary competences and transferable skills

- The assessment of interdisciplinary projects should take into account not only theoretical knowledge, but also collaborative, critical thinking and problem-solving skills.
- Practical example: In a project on "Renewable Energy," the evaluation may include criteria related to innovation, collaboration, efficiency of proposed solutions and clarity of presentation.

c. Presenting and communicating results

- At the end of the project, students are encouraged to present their work in a creative format and

professional. The presentation can be done through various means (e.g. PowerPoint, poster, video) and can involve a real audience (colleagues, teachers, parents).

- Practical example: Students can create a video showcasing the concept of a "City of the Future," explaining the proposed solutions and the environmental impact.

Practical activity:

Participants will collaborate in teams to create an interdisciplinary project on a topic of their choice. Each team will present the structure of the project, describing how the different disciplines will be integrated and the expected outcomes.

Expected results:

At the end of this sub-module, participants will be able to design a complete interdisciplinary project, integrating knowledge and methods from different fields to create an educational project with impact.

6.2. STRATEGIES FOR COLLABORATION BETWEEN

Collaboration between teachers is essential to develop and implement interdisciplinary and innovative educational projects, contributing to improving the quality of teaching and learning. In this sub-module, participants will learn strategies and methods to collaborate effectively with colleagues from other disciplines, as well as ways to create a culture of collaboration in the school. This sub-module emphasizes joint planning, effective communication and the use of shared resources to ensure the success of interdisciplinary projects.

OBJECTIVE:

- **Understand the importance of collaboration between teachers** - participants will learn the benefits of collaboration and its impact on student performance and teacher team effectiveness.
- **Develop communication and joint planning skills** - participants will acquire techniques to communicate effectively and plan activities and projects together with other teachers.
- **Learn how to create and manage interdisciplinary teams** - participants will discover how to form effective working teams, take clear roles and manage the challenges of collaboration.
- **Explore digital tools for collaboration** - participants will learn to use digital tools that facilitate collaboration between teachers, especially in interdisciplinary learning contexts.

CONTENTS:

1. The importance and benefits of collaboration between teachers

Collaboration between teachers not only improves the quality of teaching but also contributes to

continuous professional development and the creation of a learning community.

- **Defining collaboration between teachers**: Collaboration between teachers involves the joint planning, implementation and evaluation of educational activities in order to create richer learning experiences for students.
- **The benefits of collaboration**: it stimulates the exchange of ideas and resources, increases motivation and job satisfaction, improves team cohesion and provides valuable support in overcoming pedagogical challenges.
- **Practical example**: In a school, science and art teachers can work together to do a project on anatomy through drawing, where students study the structure of the human body and represent it visually.

2. Forming an interdisciplinary team of teachers

To collaborate effectively, teachers need to form teams that include people with diverse skills and knowledge. In this context, participants will learn to define their roles and responsibilities within the team.

a. Setting common goals and objectives

- Before starting the project, the team should set clear aims and objectives for the collaboration. These should be aligned with the school's overall objectives and meet the needs of the pupils.
- **Practical example**: For a project on climate change, geography, biology and civics teachers set the aim of raising awareness of the impacts of climate change and the specific objectives for each subject.

b. Assigning roles and responsibilities

- Each member of the team should have a clear role, and responsibilities should be defined according to each teacher's competences. Roles may include coordinator, documentation officer, evaluation expert, etc.
- **Practical example**: in an interdisciplinary project, the science teacher can coordinate the research part, the math teacher can contribute to the data analysis and the literature teacher can coordinate the presentation part.

c. Establishing working rules and a collaboration plan

- The team will define the working rules, including frequency of meetings, communication and progress evaluation methods. These rules will ensure coherent and effective collaboration.
- **Practical example**: Teachers set up a weekly meeting to discuss the progress of the project and use a shared document to keep track of each other's tasks.

3. Effective communication and constructive feedback

For effective collaboration, communication needs to be clear and open and feedback between colleagues to be constructive.

a. Effective communication techniques

- Participants will learn communication techniques that encourage clear expression of ideas and

active listening. Assertive and empathic communication is key to understanding the perspectives and needs of each team member.

- **Practical example**: During a meeting, each teacher has the opportunity to express his/her views and the rest of the team practices active listening by recapping the key points discussed.

b. Methods of giving and receiving feedback

- Giving and receiving constructive feedback is essential to improve activities and solve any problems. Participants will learn feedback techniques such as the sandwich method (praise - suggestions - praise).
- **Practical example**: After the first stage of an interdisciplinary project, teachers give feedback to each other, praising aspects well done and offering clear suggestions for optimization.

c. Conflict resolution and dealing with disagreements

- In a diverse team, disagreements are inevitable. Participants will learn conflict management and negotiation techniques so that conflicts can be resolved constructively.
- **Practical example**: If there are differences of opinion on assessment methods, the team can organize a discussion to find a compromise or to integrate everyone's suggestions in a fair way.

4. Joint planning of educational activities and interdisciplinary projects

Joint planning is essential to ensure that all activities and projects are well coordinated and that each teacher contributes effectively to the achievement of the objectives.

a. Creating a detailed work plan

- A clear work plan, including all project milestones, resources needed and deadlines, help organize activities efficiently and avoid delays.
- **Practical example**: For a project on recycling, the plan could include research stages, creative activities and a final presentation session, with clear deadlines for each stage.

b. Integration of the learning objectives of each subject

- Each teacher will contribute with learning objectives specific to his/her field, which will be integrated into the project to ensure a comprehensive and interdisciplinary approach.
- **Practical example**: in a project on nutrition, the biology teacher focuses on digestive anatomy, the PE teacher on the benefits of physical activity and chemistry teacher on food composition.

c. Monitoring and evaluating progress as a team

- The teaching team will establish methods for assessing progress, including regular meetings to discuss achievements and challenges.
- **Practical example**: Teachers organize a bi-monthly meeting to review students' progress in the project and adjust activities if necessary.

5. Digital tools for teacher collaboration

Technology can make it easier for teachers to collaborate, especially when they cannot meet face-to-face. Participants will explore some digital tools that simplify the collaboration process.

a. Google Workspace (Google Drive, Docs, Sheets, Calendar)

- Google Workspace offers a suite of tools for sharing documents, scheduling tasks and collaborating in real time. Google Docs and Google Sheets allow collaborative editing, and Google Calendar can be used to set meetings and deadlines.
- **Practical example**: Teachers can use Google Docs to collaborate on a common lesson plan, each adding sections relevant to their subject area.

b. Project management platforms such as Trello and Asana

- Trello and Asana are platforms that allow you to manage projects by creating to-do lists and milestones. Teachers can use these platforms to organize activities and monitor the progress of each team member.
- **Practical example**: In an interdisciplinary project, teachers can use Trello to create task cards for each activity, thus having an overview of the implementation steps.

c. Microsoft Teams and Zoom for online meetings and resource sharing

- Videoconferencing platforms such as Microsoft Teams and Zoom facilitate communication and collaboration, especially when teachers cannot physically meet. They allow you to organize meetings and share documents and screens.
- **Practical example**: Teacher team can organize weekly Zoom meetings to discuss project progress and share ideas or additional resources.

The Teacher Collaboration Strategies sub-module helps participants to develop essential skills for working in interdisciplinary teams, promoting effective collaboration and a mutually supportive culture in the school. These skills not only enhance students' learning experiences, but also contribute to teachers' ongoing professional development and the creation of a cohesive and collaborative educational community.

