2023-1-PT01-KA220-HED-000165596

COBLAGES

Emergent societal challenges and sustainable development

Learning Path

Polytechnic Institute of Viseu

2025

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ISBN

978-972-8765-59-0

DOI

10.34633/978-972-8765-59-0

Date

2025

Editor

Instituto Politécnico de Viseu

Project partners

Instituto Politecnico De Viseu (project coordinator), Portugal; Aproximar, Portugal; Universidad de Vigo, Spain; Ankara Bilim Üniversitesi, Turkey; The European Association for Social Innovation, Romania; Universitatea de Vest din Timișoara, Romania

The project *COBLAGES: Using Community-Based Learning to Prepare Higher Education Students for an Ageing World* (2023-1-PT01-KA220-HED-000165596) is cofounded by the Erasmus+ programme.
The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Index

Course Presentation

🌍 🚀 **Ready to shape the future?** 🚀 🌍

This short course falls under the scope of the project COBLAGES: Using Community-Based Learning to Prepare Higher Education Students for an Ageing World (2023-1-PT01-KA220-HED-000165596) and offers cutting-edge skills to tackle today's biggest challenges and social sustainable development goals. Therefore, through an analysis of issues related to:

💻 Digital technologies | 🌱 Climate change | 👴 Longevity & Aging | 🌾 Sustainable rural communities

🎓 This shot course is planned to be developed in blended learning, combining digital distance learning with on-site classes, which will take place in the Polytechnic Institute of Viseu (Portugal) at the end of the course.

This learning path aims to guide students in their learning process. You can expect to find in this document all the information you need to successfully complete this microcredencial, including the skills to be developed, topics to be covered, methodologies and assessment.
We expect each student to be dedicated and enthusiastic to attend and participate frequently in the various e-activities that will be offered.

We estimate a working time of approximately 45h, of which 5h are synchronous, 23h asynchronous, and 17h face-to-face, which corresponds to 9 hours per week over a period of 5 weeks.

🗓️ There will be e-activities to be developed asynchronously and five synchronous moments planned, taking place on the Zoom platform, at the dates of:

1. First week – online meeting for presentation
2. Second week - online meeting Topic 1
3. Third week - online meeting Topic 2
4. Forth week - online meeting Topic 3
5. Fifth week - online meeting Topic 4

Aim

To trigger green, digital and longevity skills among higher education students.

Skills

It is intended that, at the end of the microcredencial, the student acquires the following skills:

- Identification and understanding of the main challenges associated to longevity, digital transformation, climate change, and rural communities.

- Mastery of the main agendas and responses target to the above-mentioned challenges.

- Ability to propose a response and solution to the above-mentioned challenges.

Contents

1. **Longevity and Aging** (demographics of aging; breaking ageism; intergenerational learning and relationships).
2. **Digital technologies for society** (coding; artificial intelligence; digital literacy; the impact of digital technologies; data visualization; disinformation and literacy).
3. **Climate change and action** (design and construction, life-cycle management, waste, resilience, adaptability).
4. **Sustainable rural communities** (risk of isolation, loneliness, and desertification; support for positive economic and social development).

Methodology

The e-activities are presented every week and by topic. Each topic has a similar methodology, with analysis of texts, videos and other resources, and participation in the Forum.

The working hours will be structured as follows:

Synchronous (5h) – Each topic of the Program contents is initiated with a meeting on the zoom platform to present the topic and clarify any doubts.
Asynchronous (23h) – Each topic will have one week of e-activities (individual and/or collaborative), such as consultation, research, analysis, reflection, and discussion of documents and videos, and group dynamics. Whenever necessary, collaborative work platforms will be used. The teacher will monitor the entire process, providing feedback during the development of the tasks.

Face-to-face (17h) - Each topic will have a morning/afternoon of lessons in order to develop in person activities, with collaborative work to promote reflection about the subjects and finalize the topics and course.

