DEGREBE

Development of Green Skills for Better Employability

2021-1-HU01-KA220-VET-000024924

Co-funded by
the European Union

Module 5 Mobility issues, Design thinking

A Design Thinking is an approach and methodology which is: non-linear, iterative 5-stage process that provides a solution-based approach to solving problems. It is originally applied in the work of designers and today, twenty-first-century organizations fuse it in a wide range of industries. They find it a valuable means to problem-solve for the users of their products and services. With design thinking, teams have the freedom to generate ground-breaking solutions. It can be applied to nurture and encourage creativity of the team and to develop innovative solutions (products and services).

"The individual choices people make about their mobility behavior have profound impacts on their own lives, as well as society as a whole." According to MIT Media Labs.

Mobility choices are especially important and play critical role in the efforts to reduce the carbon footprint and the emissions in the direction of sustainability and climate change. This is one of the main factors and the choice that citizens and organizations make with regard to the mode of urban transportation is crucial. Motorized transportation leads to negative external impacts such as carbon emissions and air pollution, whereas active modes such as walking and cycling improve the physical and mental health of the travellers. Urban planning can influence these mobility choices and their societal impacts by organizing spatial land uses in such a way as to encourage short trips using active modes. Adaptability is one of the key qualities in today's world that we all need to learn and work on. The current times bring new challenges and obstacles that have never been there before to this extent, and it is up to us how we

deal with them. We have the climate crisis, the economic crisis, the war in Ukraine, rising inflation, the housing crisis, and other stressors on all sides that we must learn to work with and adapt to an ever- changing society. That is why it is important that we pay due attention to adaptability and integrate it into our teaching.

1. DESIGN THINKING

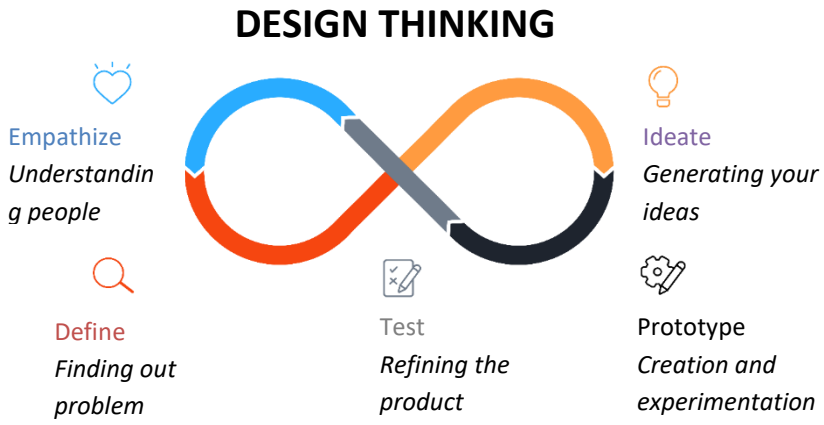
1.1. What is Design Thinking

Design Thinking is an iterative process in which we seek to:

- Understand the user
- Challenge assumptions
- Redefine problems

It is the attempt and challenge to identify alternative strategies and solutions that might not be instantly apparent with our initial level of understanding challenge assumptions.

At the same time, Design Thinking provides a solution-based approach to solving problems. It is a way of thinking and working as well as a collection of hands-on methods.



In its core, it is not just a process or approach to be applied. It nurtures creativity and allows teamwork, collaboration, generating and developing solutions and different options to be tested.

Ultimately, it provides a new way to think, with a lot of practical and leanring-by-doing methods to help organisations and individuals develop and apply new mindset. It is very often applied in new companies (startups) and bigger organisations to drive innovation

In essence, design thinking:

- Revolves around a deep interest to understand the people for whom we design products and services.
- Helps us observe and develop empathy with the target users.
- Enhances our ability to question: in design thinking you question the problem, the assumptions and the implications.
- Proves extremely useful when you tackle problems that are ill-defined or unknown.
- Involves ongoing experimentation through sketches, prototypes, testing and trials of new concepts and ideas.

Although IDEO's (Design firm) CEO Tim Brown is considered to be the father of Design Thinking, Don Norman is the grandfather of the human-centered design and he explains how the approach and flexibility of design thinking can actually help tackle the leading and most pressing global challenges.

Don Norman, who also coined the very term User Experience, explains what Design Thinking is and what's so special about it.