Practical activity:

- **Forming an interdisciplinary collaborative team**: Participants will form teams in course and work together to set objectives and plan an interdisciplinary project on a complex topic.
- **Simulation of a feedback and communication session**: each team will practice the techniques of communicating and giving constructive feedback, discussing the challenges and possible solutions in the collaboration.
- **Using a project management platform**: Each team will work on a digital platform, such as Trello or Google Workspace, to coordinate tasks and experience the benefits of digital collaboration.

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Expected results:

Participants will be able to develop effective collaboration strategies and create an interdisciplinary working environment based on open communication and mutual respect, and will acquire:

- **Collaboration and teamwork skills**: Participants will learn how to work in interdisciplinary teams, communicate effectively, and assume roles and responsibilities.
- **Effective communication techniques and constructive feedback**: Learners will develop essential skills to communicate openly and constructively, managing possible conflicts or misunderstandings.
- **Joint planning and project management skills**: participants will learn how to create effective work plans, assign roles and monitor team progress.
- **Using digital collaboration tools**: Learners will acquire practical skills in using digital platforms and applications to support collaboration and coordination between teachers.

6.3. CASE AND BEST PRACTICES

Case studies and good practices are valuable resources for effective learning, providing concrete and applied examples of success in education, from which participants can learn how to implement interdisciplinary projects with impact. The Case Studies and Best Practices sub-module gives participants the opportunity to analyze and discuss real examples of interdisciplinary educational projects, identifying key success factors and applying ideas and strategies in their own projects.

OBJECTIVE:

- **Understanding the principles of successful interdisciplinary projects** - participants will analyze successful educational projects to identify the key principles and strategies used.
- **Developing critical analysis and application skills** - participants will learn how to evaluate case studies, extract ideas and adapt observed practices to their specific needs.
- **Promoting the exchange of ideas and knowledge** - participants will share their own experiences and learn from the experiences of their peers, creating a collaborative learning community.
- **Stimulate innovation and adaptability** - case studies inspire new ideas and creative solutions that can be implemented in the context of each participant's school and subject.

CONTENTS:

1. What are case studies and good practices?

Before looking at concrete examples, participants will learn the definitions and role of case studies and good practice in education.

- **Definition of case studies**: Case studies are detailed examples of specific educational projects that include information about the context, objectives, methods used, challenges and outcomes.

- **Good practices**: are proven methods or strategies are recognized as effective and can be applied in other contexts.
- Their **role in education**: they enable teachers learn from the real-life experiences of others, assess applicability and adapt practices to their own educational context.

2. Characteristics of a relevant case study

In order to select and evaluate case studies, participants will learn about the key features of a well-structured case study.

a. Relevance to educational objectives

- The case study should be relevant to the specific aims and themes that participants wish to implement in their interdisciplinary projects.
- **Practical example**: If the goal of the project is to increase student engagement in science learning, a case study of an interactive STEM project would be particularly valuable.

b. Clarity of description of the process and methods used

- The case study should provide a detailed description of how the project was implemented, including the steps, methods and resources used.
- **Practical example**: A case study about an environmental project could include information about project-based learning (PBL) methods and the natural resources studied by the students.

c. Identifying challenges and applied solutions

- A useful case study shows not only the success of the project, but also the challenges encountered and how the team overcame these obstacles.
- **Practical example**: In a history and geography project on the migration of populations, case study can include the challenges encountered in working with local communities and the solutions implemented to involve them.

d. Evaluation of results and impact

- The case study should include an assessment of short- and long-term outcomes and impacts, so that participants understand the positive effects and areas for improvement. improved.
- **Practical example**: In a civic education project, the evaluation of the results could show how the activities have contributed to raising awareness of the importance of civic participation.

3. Examples of case studies and good practice in interdisciplinary projects

For a better understanding of the application of interdisciplinary projects, participants will analyze concrete case and best practices, discuss them in groups and extract lessons for their own projects.

a. City of the Future project - Collaboration across disciplines to imagine sustainable cities

- **Project description**: Students work together to design a green city, integrating knowledge from geography, ecology, urban planning and technology. The project involves research, design and presentation of a model of the city.

- **Methods and resources used**: project-based learning (PBL), physical and digital models, presentations and group discussions.
- **Challenges and solutions**: Challenges included the coordination of mixed teams, and the solution was to create smaller teams and share responsibilities.
- **Outcomes and impact**: Students learned about sustainability and the importance of collaboration, and the project sparked interest in the local community, leading to public discussions.

b. Healthy Eating Project - Integrating biology and economics into learning about nutrition

- **Project description**: Students investigate the nutritional aspects of food and its impact on health while learning about budgeting and local food sources.
- **Methods and resources used**: case studies, farm visits and nutritional analysis, practical lessons budgeting.
- **Challenges and solutions**: One obstacle was adapting materials to different levels of understanding, and the team of teachers carried out differentiated activities.
- **Results and impact**: Students learned how to evaluate food nutritionally and economically, developing a positive attitude towards healthy eating.

c. Art in History project - Integrating arts and history to explore historical events

- **Project description**: Students explore historical events through art, creating works inspired by specific historical periods. Project includes historical research, presentations and art exhibits.
- **Methods and resources used**: text analysis, visits to museums, discussions about the historical and social context of the periods studied, creative art activities.
- **Challenges and solutions**: One obstacle was the initial lack of interest in history, which was solved by associating it with the visually appealing elements of art.
- **Outcomes and impact**: Students developed a deeper understanding of historical events and learned to appreciate the role of art in transmitting cultural values.

4. Critical analysis of case studies

Participants will learn how to critically analyze case studies and apply the good practices discovered in their own projects. They will discuss the strengths and weaknesses of each case study and identify ideas that can be adapted for their own context**.**

a. Identifying transferable elements

- Participants will learn to recognize the elements and strategies that can be applied in different educational contexts and adapt them according to the needs of the students and the school.
- Practical example: in a project on environmental protection, teachers could adapt the structure of an existing STEM project, focusing on recycling and the impact on ecosystems.

b. Compare with your own projects and adapt ideas

- Participants will compare the case studies with their own projects and discuss how they could improve the structure or approach using ideas from the case studies.

- Practical example: A teacher planning a project on health can use the differentiated activities method seen in a case study to adapt the content according to the level of understanding of the students.

c. Group discussions to identify best practices

- Participants will discuss in groups the good practices identified and work together to develop new ideas and perspectives on their applicability.
- Practical example: in a group session, participants can discuss the challenges encountered in interdisciplinary collaboration and the solutions applied in their projects, drawing inspiration from successful examples of their peers.