Activities

Topic 0 - Introduction to the course and Familiarization with the course online contents

The course begins with a period of familiarization and presentation of the curricular unit.

Synchronous class
The week will start with an online class on the zoom platform to present the topic and clarify any doubts.

E-activity 0
In order to start the course, each student must:
(i) read the learning plan, to become aware of the structure and organization of the microcredencial, the objectives and skills, the sequence of activities planned and what is expected of him/her, particularly in terms of tasks and availability;
(ii) explore the virtual learning environments, browsing the Moodle;
(iii) participate in the Forum, presenting him/herself (nationality, course, interests, motivation to be in this microcredential, etc.).

Topic 1 - Longevity and Aging

In this topic we will analyze information on the current demographic situation and the projected one for the coming years using the main national databases and international reports. Furthermore, we will explore the main challenges and opportunities of an aged society.

Synchronous class

The week will start with an online class on the zoom platform to present the topic and clarify any doubts.

Presentation – Annex A

E-activity 1 – Demographic national indicators

Based on the census, Eurostat, or other databases that you consider appropriate, you should look for the main statistical indicators of population ageing, such as the old-age dependency ratio, ageing index and longevity index. You can search for data from the latest Census (2021), past Censuses (e.g., 1991, 2001, 2011) or even projections for the coming years (e.g., 2030, 2060). Then, choose one indicator and present the information (in text, graph or table as you prefer) in one slide/document and submit to the folder of e-activity 1.

E-activity 2 – Challenges and opportunities of an aged society

After viewing and analyzing the texts and the video on the challenges and opportunities arising from ageing (available in the resources section) you should participate in the Forum for this e-activity, adding 1 challenge and 1 opportunity that you found most relevant and commenting on your colleagues' opinions.

Resources

European Commission. (2021). Green paper on ageing. https://commission.europa.eu/system/files/2021-06/green_paper_ageing_2021_en.pdf

Eurostat. (2023). Ageing Europe - statistics on population developments. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Ageing_Europe_-_statistics_on_population_developments

World Health Organization. (2015). Global report on ageing and health. World Health Organization. https://www.who.int/publications/i/item/9789241565042

United Nations. (2023). World Social Report 2023: Leaving No One Behind in an Ageing World. https://desapublications.un.org/publications/world-social-report-2023-leaving-no-one-behind-ageing-world

Topic 2 - Digital technologies for society

In this topic, we will explore the impact of digital technologies on society, focusing on coding, artificial intelligence, and data visualization. Additionally, we will discuss the importance of digital literacy in addressing (dis)information and promoting critical thinking in the digital age.

Synchronous class

The week will start with an online class on the zoom platform to present the topic and clarify any doubts.

Presentation – Annex B

Contents

Writing code:

- AI, Anyone Can Be a Coder Now | Thomas Dohmke | TED

External video: https://youtu.be/nv9WwHpOKEg

Support document - Annex C

- Tutorial | Getting Started with Creative Coding (external video): https://youtu.be/x1NxkEjfNtI
- Online editor (online software): https://editor.p5js.org/

Data visualization:

Presentation - Annex D

Media literacy and digital literacy:

Presentations - Annexes E, F, G

E-activity 3 – Analyzing Narrative and Mixed-Format Podcasts: A Critical Listening Exercise

After watching the videos and the explanations on how to create podcasts, you should choose a narrative non-fiction podcast or a mixed podcast (narrative and interview, for example) from your country, listen to it and analyse it, answering a short questionnaire that will be made available to you. You should avoid analysing monologue, dialogue or entertainment podcasts.