"*the more I pondered the nature of design and reflected on my recent encounters with engineers, business people and others who blindly solved the problems they thought they were facing without question or further study, I realized that these people could benefit from a good dose of design thinking*.[...], Don Norman

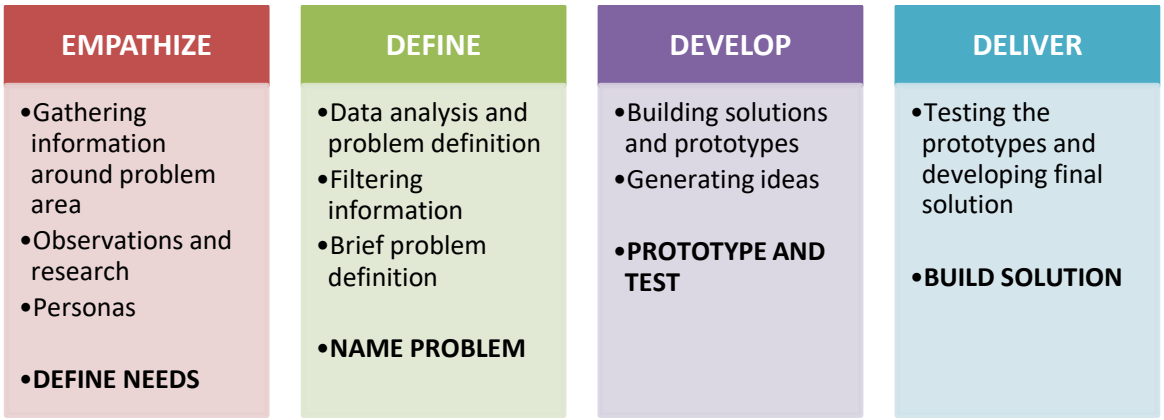
As user experience is more and more important being a competitive advantage for many companies it is applied as a means to simplify and "humanize" the processes and products. Ultimately it should drive innovation. And it is a sequence of iterative

approximations in the area of MIGHT be. The whole process involves iteration, trial-and-error and experimentation mindset and nature of the work.

Some authors are less optimistic when considering the amount of iteration required:

Thus, this widespread adoption of design thinking will drive the creation of alternative products and services for both business and society.

It is very well structured and self-explanatory and guided methodology with five main stages and plan for real work and action:



1.2. Stage 1: Empathize—Research Your Users' Needs

The main activities at this stage relate to develop and apply Empathy of individuals and the teams – i.e., an empathetic understanding of the problem to be solved. This can be done by series of interviews with the target groups/users, user research, observations, Empathy maps and the ultimate goal is to build the main profile – the Persona. Empathy is central to the human-centered design process such as design thinking. It allows to set aside the assumptions about the world and gain real insight into users and their needs.

“Deep understanding of the problems and realities of the people you are designing for”

Observe

- How users interact with their environment.
- Capture quotes, behaviors and other notes that reflect their experience.
- Notice what they think, feel, need.

Engage

- Interviews scheduled or ad-hoc.
- Learn how to ask the right questions.

Immerse

- Find ways “to get into the user’s shoes”.
- Best way to understand the users’ needs.

Empathize Tools:

- Best way to understand the users’ needs.
- Assume a beginner’s mindset
- Ask What-How-Why
- Ask the 5 whys
- Empathy map
- Conduct interviews with empathy
- Build empathy with analogies
- Use photo and video user-based studies
- Use personal photo and video journals
- Engage with extreme users
- Story share-and-capture
- Bodystorm
- Create journey maps

1.3 Stage 2: Define—State Users' Needs and Problems

At this stage information that is gathered is transformed into insights and the observations are analyzed to define the main problems that are identified. These definitions are called problem statements. Personas help keep the efforts human-centered before proceeding to ideation.

- Synthesise your observations about your users from the Empathize stage.
- Definition of a **meaningful** and **actionable problem statement**, which the design thinker will focus on solving.

- A great definition of your problem statement → kick start the ideation process (third stage) in the right direction.
- Unpack your empathy findings into **needs** and **insights** and **scope a meaningful challenge**.
- Define your Point of View – meaningful and actionable problem statement.
    - Preserves emotion and the individual you're designing for.
    - Includes strong language.
    - Uses sensical wording.
    - Includes a strong insight.
    - Generates lots of possibilities.

Define tools

- Define your Point of View – meaningful and actionable problem statement.
- Point of view
- How Might We
- Why-How Ladder
- Powers of Ten

1.4. Stage 3: Ideate—Challenge Assumptions and Create Ideas

This stage involves creativity techniques and tools to generate ideas. The foundation and background of knowledge from the first two phases drives to "think outside the box", look for alternative ways to view the problem and identify innovative solutions to the problem statement that is created. The goal is to generate radical design alternatives.