5. Implement good practice in your own projects

After analyzing the case studies, participants will integrate good practices into their own projects, adapting them to their own school context.

a. Establishing an implementation plan

- Each participant will develop a plan to implement the ideas inspired by the case studies, specifying the objectives, methods and resources needed.
- Practical example: Teachers will determine how they can integrate collaborative learning methods into their projects, using the analyzed examples.

b. Adaptation to the specific school and classroom context

- Participants will discuss possible challenges and adapt good practices so that they are feasible in the context of their school, taking into account the resources and specificity of the students.
- Practical example: Teachers in rural areas can adapt an urban project to protect environment, focusing on local resources and recycling activities in the community.

c. Evaluation of good practice implementation

- Participants will evaluate the results of good practice and analyze their impact on the quality of learning and student engagement.
- Practical example: Teachers can make a questionnaire at the end of the project to evaluate students' perception of the experience and to identify possible improvements**.**

Practical activities:

- **Group analysis of case studies**: Participants will work in teams to analyze and discuss concrete case studies, identifying methods, challenges and solutions that can be integrated into their own projects.
- **Creating a good practice implementation plan**: each participant will create a plan for implementing a good practice in their project, specifying the necessary steps and resources involved.
- **Peer presentation and feedback**: Participants will present implementation plans to their peers, giving and receiving constructive feedback on how to adapt and implement.

The CASE STUDIES AND GOOD PRACTICE sub-module provides participants with an in-depth understanding of

how they can apply other teachers' experiences and projects to improve the quality of learning. By analyzing and implementing good practices, teachers develop an innovative and adaptable attitude and are able to create interdisciplinary projects inspire and actively involve students.

Expected results:

Participants will be familiarized with good practice in implementing interdisciplinary projects and will understand how to address challenges and capitalize on opportunities, and will acquire the following **competences**:

1. **Critical analysis skills**: Participants will acquire the ability evaluate case and to extract relevant ideas, adapting them to their own educational context.
2. **Knowledge about good practice**: learners will learn successful methods and strategies that can be applied in interdisciplinary projects to achieve better results.
3. **Ability to implement innovative ideas**: participants will know how to adapt and implement good practice in their own context, contributing to the development of more engaging and effective learning projects.
4. **Developing collaboration and exchange of ideas**: learners will gain experience in working with peers to learn from shared experiences and create an active and innovative learning community.

6.4. PRACTICAL IMPLEMENTATION OF

The practical implementation of projects is where the planning, resources and collaboration of a project come to life and activities actually take place in classroom. In this sub-module, participants will learn how to carry out an interdisciplinary educational project in practice, from preparing the necessary resources, to carrying out the activities, managing teams and monitoring progress. Practical implementation is a dynamic process, which involves adapting to the situations encountered and solving challenges in real time.

OBJECTIVE:

- **Acquire organizational and resource preparation skills** - participants will learn how to prepare and manage the resources needed to implement an educational project.
- **Develop team coordination skills** - participants will learn how to work effectively with colleagues and manage teams of students involved in the project.
- **Learn methods for monitoring and adapting the project** - participants will learn techniques for monitoring progress and adapting activities as they go along, according to the needs and progress of the pupils.
- **To apply techniques for evaluating progress and final outcomes** - participants will discover methods for evaluating student progress and the overall impact of the project.

CONTENTS:

1. Preparing for project implementation

Thorough preparation is the key to successful implementation. Participants will learn how to organize and prepare all the necessary resources to ensure a smooth running of the project.

a. Organization of teaching resources and materials

- Identifying and preparing the necessary resources (materials, equipment, digital platforms) is essential to avoid interruptions during activities.
- **Practical example**: In a science project, teachers can prepare materials such as the substances needed for experiments, protective equipment and guidelines for their use.

b. Preparing the learning environment

- The learning environment should be arranged to encourage collaboration and provide space for hands-on activities. This may include spaces for group discussions, work areas and presentation of results.
- **Practical example**: for an interdisciplinary art and science project, the classroom can be divided into areas for painting and building scientific models, and a special area can be set aside for group discussions.

c. Set clear objectives and expectations

- It is important for students to understand the objectives of the project and the expectations for their involvement and behavior during the activities. This ensures clear direction and avoids misunderstandings.
- **Practical example**: In a project on recycling, teachers can set the objective of creating a recycling awareness campaign in the community, and students will know that they need to develop information materials and public presentations.

2. Practical activities and team management

To run the project effectively, participants need to learn techniques for managing teams and coordinating day-to-day activities.

a. Coordinating teams of pupils and distributing roles

- Teachers will learn how to organize teams and assign roles to each student, according to their abilities and interests, to encourage involvement and collaboration.
- **Practical example**: In a robot building project, one student may be responsible for the programming part, another for the physical design of the robot, and another student for the documentation and presentation of the project.

b. Encouraging communication and collaboration between pupils

- Teachers will use facilitation techniques to encourage students to collaborate, express ideas and share responsibilities. Team-building activities and regular feedback contribute to team building.
- **Practical example**: in geography and history project, teams may have weekly sessions

feedback where they discuss what worked well and what needs to be improved.

c. Monitor and adapt activities according to team progress

- Teachers will monitor the progress of teams and adapt activities to better meet the needs and level of understanding of students. This may involve providing additional resources or adjusting tasks.
- **Practical example**: If the team is having difficulty understanding a science concept, the teacher may organize an additional session to clarify or provide additional resources.

3. Using tools to monitor progress

In order to ensure that the project goes according to plan and that pupils achieve learning objectives, it is important that teachers use effective monitoring tools.

a. Project logs and progress reports

- Students can keep project diaries in which they record their progress, challenges and solutions. These can be checked by teachers to track each student's involvement.
- **Practical example**: In a science research project, students can keep a journal documenting the steps of the experiment and the results.

b. Regular review meetings

- Teachers will organize review meetings with teams to discuss progress project, to provide feedback and assess whether adjustments are needed.
- **Practical example**: In a creative writing and art project, teachers may have weekly meetings with each team to discuss the status of the project and to guide them in their work.

c. Using digital platforms for monitoring

- Platforms such as Trello, Google Classroom or Asana can be used to monitor assignments, progress and student engagement. Teachers can easily track which activities have been completed and which are in progress.
- **Practical example**: in an interdisciplinary project, each team can organize their tasks on Trello and the teacher can add comments and suggestions to optimize the activities.

4. Adapting the project according to feedback and student needs

Flexibility is key to the success of a project, and teachers must be prepared adapt activities according to feedback and the evolution of teams.

a. Adjust tasks according to difficulty level

- Depending on the students' level of understanding and involvement, teachers can simplify or complicate certain tasks so that each team can work to its maximum capacity.
- **Practical example**: If a team is having difficulty creating an informational poster, the teacher can provide a basic template to help facilitate their design process.

b. Solving problems and challenges

- Teachers will learn techniques for identifying problems and applying effective solutions, such as rearranging teams, offering additional support or organizing training sessions.

additional work.

- **Practical example**: If conflicts arise between members of a team, the teacher can organize a discussion to identify the cause and facilitate resolution in a constructive way.

c. Integrating student feedback into the project structure

- Student feedback can provide valuable information about how students perceive the activities, and teachers can adjust the project to better respond to students' interests and needs.
- **Practical example**: If students feel that the time for a particular activity is insufficient, teachers can adjust the program to allocate more time for that stage.

5. Final evaluation of the project and reflection on the results

Project evaluation is an essential step to measure impact and to identify areas for future improvement.

a. Assessing student progress and achievement

- Teachers will assess pupils' progress in relation to the learning objectives and the quality of the results obtained. This may include assessment of skills developed, knowledge acquired and final products achieved.
- **Practical example**: In a creative arts project, teachers can assess the originality of the work and the students' understanding of the theme.

b. Student self-reflective assessment

- Teachers can encourage students to evaluate their own participation, to reflect on the skills and knowledge acquired and to identify the strengths and weaknesses of the project.
- **Practical example**: Students can complete a self-assessment questionnaire describing what they have learned and how they could improve their involvement in a future project.

c. Teacher reflection on process and outcomes

- At the end of the project, teachers will reflect on the steps taken, the impact on pupils and the methods used to identify what worked well and what can be improved.
- **Practical example**: Teachers can organize a team meeting where they discuss the strengths and challenges of the project, noting suggestions for optimizing future implementations.