Content

Artificial intelligence: Generative AI Fundamentals and Applications

Presentation - Annex H

E-activity 4 – Leveraging Generative AI to Address the Challenges of Population Ageing: Content Creation and Critical Reflection

Based on the proposed activity, participants are encouraged to leverage Generative Artificial Intelligence tools, such as ChatGPT, GPT-4, DALL·E, or Synthesia, to explore topics related to the challenges of population aging. The activity is structured into two key steps: content creation and critical reflection. In the first step, participants select a theme aligned with COBLAGES, such as "Active Ageing and Digital Inclusion" or "Technologies to Support Older Adults," and craft a clear prompt to guide the AI tool in generating text, images, audio, or

video content that delves into the chosen topic. The second step involves analyzing the generated content and highlighting its strengths, weaknesses, and potential biases. Participants must also reflect on their choice of tool and theme, evaluate the quality of the AI-generated output, and propose practical applications in areas like sustainability and longevity. The final output, including the generated content and reflection, should be compiled in a single document or slide and shared in the E-activity 4 folder. Additionally, participants must engage with their peers by commenting on at least one colleague's work, fostering collaborative learning and deeper insights into the implications of AI in addressing issues related to aging populations.

Resources

European Commission. (2023). European AI Alliance. Retrieved from https://digital-strategy.ec.europa.eu/en/policies/european-ai-alliance
OpenAI. (2023). ChatGPT overview. Retrieved from https://openai.com/blog/chatgpt/
Stanford University. (2023). AI Index Report. Retrieved from https://aiindex.stanford.edu/
UNESCO. (2021). Recommendation on the ethics of artificial intelligence. https://unesdoc.unesco.org/ark:/48223/pf0000380455

Topic 3 - Climate change and action

With this topic it is intended to sensitize students to the impacts of climate change and its intersections with the digital transition and population aging, and develop skills in sustainability, in order to prepare students to contribute to innovative and inclusive solutions in the context of a society in ecological and digital transition. It will be proposed the analysis of key futures that lead to climate change, its impacts, adaptation and vulnerability by the discussion of Intergovernmental Panel on Climate Change (IPCC) documents.

Synchronous class

The week will start with an online class on the zoom platform to present the topic and clarify any doubts.

Presentation – Annex I

Contents

The Working Group II contribution to the Sixth Assessment Report assesses the impacts of climate change, looking at ecosystems, biodiversity, and human communities at global and regional levels:

- https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/

The regional and crosscutting fact sheets give a snapshot of the key findings, distilled from the relevant Chapters and Cross-Chapter Papers, the Technical Summary and the Global to Regional Atlas:

- https://www.ipcc.ch/report/ar6/wg2/about/factsheets/

E-activity 5 - What is Climate Change?

Students are encouraged to participate in the Forum to discuss the theme presented and the uploads done by all the colleagues about what is climate change and how it is filed in their own region. The E-activity will be supported in literature and resources presented, namely in the report and the factshets of the IPCC about the climate change impacts, adaptation and vulnerability.

E-activity 6 – Our effort in the climate Change mitigation process

Watching the movie from the IPCC https://www.youtube.com/watch?v=SDRxfuEvqGg&t=1s. Interact with the video and answer the questions that are being asked. Ask your own questions when you see fit (NOTE: To work on VideoAnt you have to make a registration - you can log in with a GMAIL account) https://ant.umn.edu/zbgiftfxeq

Submit a file: Considering one of the IPCC Fact Sheets from the regional impacts (https://www.ipcc.ch/report/ar6/wg2/about/factsheets/), choose one related to the previous video and submit a little text about one impact of climate change in your region and a mitigation strategy suggested

Resources

Intergovernmental Panel on Climate Change (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability. https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/

NASA (2024). Climate Change https://science.nasa.gov/climate-change/

World Health Organization (2024). Climate Gange. https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health

Topic 4 - Sustainable rural communities

With this topic it is intended to inform students about the difficulties of living in rural areas, and the importance of promoting the development of rural communities through the active involvement of all individuals in fostering environmental, social, and economic sustainability. An initial analysis of the challenges facing rural areas is followed by an analysis of good practices in the political, agricultural, educational, cultural, health and social support sectors.

Synchronous class

The week will start with an online class on the zoom platform to present the topic and clarify any doubts.