The goal of ideation is to explore a wide solution space both a large quantity and broad diversity of ideas. From this pool of ideas you can build prototypes to test with users.

Tools to ideate:

- Brainstorm
- Braindump
- Brainwrite

- Brainwalk
- Challenge Assumptions
- SCAMPER
- Mindmap
- Sketch or Sketchstorm
- Storyboard
- Analogies
- Provocation
- Movement
- Bodystorm
- Gamestorming
- Cheatstorm
- Crowdstorm
- Co-Creation Workshops
- Power of Ten
- Prototype
- Creative Pause

1.5. Stage 4: Prototype—Start to Create Solutions

This is the main experimental phase. The aim is to identify the best possible solution for each problem found. It involves activities and tasks that lead to the development of a "raw version" of the main ideas generated, evaluated and selected during the Ideate phase.

It involves:

- A prototype can be anything that takes a physical form -a wall of post-its, a role-playing activity, an object.
- In early stages, keep prototypes inexpensive and low resolution to learn quickly and explore possibilities.
- Prototypes are most successful when people (the design team, users, and others) can experience and interact with them.
- Great way to start a conversation.

- Interactions with prototypes drives deeper empathy and shapes successful solution.

Low fidelity prototyping guidance:

- use basic models or examples
- draw just some main features
- Methods
  - Storyboarding.
  - Sketching
  - Card sorting.
  - 'Wizard of Oz'

A wizard of Oz prototype fakes functionality that you want to test with users, saving you the time and money of creating it.

Prototypes of digital systems, in which the user thinks the response is computer-driven, when in fact it's human-controlled.

Determine what you want to test.

Then figure out how to fake that functionality and still give users an authentic experience.

1.6. Stage 5: Test—Try Your Solutions Out – and Iteration

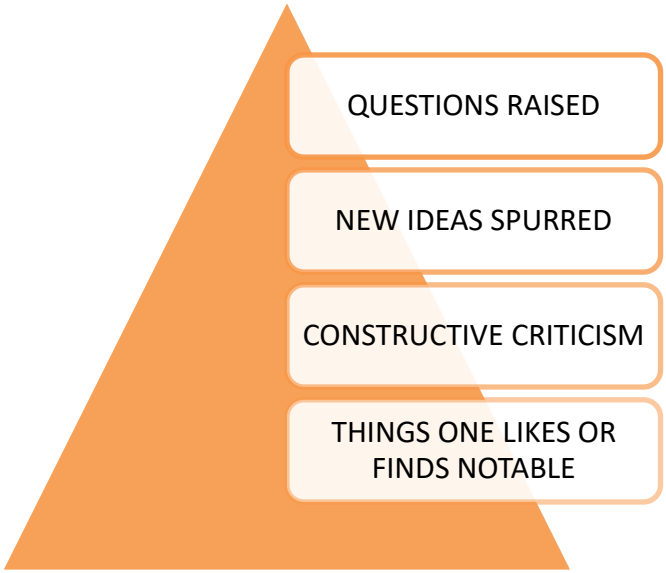
Evaluators rigorously test the prototypes. Although this is the final phase, design thinking is iterative: Teams often use the results to redefine one or more further problems.

Testing is the Chance to gather feedback, refine solutions, and continue to learn about your users. The test mode is an iterative mode in which you place low-resolution prototypes in the appropriate context of the user's life.

It is very important to **prototype as if you know you're right, but test as if you know you're wrong**. When testing you should consider both the postivie and the negative feedback: Avoid overexplaining how the prototype works, or how it is supposed to solve your user's problems. Let the users' experience in using the prototype speak for itself, and observe their reactions. The negative feedback should provide overview and answers to what works and what doesn't work.

Feedback capture matrix is a tool that allows:

- Real-time capture of feedback on presentations and prototypes
- Arranges thoughts and ideas into four categories for easy assessment
- Fill in the matrix as you give or receive feedback.



Testing with users

- Allows you to learn about the solution you created but also about the users (builds empathy).
- Let your **user experience** the prototype.
  - Show don't tell. Put your prototype in the user's hands (or your user in the prototype) and give only the basic context they need to understand what to do.
- Have them talk through their experience.
  - Use prompts. "Tell me what you're thinking as you do this."
  - Actively observe.
- Don't immediately "correct" your user.
- Watch how they use (and misuse) your prototype.

- Follow up with questions.

This is often the most valuable part.

In conclusion, the above-described stages are different modes which contribute to the entire design project, rather than sequential steps. The main goal in this process is to gain the deepest understanding of the users and what their ideal solution/product would be.