Practical activity:

- **Simulating a resource preparation session**: participants will organize materials and resources for a fictitious project, practicing detailed implementation planning.
- **Coordinating a team of students in a simulated scenario**: Each participant will practice coordinating a team of students in a practical activity to develop their organizational and communication skills.
- **Evaluation of a simulated project**: Participants will evaluate a fictitious project, completing project logs and progress reports and discussing necessary adjustments in a feedback session.

The PRACTICAL IMPLEMENTATION OF PROJECTS sub-module equips participants with all

the tools and skills to turn project plans into reality. This sub-module focuses on rigorous preparation, effective team management, adapting activities and evaluating progress, empowering teachers to create meaningful and impactful learning experiences for their students.

Expected results:

Participants will have a concrete plan for the implementation of an interdisciplinary project, which they can adapt and apply in the context of their school, and will acquire the following competences:

- **Practical organization and planning skills**: Participants will learn to prepare resources, organize activities and create a collaborative and effective learning environment.
- **Ability to coordinate and monitor teams of pupils**: Learners will acquire skills in coordinating teams, encouraging collaboration and adapting activities according to pupils' progress.
- **Assessment and progress monitoring techniques**: participants will learn formative and summative assessment methods, as well as self-reflection techniques for students and teachers.
- **Adaptability and flexibility in implementation**: trainees will learn to adapt to the challenges encountered during project implementation and to provide effective solutions achieve the objectives.

MODULE EVALUATION:

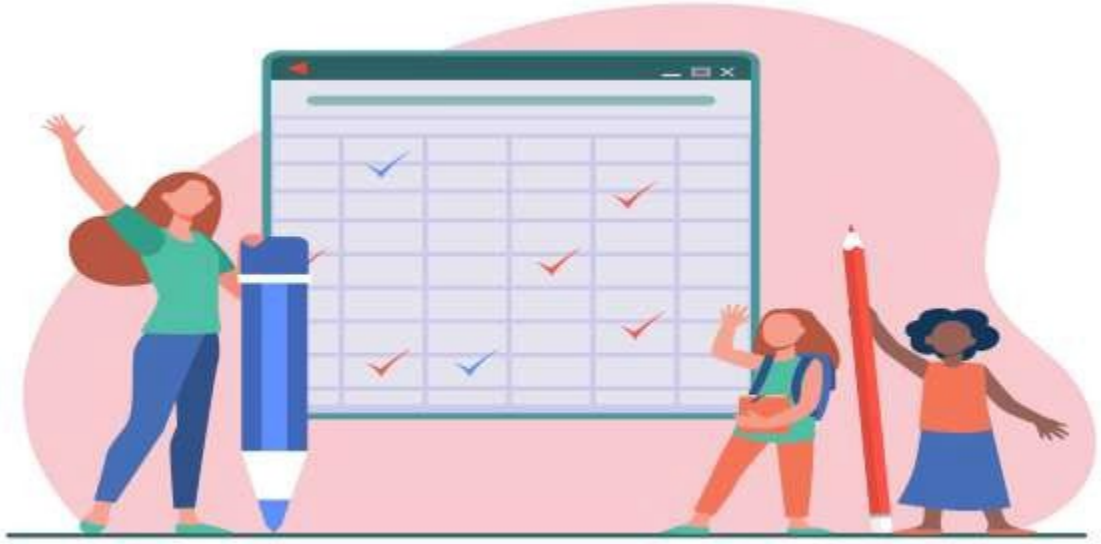
Evaluation will be based on interdisciplinary team projects. Each team will present the complete project, including theme, objectives, structure of activities, methods of collaboration and implementation plan.

EXPECTED RESULTS AT THE END OF THE MODULE:

At the end of this module, participants will be able :

- Design and implement interdisciplinary projects, integrating knowledge and methods from different disciplines.
- Collaborate effectively with teachers in other fields to create impactful educational projects.
- Apply good practices and lessons learned from the case studies in their own projects.

MODULE 7: ASSESSMENT AND EVALUATION



Assessment is an essential element of the educational process, its role is to measure student progress, provide constructive feedback and ensure that learning objectives are met. This module focuses on formative and summative assessment techniques, methods of effective feedback, as well as the final assessment criteria and the process of certification of acquired competences.
The main objective of this module is to provide teachers with the necessary tools for fair, equitable and development-centered assessment of students in line with the requirements of VET education and the creative industry.

OBJECTIVE:

- Developing teachers' skills in applying formative and summative assessment techniques.
- Improve methods of constructive feedback to support pupils' progress.
- Establish clear and relevant final assessment criteria reflecting competences acquired
- Understand the certification process and how students can have their competences officially recognized.
- Using digital tools for more efficient and transparent evaluation.

1. FORMATIVE AND SUMMATIVE ASSESSMENT TECHNIQUES

Evaluation can have several functions, but the most relevant for VET education and training are:

FORMATIVE ASSESSMENT

Definition: Formative assessment is a continuous, interactive and flexible process that takes place throughout the learning process, with the aim of monitoring students' progress, providing constructive feedback and adapting teaching strategies to their needs. In contrast to summative assessment, which measures final performance, formative assessment is a learning tool that helps students improve their skills and correct their mistakes before the final test.

Features:

a) **It is a continuous process** - it takes place throughout learning, not just at the end of a modul.
b) **It is student-centered** - it helps to identify strengths and areas for improvement.
c) **Provide constructive feedback** - students receive recommendations for improving performance.
d) **It is flexible and personalized** - the teacher can adapt the teaching methods according to each student's learning pace.
e) **Encourages reflection and self-evaluation** - students are actively involved in the learning process and become aware of their progress.
f) **Use a variety of methods** - from observations and discussions to digital tools and projects practice.

Benefits of formative evaluation

a) **Enhances active learning -** students receive constant feedback and can adjust their learning strategies.
b) **Increase motivation and engagement** - students feel more accountable for their progress and are more motivated to learn.
c) **Reduces the stress associated with summative assessments** - provides an opportunity to learn without the pressure
final grades.
d) **Allows adjustment of teaching strategies** - teachers can adapt their methods according to specific student needs.
e) **Promotes the development of metacognitive skills** - students learn to self-assess their progress and improve their performance.

Methods used:

- **Observing student activity during practical exercises - The teacher monitors student activity during lessons, observing how students interact, solve problems and express ideas.**
- **Peer assessment - students give feedback to their peers.**

- **Guided questioning and reflection on learning - Teachers ask open-ended questions to encourage students to think critically and reflect on their own learning.**
- **Learning and reflection journals - Students document their progress, difficulties encountered and strategies used.**
- **Quick tests and interactive quizzes using digital platforms - short quizzes are used to check understanding of concepts in an interactive way.**

SUMMATIVE EVALUATION

Definition: Summative assessment is the process of measuring and certifying the knowledge, competences and skills acquired by learners at the end of a learning unit, module or course. Its purpose is to verify the degree of achievement of educational objectives and to provide a clear picture of students' final performance.