Presentation – Annex J

E-activity 7 – Strategies to promote sustainable rural communities

Based on the following three resources (article, presentation, and video), elaborate a summary of 300 words about strategies to promote sustainable rural communities and summit to the Forum (e-activity 7). You can further comment on your colleagues' ideas.

Article

Mihai, F.-C., & Iatu, C. (2020). Sustainable Rural Development under Agenda 2030. In M. J. Bastante-Ceca (Ed.), *Sustainability Assessment at the 21st century* (pp. 9-18). IntechOpen Limited. https://doi.org/10.5772/intechopen.90161

Presentation - PPT from synchronous class

Video

Use Territorial approaches for sustainable rural development
https://www.youtube.com/watch?v=4NRv7Jb4raI

E-activity 8 – Good practices in sustainable rural communities

By recognizing the importance of promoting sustainable rural communities, the Europeam Comission has been supporting projects target to that purpose. In the Rural Pact Community Platform (https://ruralpact.rural-vision.europa.eu/good-practice/search_en) there is a list of 67 good practices, including projects, policies and methodologies.

After searching the list, choose a good practice, and present a summary about it in the Forum (e-activity 8), emphasizing why you chose that one. In addition to your post, you are welcome to comment on your colleagues' choices.

Resources

Merzlov, A., Chayka, V., Sadykov, M., Ovchintseva, L., Popova, O., Crozet, H., Ruger, T., Dietrich, M., & Thomas, A. (2012). *Introduction to Sustainable Rural Development: Key Concepts and Theoretical Foundations*. Series of training manuals "RUDECO Vocational Training in Rural Development and Ecology". ISBN 978-5-906069-62-7

Mihai, F.-C., & Iatu, C. (2020). Sustainable Rural Development under Agenda 2030. In M. J. Bastante-Ceca (Ed.), *Sustainability Assessment at the 21st century* (pp. 9-18). IntechOpen Limited. https://doi.org/10.5772/intechopen.90161

Simon, B., & Lane, A. (2009). Creating sustainable communities - A means to enhance social mobility? *Local Economy, 24*(8) pp. 646–657.

Evaluation

The assessment of learning will be summative and it takes into account the completion of the E-activities from each of the four topics of the program contents.
The grade will be expressed on a scale of 0-20.

Approval in the course requires a grade equal to or higher than 10. The following weighting will be applied:
Topic Longevity and Aging - 25% (5 points)
Topic Digital technologies for society - 25% (5 points)
Topic Climate change and action - 25% (5 points)
Topic Sustainable rural communities - 25% (5 points)

The assessment of the contributions presented in the e-activities is based on the following criteria:
- Presents the desired information;
- Is based on rigorous and scientifically valid information;
- Correctly delves into the topic;
- Demonstrates critical and reflective thinking.

We hope you enjoy this curricular unit and achieve the defined skills. The world is being faced with great challenges and it is increasingly important that everyone, as professionals and citizens, is prepared and made a difference!

The end.

ANNEXES

2023-1-PT01-KA220-HED-000165596

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Emergent societal challenges and sustainable development
AGING AND LONGEVITY