2. MOBILITY CHOICES

2.1. Overview of the Global strategies and policies

The Sustainability Development Goals of the United Nations are 17 and they represent the "world's shared plan to end extreme poverty, reduce inequality, and protect the planet by 2030". Adopted by 193 countries in 2015, the SDGs were agreed among the global leaders after tough and long and comprehensive negotiations in UN history. They have united people from various sectors, geographies, and cultures. Achieving the goals by 2030 very strong determination and efforts to learn what works, and the adaptation to new information, context and changing trends.

The Marrakesh Partnership for Global Climate Action was launched in 2016 to

- Encourage and force action on climate change
- Further increase ambition before 2020 and
- In support of the Paris Agreement.

It builds on the 2014 Lima-Paris Action Agenda which brought together large initiatives with the objective to galvanise the contribution of non-state actors.

The partnership has the following focus areas:

- Land use
- Oceans and coastal zones
- Water
- Human settlements
- Transport
- Energy
- Industry

Shared Mobility 2030 Action Agenda

Over 50 public, private and non-profit organisations have released the Shared Mobility 2030 Action Agenda. It is a very ambitious and successful result and initiative aiming to support and enhance shared mobility.

The purpose of the agenda is to hold its members accountable to a to-do list of actions that will accelerate the uptake of shared mobility. The Shared Mobility Action Agenda supports all shared transportation options, including public transportation, ride-hailing, car-sharing, on-demand responsive microtransit, shared bikes and scooters and paratransit.

From another point of view, although shared transport can provide cleaner, more accessible and more equitable transportation options, the United Nations Technology Executive Committee and the Climate Technology Centre and Network report for COP27 said that "the activities and performance of the shared mobility is likely to play a minor role in deep decarbonisation".

2.2. Mobility Choices Goals:

Provision of the cities and the citizens with more mobility options

Transportation choices that are safe, sustainable, convenient and efficient

Support healthier, greener and more active lifestyle

Decrease of the greenhouse gas emissions and support cleaner air.

2.3. Sustainable transportation and mobility

Sustainable transport refers to ways of transportation that are sustainable in terms of their social and environmental impacts.

The role of transport in sustainable development was first recognized at the 1992 United Nation's Earth Summit and reinforced in its outcome document – Agenda 21. During the 2002 World Summit on Sustainable Development, the participants discussed the role of transport in the outcome document - the Johannesburg Plan of Implementation (JPOI). JPOI provided various points for sustainable transport: infrastructure, public transport systems, goods delivery networks, affordability, efficiency and convenience of

transportation, as well as improving urban air quality and health, and reduce greenhouse gas emissions.

Some sustainable mobility choices could be:

- Airplane versus car: A long-distance airplane flight emits more CO2 per mile than a journey by car with one sole passenger on board. Nevertheless, air travel is still one of the most polluting modes of transport.
- Train versus car
- Train versus plane for shorter distances
- Car sharing
- Electric vehicles
- Efficient driving style
- Hydrogen vehilces
- Other options.

RELATED SDGS

GOAL 3 GOOD HEALTH AND WELL BEING

GOAL 9 INDUSTRY INNOVATION AND INFRASTRUCTURE

GOAL 11 SUSTAINABLE CITIES AND COMMUNITIES

According to research and data transport is responsible for 23% of global energy-related greenhouse gas emissions. This means that in order to address climate change sustainable transport is key success factor.

It is a driver for city and urban development, linking people, connecting the communities to the world, enlarging and building new markets and supporting trade.

Thus, sustainable transport drives sustainable development. It is fundamental to the needs of people in their personal and economic lives. Yet, it is respecting the ability of the next generations to meet their needs.

There are also big opportunities provided by sustainable transport: saving lives every year by better road safety and less air pollution, and reduction of carbon emissions by 7 gigatonnes.

The sustainable transport transformation requires a change rather than any serious increase of the infrastructure expenditure.

Transport is considered as a means that allows people to access what they need: education, jobs, markets, social interaction, and other services and amenities for their healthy and fulfilled lives.

This allows more options and mobility choices for the citizens, businesses, organisations, and the cities as a whole.

The Sustainable transport impacts on achieving the SDGs are as follow:

2.4. GLOBAL TRENDS AND CHALLENGES:

- High level and intensity of urbanization and urban-rural integration
- Changes in demography
- Global supply chains and trade routes
- Digital and data connectivity
- Development of more efficient and greener technology and processes

2.5. THE 'AVOID-SHIFT-IMPROVE' APPROACH

The decisions related to the use of inefficient or unnecessary travel or transport can be made and supported by improved and integrated urban planning, smart city management, new smart and urban projects including localized ones, transport demand management, less complex and extended supply chains, and e-communication options (mobile phone use, teleworking).