In contrast to formative assessment, which is a continuous and flexible process, summative assessment is carried out at the end of a learning process and is used for certification, promotion or making final decisions on student progress.

Features:

- **It is carried out at the end of a module or course - it measures learning outcomes after the completion of an educational process.**
- **It is standardized and objective - based on clearly defined assessment criteria.**
- **It has a certification purpose - it is used to establish progress, award grades and recognize skills acquired.**
- **It is performance-focused - it measures student achievement against set targets.**
- **It is used for academic decisions - it determines promotion, qualification or transition to higher levels of learning.**
- **May include various forms of testing - written exams, final projects, presentations, portfolios etc.**

Methods used:

- Final projects and portfolios of works.
- Written or practical tests.
- Case studies and problem solving in real-life contexts.
- Presentations and demonstrations of skills acquired.

Benefits of summative evaluation

- Provides a clear framework for measuring student performance.
- It helps set a quality standard in education.
- It allows formal recognition of acquired skills and competences.
- Supports decision making on pupils' educational progress
- It can contribute to the development of key competences such as critical thinking and

ability to organize information.

Summative assessment is a fundamental tool to measure students' final performance and to certify acquired competences. By using a combination of assessment methods (written tests, projects, case studies, self-assessment and presentations), teachers can get clear picture of each student's progress and ensure a fair and industry-relevant assessment system.

2. FEEDBACK METHODS

Effective feedback contributes to improving student performance and developing a growth mindset.

Types of feedback

- Descriptive feedback - Provides detailed information about student performance and recommendations for improvement
- Interactive feedback - Involves dialog between teacher and student, stimulating reflection and self-correction.
- Feedback through rating rubrics - Helps to clarify expectations and give a score fair.
- Self and peer assessment - Students analyze their own performance and give feedback their colleagues.

Feedback Tools

- Google Forms, Kahoot, Mentimeter - for quick quizzes and evaluations.
- Digital rubrics - for clear assessment of competences.
- Collaboration apps - such as Padlet, Miro for reflection and brainstorming**.**

3. FINAL EVALUATION CRITERIA

The final assessment must be clear, objective and tailored to the specific competences.
Assessment criteria should reflect:

1. Technical and digital skills

- Effective use graphic design (Canva, CapCut, Adobe Suite, etc.) in creating of educational materials.
- The ability to realize creative and industry-relevant projects.
- Integrating design thinking into problem solving.

2. Creative and innovation skills

- **Create original and attractive visuals.**
- **Critical thinking and problem solving by design.**

3. Collaboration and presentation skills

- Effectively communicate ideas and present projects in a professional manner.

- ❖ Teamwork and interdisciplinary collaboration.

4. CERTIFICATION PROCESS

1. Types of certification

a) **Certificate of participation** - for teachers who complete the training.
b) **Certification of student competences** - based on practical projects and final assessment.

2. Steps in the certification process

a) Continuous assessment throughout the course using formative methods.
b) Presentation of a project portfolio at the end of the training.
c) Final evaluation based on the established criteria.
d) Awarding certificates attesting the acquisition of specific competences.

3. Relevance of certification

a) Increasing the employability of VET students.
b) Formal recognition of digital and design thinking skills.
c) Increase the visibility and credibility of VET institutions adopting new teaching methods.

Module 7: **Assessment and Evaluation** is an essential pillar of the curriculum, providing teachers with the tools they need to effectively assess student performance. Through the application of formative and summative assessment techniques, the use of constructive feedback methods and the establishment of clearly defined assessment criteria, teachers can ensure a transparent, fair and motivating educational process.

MODULE 8: FUTURE TRENDS IN DESIGN AND TECHNOLOGY

The VIIVOLUTING TRENDS IN DESIGN AND TECHNOLOGY sub-module explores the rapid developments in design and technological innovations that are influencing the field of education and how students acquire future skills. Attendees will learn about emerging trends, new technologies in education, and discover the importance of adaptability, lifelong learning, and developing the skills needed to meet the challenges of a changing world. In an era of digitization and automation, knowledge of these trends and innovative technologies is essential to keeping educational methods current and relevant.

GENERAL OBJECTIVE:

This module aims to familiarize participants with emerging trends in design and technology, particularly in education, and how they will transform teaching and learning. Participants will explore new technologies such as Virtual Reality (VR), Augmented Reality (AR) and Artificial Intelligence (AI) and learn how to quickly adapt to industry changes. The module will also address the skills of the future and lifelong continuous learning strategies essential to stay competitive in educational and professional environments.

SPECIFIC OBJECTIVES:

1. Understanding emerging trends in design and technology - participants will learn about the changes and innovations that will influence the design education and design industry in the future.

2. Exploring how VR, AR and AI can be integrated into education to enhance teaching and learning - participants will explore the use of virtual reality, augmented reality, artificial intelligence and other emerging technologies to enhance the learning experience.
3. Identifying the future skills needed in the digital age and how they influence the educational process - participants will look at the skills that students need to develop to be future-ready, such as critical thinking, creativity, digital literacy and collaboration.
4. Developing a lifelong learning mindset and understanding strategies for adapting to rapid change in industry - participants will learn the importance of continuous training and adaptability to cope with rapid technological and industrial change.

8.1. EMERGING TRENDS IN DESIGN

OBJECTIVE:

This section provides a detailed understanding of the main emerging trends in design, focusing on how they influence and transform education. Trends in design are continually evolving and teachers and trainers need to be aware of these changes in order to deliver up-to-date education. Participants will discover the major trends influencing visual, interactive and experiential design.

The aim is to equip participants with theoretical knowledge about technological and design innovations, preparing them for the integration of these trends into educational practice.

The impact of digitization in education:

- **Global accessibility:** Through digitization, education can be accessed anywhere, eliminating geographical barriers. Students anywhere in the world can access online courses from renowned institutions such as MIT or Harvard through digital learning platforms such as **Coursera**, **edX** and **Udemy**.
- **Multimedia resources:** Traditional lessons can be complemented by multimedia resources (videos, animations, infographics), making the learning process more engaging and easier to understand. Platforms such as **Khan Academy** offer rich learning materials that support visual and interactive learning.
- **Automatic assessment:** Digital platforms enable automatic assessment and provide rapid feedback to students. Artificial intelligence plays a key role in this process, improving personalization of the educational path.

a. Sustainable and eco-friendly design

- More and more organizations and design professionals are adopting a sustainable approach. Sustainable design includes recyclable materials, energy efficiency and environmentally friendly production methods.
- Practical example: Teachers can encourage students to use eco-friendly materials for their design projects or to create resource-efficient digital products.

b. Minimalism and functionality

- Minimalism continues to be a strong trend in design, emphasizing simplicity and functionality, reducing visual elements to the essentials.
- Practical example: Students can learn to create simple, yet powerful infographics and presentations by eliminating unnecessary elements and focusing on the clarity of the message.

c. Inclusive and accessible design

- Inclusive design aims to be accessible to all users, including people with disabilities. This includes contrasting colors, legible fonts and simplified navigation elements.
- Practical example: Teachers can teach students how to create visual materials that are accessible to people with visual or mobility impairments, using contrasts, clear font sizes and well-defined visual structures.