It is also important shifting travel and transport to improve trip efficiency through most efficient or environmentally-friendly mode or combination of such. Also, capable of meeting the travel/transport needs, and/or shifting to off-peak travel, and

The environmental performance of transport can be improved by technological, operational, regulatory or pricing factors.

In addition, infrastructure improvements can make transport vehicles and equipment more sustainable and provides more energy efficient and less carbon intensive options. The approach does not mean there should be "avoidance," "shifting" or "improvement". Each option should be evaluated and considered to support sustainability. The model is most applicable to the urban conditions and to long distance or international freight transport, where various transport modes and options are available.

In rural areas, where options are often limited, 'shifting' is less relevant, at least in the short-term. Other imperatives like the speed demanded by the users and customers could mean that some freight or shipping operators, for instance, focus more on the 'improve' approach. However, there are cases where freight may be shifted from road to rail or waterways or from conventional delivery trucks to electric vehicles.

Thus, globally we can work toward 'shifting' to a reality where efficient and effective inter-modality is achieved and all modes contribute to a more efficient and sustainable system.

Essentially, as a condition and key success factor there should be: sound policy and governance structures and basic technical and financial capacities at all levels. And thus we can effectively apply "Avoid-Shift-Improve".

While most developed countries have such factors and conditions and the relevant capabilities at least in some form, many other very often less developed countries, do not have the capacity building to create or enhance them.

The Bogota Declaration on Sustainable Transport Objectives is one such milestone that provides an important foundation. In 2011, representatives of the national transport and environment agencies of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay and Uruguay met in Bogota, Colombia and outlined key priorities and objectives in sustainable transport, adopting a working definition of sustainable transport as "the provision of services and infrastructure for the mobility of people and goods needed for economic and social development, and improved quality of life and competitiveness. These services and transport infrastructure provide secure, reliable, economical, efficient, equitable and affordable access to all, while mitigating the local and global negative impacts on health and the environment, in the short-, medium- and long-term, without compromising the development of future generations."

The Bogota Declaration applied the 'Avoid-Shift-Improve' approach to adapt transport better with the sustainable development principles.

The signatories promoted cross-cutting strategies on enhanced road safety, adaptation of infrastructure, reduce of greenhouse gas emissions, and actions to fight climate change. They also supported the vulnerable users, allocation of more financial resources to sustainable transport modes and alternatives, and efficient governance.

2.6. Making transport more sustainable

The main steps and actions to be taken as suggested by the UN are:

POLICY DEVELOPMENT AND IMPLEMENTATION

- A better and integrated approach to transport policy and regulations
- Building the necessary capacity, especially in developing and less developed countries,
- Improve safety and access to services of transport and mobility
- Stakeholder engagement and public awareness
- Monitoring and evaluation

FINANCING

- Government funding
- Partnership with the private sector
- New measures by business
- Financial support by international financial institutions
- Special climate funds

TECHNOLOGICAL INNOVATION

- Enabling innovative technology for transformation
- Power and energy options
- New type of vehicles
- New integrated systems

In conclusion, there are various means of transportation to be developed and adapted for the purposes of the action plan for sustainable transport and mobility choices.

Sustainable transport is a very important driver of sustainable development and a means by which people can access what they need to fulfil their lives. All actors and stakeholders: governments, business, society, citizens, organisations should make a strong commitment and efforts to transform the transport options in terms of individual travel and freight. It should become more efficient, safe, affordable, accessible, adaptable, and resilient, while reducing carbon and other harmful emissions and environmental impacts.

Opportunities arising from sustainable transport are many and very different. Integrated policy and regulations are crucial to decision making about the transport systems and the necessary infrastructure.

Financing decisions should be based on a systematic and holistic approach. The complex nature of transport investments and their consequences call for innovative funding options.

New technology that supports clean fuels and clean energy is a high priority and of great importance, and it should be considered as an imperative in fighting climate change.

The ‘Avoid-Shift-Improve’ approach is an example for approach and useful framework for assessing the transportation measures and for taking action for sustainable transport.

In general, the mobility choices of the individuals impact the sustainable development and the ultimate impact: reduce of pollution and better quality of air and clearer skies; improved health and well-being of citizens and communities; reduced use of harmful chemicals.

This leads also to healthier communities and whole nations which will improve the global and general well-being.

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