Trends associated with digitization:

- **Integrated educational platforms:** Educational institutions are adopting learning management systems (LMS), such as **Google Classroom**, **Moodle** or **Canvas**, which facilitate interaction between students and teachers through a single integrated platform.
- **Distance education:** The COVID-19 pandemic has accelerated the implementation of distance education and demonstrated the viability of this model. Schools and universities around the world continue to develop hybrid and online courses to increase accessibility and flexibility.

Expected results:

At the end of this section, participants will have a clear understanding of the main trends in design and technology and their impact on education.

8.2. NEW TECHNOLOGIES IN EDUCATION: VR, AR, AI

Emerging technologies are rapidly transforming the field of education, offering new ways of learning and interaction. Participants will explore the most relevant technologies and how to integrate them into the teaching process.

OBJECTIVE:

- ❖ Learning how new technologies such as virtual reality (VR), augmented reality (AR) and artificial intelligence (AI) can be integrated into education.

A. VIRTUAL REALITY (VR) AND AUGMENTED REALITY (AR)

Concept:

Virtual Reality (VR) offers users an immersive experience in a fully immersive environment digital. **Augmented Reality (AR)** integrates digital elements into the physical environment, visualized through

through devices such as cell phones or AR glasses.

Virtual Reality (VR) and **Augmented Reality (AR)** create immersive experiences and

interactive, giving students unique hands-on learning opportunities. VR allows real-life situations to be simulated, while AR superimposes digital elements over physical reality.
Example: Teachers can use VR to allow students to explore the ancient world or experience complex scientific phenomena, and AR to add extra information to real objects in the classroom.

The impact of VR and AR in education:

- **Immersive educational simulations:** VR enables the creation of realistic and immersive educational experiences. Students can explore places that would be inaccessible in real life (e.g. the depths of the ocean or inside an active volcano) or recreate historical events for deeper understanding. Apps like **Google Expeditions** or **ClassVR** offer such experiences.
- **Hands-on learning:** VR and AR are used to teach subjects that require hands-on instruction. For example, in medicine, students can learn to operate on virtual simulators, which allows them to practice safely on patients. In engineering, AR can be used to visualize mechanical parts in detail in an interactive 3D environment.
- **Gamification and student engagement:** AR turns textbooks or static teaching materials into interactive experiences. For example, anatomy equipped AR allow students to visualize three-dimensional structures of the human body, providing visual and interactive learning.

Trends associated with VR and AR:

- **STEM education:** VR and AR are increasingly integrated into the teaching of **STEM** (science, technology, engineering, math) subjects. Apps like **Merge Cube** allow students to manipulate 3D models of organs or molecules, bringing hands-on learning directly into the classroom.
- **Virtual tours:** Many educational institutions are starting to offer **virtual tours** for pupils and students, who can explore campuses and educational facilities before enrolling for classes.

8.2. AUTOMATION AND ARTIFICIAL INTELLIGENCE (AI)

Concept:

Artificial intelligence (AI) refers to technology that enables computers to perform tasks that require human intelligence, such as learning, reasoning and decision-making. **Automation** involves using technological systems to reduce human intervention in certain processes.

Artificial intelligence (AI) can facilitate personalized learning by analyzing students' progress and tailoring content to suit their level and learning style. Chatbots and virtual assistants can provide additional support to students, helping them to clarify their queries.
Example: Teachers can use AI-based educational platforms that provide exercises and feedback tailored to each student's needs, facilitating self-paced learning.

The impact of AI and automation in education:

- **Personalize learning:** AI can automatically adjust learning materials according to the learning pace each student. This is essential for providing a personalized learning experience. For example, platforms such as **Smart Sparrow** or **DreamBox** tailor exercises based on individual student performance.
- **Adaptive learning:** Artificial intelligence uses data analytics to monitor student progress and provide personalized learning paths. This model improves the efficiency of the educational process by helping to identify students' weaknesses.
- **Automating administrative tasks:** AI can automate many administrative tasks such as grading homework, managing attendance or distributing study materials. This frees up teachers' time, allowing them to focus more on direct interaction with students.

Trends in AI and automation in education:

- **Educational chatbots:** Educational institutions are increasingly adopting **chatbots**, which can answer students' frequently asked questions and guide administrative processes (e.g. course registration). One example is the **Jill Watson** chatbot, used at Georgia Tech University to answer learners' questions online.
- **Automated grading systems:** AI enhances the grading of essays and written work through **automated grading** tools. Platforms like **Turnitin** use AI to detect plagiarism and provide constructive feedback on writing.

Practical activity:

❖ Participants will explore a VR/AR/Ai application dedicated to education (e.g. Google Expeditions, Merge Cube, Duolingo AI) and discuss how these technologies could improve teaching and learning.

Expected results:

❖ Participants will understand how VR, AR and AI can be used to create engaging and effective educational experiences.

8.3. GAMIFICATION AND GAME-BASED LEARNING

Gamification uses game elements to increase student motivation and engagement in learning activities. This includes reward mechanisms, progress levels and interactive challenges.

Practical example: Teachers can use gamification platforms such as Kahoot or Classcraft to turn lessons and exercises into interactive and competitive activities.

8.4. SKILLS OF THE FUTURE

In a world of rapidly changing labor market demands and rapidly changing technology, it is essential that students develop transferable and adaptive skills. Participants will analyze essential competences in order to integrate them into the curriculum.

OBJECTIVE:

- ❖ Identifying the essential skills that teachers and students need to develop to remain competitive in the digital age.

CONTENTS:

a. Critical thinking and complex problem solving

- Critical thinking enables students to evaluate information and make informed decisions. Problem-solving skills help them to approach new and challenging situations in an analytical and creative way.
- Practical example: Teachers can use methods based on open questions and complex scenarios, challenging students to formulate their own solutions and argue their opinions.

b. Creativity and innovation

- Creativity is essential for innovation and developing new ideas. Encouraging thinking "outside the box" helps students to be more flexible and adapt more easily to change next.
- Practical example: teachers can integrate brainstorming sessions and design thinking activities where students develop solutions to local or global challenges.

c. Collaboration and communication

- Collaboration skills are crucial in a globalized work environment, where diverse teams often collaborate remotely. Clear and effective communication is also essential for sharing ideas and understanding each other.
- Practical example: Students can be involved in group projects and collaborative activities, using digital communication and collaboration platforms to work together and learn to collaborate effectively.

d. Digital literacy and cyber security

- In the digital age, digital literacy and knowledge of cyber security are fundamental skills. Students need to understand how to use technology safely and protect their personal data.
- Practical example: teachers can run workshops on online safety and how to navigate and evaluate information on the internet, teaching students to recognize safe websites and apps.

Practical activity:

- ❖ Participants will create a personal development plan, identifying the key competences they want to develop and strategies to achieve them in the coming years.

Expected results:

- ❖ Participants will identify key competences for the future and understand how to develop these skills to stay relevant in education.

8.5. USER-CENTERED DESIGN (UCD)

Concept:

User-centered design is an approach that puts the user at the center of the design process. design, ensuring that the product or service created responds to their needs, wants and preferences. In education, this principle applies to the creation of learning resources and educational platforms that prioritize the student experience.

The impact of user-centered design in education:

- **Intuitive educational platforms:** an example of a user-centered educational platform is Google Classroom, which has a simple and accessible interface for both students and teachers. Simplicity and ease of use reduce technological stress and increase efficiency.
- **Accessibility for all categories of learners:** User-centered design of educational materials ensures that resources are accessible to all categories of learners, including those with special needs. For example, the inclusion of subtitles and machine-reading features makes it easier for students with hearing or visual impairments to access education.

Trends in UCD:

- **Design for mobile:** With the increasing use of mobile devices, educational resources need to be optimized for small screens. Mobile learning platforms like **Khan Academy** offer lessons optimized for phones and tablets.
- **Constant testing and feedback:** User-centered design means continuously testing educational platforms and materials, receiving feedback from users (students and teachers) and adjusting them to improve the learning experience.

8.6. LIFELONG LEARNING STRATEGIES AND ADAPTING TO INDUSTRY CHANGES

Participants will learn how to develop a continuous learning mindset, essential in a world of rapidly evolving technologies and industries. This involves both personal development and adaptation to industry needs.

OBJECTIVE:

This sub-module aims to provide participants with a deep understanding of the importance of **continuous** lifelong **learning** and the need to **adapt** competences and skills **rapidly** to new industry requirements, particularly in education. In the context of rapid technological change and new economic and social challenges, participants will learn how to create effective personal and professional development strategies and how to use available resources to remain competitive.

CONTENTS:

A. UNDERSTANDING THE CONCEPT OF LIFELONG LEARNING

Lifelong learning refers to the conscious and continuous commitment to learn and develop new skills and knowledge, regardless of age, professional position or level of education. It is a holistic approach to personal and professional development, based on adaptability and curiosity.

It is an essential component of staying competitive and relevant in the labor market. This means that students and teachers need to be open to the idea of constantly learning and adapting to new trends and demands.

Essential elements of lifelong learning:

- **Growth mindset:** The belief that skills and competences can be developed through effort and dedication.
- **Curiosity and self-motivation:** Participants need to maintain their curiosity and desire to explore new areas and acquire new skills.
- **Constant reflection:** Assessing personal and professional progress to identify strengths and areas for improvement
- **Sources and platforms for lifelong learning**: Exploring the resources available online (e.g. Coursera, LinkedIn Learning, Udemy) and how they can be used to develop new skills and competencies.
- **Adapting to technological change**: How to stay informed about new technologies and quickly implement innovative solutions in education.
- **Professional networking**: the importance of participating in conferences, professional groups and online communities to learn from colleagues and stay connected to the latest trends.

B. ADAPTING TO INDUSTRY CHANGE: WHY IS IT IMPORTANT?

- **Rapid changes in technology: The** rapid pace of technological innovation means that employees, including educators, need to be flexible and willing to learn new skills to adapt to new demands. The education industry is changing significantly due to the adoption of new technologies such as virtual reality (VR), augmented reality (AR) and artificial intelligence (AI).

Factors influencing adaptability:

- Global economic trends: Economic changes can influence what skills are in demand in the marketplace. Professionals need to adapt their training and skills to meet these needs.
- Changes in job structure: Automation and digitalization reduce the need for repetitive tasks, but increase the need for advanced digital skills, critical thinking and creativity.
- Cultural and social transformations: Globalization and increasing diversity in the population require intercultural skills and a deep understanding of the social context.

C. LIFELONG LEARNING STRATEGIES: HOW TO CONSCIOUSLY DEVELOP YOUR SKILLS

- **Constant self-assessment**: It is essential to regularly assess skills and identify areas for improvement.
- **Personal and professional development planning**: create a personal learning plan including short and long-term goals, skills to be developed and resources (courses, certifications, mentoring).
- **Sources of learning:**
  - Online learning platforms: (e.g. Coursera, edX, Udemy, LinkedIn Learning) offering access to courses and certifications on various topics.
  - Informal learning: workshops, webinars, podcasts, articles and free resources available online. Participants are encouraged to stay connected to information sources in their field.
  - Networking: Attend conferences, professional meetings, online communities and mentoring groups to learn from colleagues' experiences.

D. ADAPTING TO NEW TECHNOLOGIES: FROM THEORY TO PRACTICE

- **Monitor technology trends:** Participants need to stay abreast of new technologies and anticipate how they will affect their work. Technologies such as artificial intelligence, augmented reality, virtual reality and advanced automation will profoundly transform education.
- **Examples of future technologies in education:**
  - **Augmented Reality (AR):** How AR can enhance visual learning by allowing students to see interactive 3D models.
  - **Artificial Intelligence (AI):** How AI can personalize learning, providing educational pathways tailored to the pace and style of each student.
  - **Blockchain in education:** how blockchain can secure and authenticate students' certifications and academic pathways.

E. LEARNING BASED ON SELF-REFLECTION AND SELF-ASSESSMENT

- Effective learning involves regular reflection and self-assessment to understand progress and identify areas for improvement.
- Practical example: Teachers can use self-assessment questionnaires or learning journals, in which students can write down challenges and lessons learned during a project or semester.

F. THE ROLE OF PROFESSIONAL NETWORKS AND COMMUNITIES IN LIFELONG LEARNING

- **Professional networking:** the importance of developing connections with other professionals in the field, both locally and internationally, in order to learn from the best practices and experiences of others.
- **Knowledge sharing:** Active participation in online groups and communities dedicated to education and technology to share resources, ideas and experiences.
- **Attending conferences and webinars:** How to stay up to date with new trends and practices

by attending events and continuing education sessions organized by education and technology professionals.

Practical activity:

- Participants will explore online learning platforms and select a course or certification program they will follow to develop their skills.
- Participants will complete a **self-assessment exercise**, reflecting on their current skills and identifying areas where they would like to develop their skills. They will then discuss as a group the areas that need to be improved to remain relevant in the industry.
- Each participant will create a **long-term** (1 year) **personal learning plan**, specifying the skills they want to develop, the courses or resources they plan to take and how they will integrate these new skills into their work.
- Participants will analyze a **case study** from industry where a company or educational institution has implemented new technologies and had to retrain their staff to meet the new requirements. They will discuss the impact of these changes and how teachers and educational staff can respond to these challenges.
- Each participant will choose an **emerging technology** (e.g. AI, VR, AR) and develop a short plan to implement it in their teaching. They will explore practical applications of the technology and its impact on students.
- Each participant will create **a networking plan** for the coming year, specifying the events they plan to attend (conferences, webinars, workshops) and the online communities they want to be part of to improve their skills.

The Emerging Trends in Design and Technology module provides participants with the knowledge and skills to integrate emerging technologies and trends into educational projects. They will become more adaptable and prepared to respond to the challenges of an ever-changing digital world, helping their students to develop as creative, critical and innovative individuals, ready to meet the demands of an accelerating and rapidly transforming labor market.

Expected results:

- At the end of this activity, participants will have a clear plan for lifelong learning, focused on their professional and personal needs, and will be able to identify the appropriate resources to achieve their goals.
- Participants will understand why adaptability is a key competence in the context of rapid technological and economic change and how they can prepare their students for future transformations.
- Attendees will understand the importance of maintaining a learning mindset and how this attitude can help them adapt to continuous changes in the industry.
- Participants will develop a concrete lifelong learning plan to help them adapt to changes in education and technology.

- Participants will gain a clear understanding of how to integrate new technologies into education and develop skills to adapt to rapid technological change.
- Participants will understand the importance of professional networking and have a concrete plan for attending events and connecting with education and technology professionals

MODULE EVALUATION:

The assessment will be based on an individual or team project in which participants will describe how they plan to integrate one of the emerging technologies into their teaching (VR, AR, AI) and develop the skills of the future for themselves and their students.

EXPECTED RESULTS AT THE END OF THE MODULE:

At the end of this module, participants will be able :

- Identify future trends in design and technology and apply them to education.
- Integrate new technologies (VR, AR, AI) into teaching and learning to create engaging experiences.
- Develop and adapt the skills needed to cope with industry changes and create a lifelong learning plan.

Skills acquired by completing the module:

- **Skills to identify emerging trends**: Participants will learn to identify and integrate design and technology trends into their educational activities.
- **Knowledge about emerging educational technologies**: learners will gain knowledge about VR, AR, AI and other technologies and how they can be used to create innovative learning experiences.
- **Future skills**: Participants will develop essential skills for the future such as critical thinking, creativity, collaboration and digital literacy.
- **Lifelong learning mindset and adaptability**: Trainees will learn to adopt a lifelong learning mindset and adaptability to changes in the industry.

MODULE 9: CULTURAL AND SOCIAL RESPONSIBILITY IN DESIGN

INTRODUCTION

In an increasingly interconnected world, design can no longer be seen solely in terms of aesthetics and technical functionality. Creativity and innovation need to be accompanied by a deep understanding of **cultural and social responsibility**, considering the impact design has on communities, identities and social values. This module explores how design can influence and shape social reality as a vehicle for respecting cultural diversity and promoting inclusion.

Cultural and social responsibility in design is not only a moral principle but also a necessity in an increasingly diverse and interconnected world. Designers have an essential role in shaping not only experiences and products, but also how cultures and communities perceive and interact with each other. This responsibility implies a deep understanding of cultural and social diversity and a conscious commitment to promoting inclusion, sustainability and social justice through design.

Responsible design must be accessible and equitable for all, respecting cultural and social values and symbols, avoiding stereotypes and trivialization. By including communities in the design process and using the principles of sustainability, designers can create solutions that not only meet immediate needs, but also have a positive long-term impact on society and the environment.

Moreover, design can become a tool for **social activism**, a catalyst for changing behaviors and for solving global problems, such as how would be

economic inequality, discrimination or the climate crisis. In this sense, designers have a huge power of influence and, at the same time, a great moral responsibility to act ethically and empathetically.

9.1. WHAT IS CULTURAL AND SOCIAL RESPONSIBILITY IN DESIGN?

Cultural and social responsibility in design involves an awareness of the impact that a product, project or visual has on society and culture. It is an approach that transcends the simple utility or beauty of a design, bringing to the forefront the need to respect cultural diversity, address social challenges and create solutions that contribute to the well-being of communities.

Responsible design:

- **Respect cultural values and diversity:** Every community has its own values, symbols and norms. Culturally responsible design recognizes these elements and avoids stereotyping, ensuring that the product or visual material does not offend or trivialize a particular culture.
- **Promote social inclusion:** Design should be accessible to all, regardless of age, gender, physical ability, race or economic status. Socially responsible design helps create an environment where every individual feels represented and valued.
- **Address social problems:** Through design, current social problems such economic inequality, climate change or discrimination of any kind can be addressed. Design can be a form of activism, offering practical and visible solutions to the challenges facing society.

9.2. RESPONSIBLE CULTURAL DESIGN: HOW TO AVOID STEREOTYPING AND TRIVIALIZATION?

One of the fundamental aspects of cultural responsibility in design is to **avoid stereotyping** and **trivializing** minority cultures or those that are different from the dominant culture.

Design projects can quickly become a form of expression of power, reflecting and amplifying power imbalances between different social groups. Designers therefore need to pay attention to how symbols and messages are perceived and used.

Cultural stereotyping occurs when elements of a culture are reduced to clichés, sometimes without understanding their complexity or deeper meaning. For example, the inappropriate use of indigenous symbols or elements of traditional art in a commercial context without respecting their origin can create tensions and even offense.

To avoid these pitfalls, designers must:

- **Research:** Before using any cultural item, it is essential to understand its meaning and the historical and social context from which it comes. This requires thorough research and collaboration with representatives of the culture in question.
- **Collaborate with communities:** Instead of remotely interpreting a culture, designers can collaborate directly with community members to ensure that design is authentic and respectful.

- **Avoid commercializing cultural symbols:** turning sacred or traditional symbols into commercial products can lead to their trivialization and loss of their original meaning.

9.3. DESIGN AND SOCIAL RESPONSIBILITY: ACCESSIBILITY AND INCLUSION

Design has the power to create a more equitable and inclusive environment, ensuring access to essential products and services for all. To this end, socially responsible design must respond to the needs of all individuals, including those with disabilities, those from disadvantaged socio-economic backgrounds and other vulnerable groups.

Accessibility is an essential component of responsible design. In the educational context, for example, accessible design means creating learning materials that are easy to understand for all learners, including those with learning difficulties or those who do not speak the predominant language. This means adapting text formats, adding subtitles to videos or using descriptive images to facilitate understanding.

Inclusivity in design also means accurate representation of human diversity. Visual materials such as posters, advertisements or educational graphics should reflect diversity of gender, race and ability. It is essential that all groups see themselves represented in a positive and realistic way.

Good practice examples:

- **Universal Design:** This concept involves designing products and environments in such a way that they are usable by all people without requiring special adaptations. Examples of applications include buildings that are accessible for people with disabilities, websites that are compatible with screen readers and ergonomic design that improves comfort for all users.
- **Inclusive educational design:** In education, designing resources that are accessible to students with special needs is a clear example of social responsibility. Audio-visual materials, digitized content and online learning systems must be compatible with assistive technologies.

9.4. DESIGN AS SOCIAL ACTIVISM: ADDRESSING GLOBAL CHALLENGES

In many cases, design is not just about solving functional problems, but can be a powerful tool for **social activism**. Through design, social issues can be highlighted and addressed in a creative and visual way. Visual awareness campaigns are clear examples of how design can generate real change in society.

Sustainable design is another important aspect of social responsibility. In an era of climate change and environmental degradation, designers have a responsibility to create products that minimize the negative impact on the planet. Sustainable design means using resources efficiently, reducing waste and creating solutions that encourage eco-friendly behavior.

Participatory design projects are another way designers can involve communities in the process of creating solutions. By working directly with the final beneficiaries, designers

can create solutions that are more efficient, practical and relevant to people's real needs.

Example of a social design project:

- **Participatory urban design projects:** in big cities, designers often work with local communities to create public spaces that meet the needs of all residents, from children's playgrounds to facilities for the elderly and disabled.

9.5. ETHICS AND MORAL RESPONSIBILITY OF THE DESIGNER

Cultural and social responsibility in design also implies an **ethical responsibility**. Designers need to be aware of the influence their work can have on people's perceptions and behavior. Careless or unethical design can contribute to the perpetuation of inequality and discrimination.

To act ethically, designers must embrace:

- **Transparency:** Be open about the processes of creation and the underlying decisions design.
- **Empathy:** Understand the emotional impact of their design on end users and be sensitive to their needs.
- **Respect for privacy and data:** With personal data playing an increasingly important role in the development of digital products, designers need to protect users' information and respect privacy rules.

In conclusion, cultural and social responsibility in design is a fundamental concept for all those who wish to contribute to a more equitable, inclusive and sustainable world. Designers must understand that their work does not only influence the aesthetics or functionality of a product, but also the values and structure of society as a whole.

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