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Choose a number

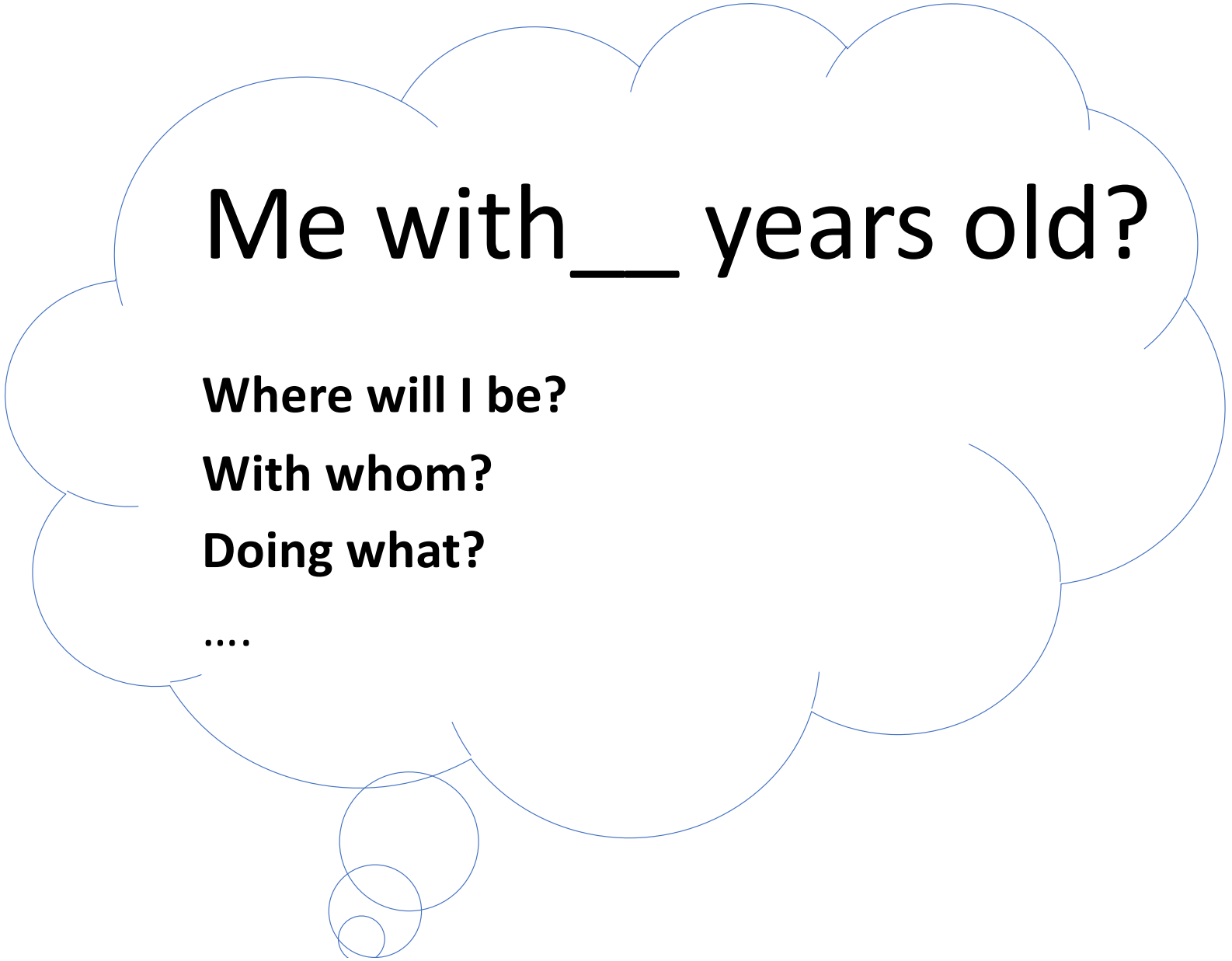
60 61 62 63 64 65 66 67 68 69

70 71 72 73 74 75 76 77 78 79

80 81 82 83 84 85 86 87 88 89

90 91 92 93 94 95 96 97 98 99

100 101 102 103 104 105 … 110


Me with__ years old?
Where will I be?
With whom?
Doing what?
….

COBLAGES

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AGING AND LONGEVITY

Why this topic matters?

- Older people are the fastest growing age group in Europe.

- This demographic shift will have a significant impact on the regions
  - Challenges
  - Opportunities

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Demographic aging - Indicators

Elderly population: is the share of the population aged 65 years and over.

Old-age dependency ratio: is the number of individuals aged 65 or older per 100 people of working age, defined as those aged between 20 to 64 years old.

Human life expectancy: is a statistical measure of the estimate of the average remaining years of life at a given age.

Past and future population ageing trends

2001/2011 2021/2024 2030/2050

Demographic aging - Indicators

Elderly population: is the share of the population aged 65 years and over.

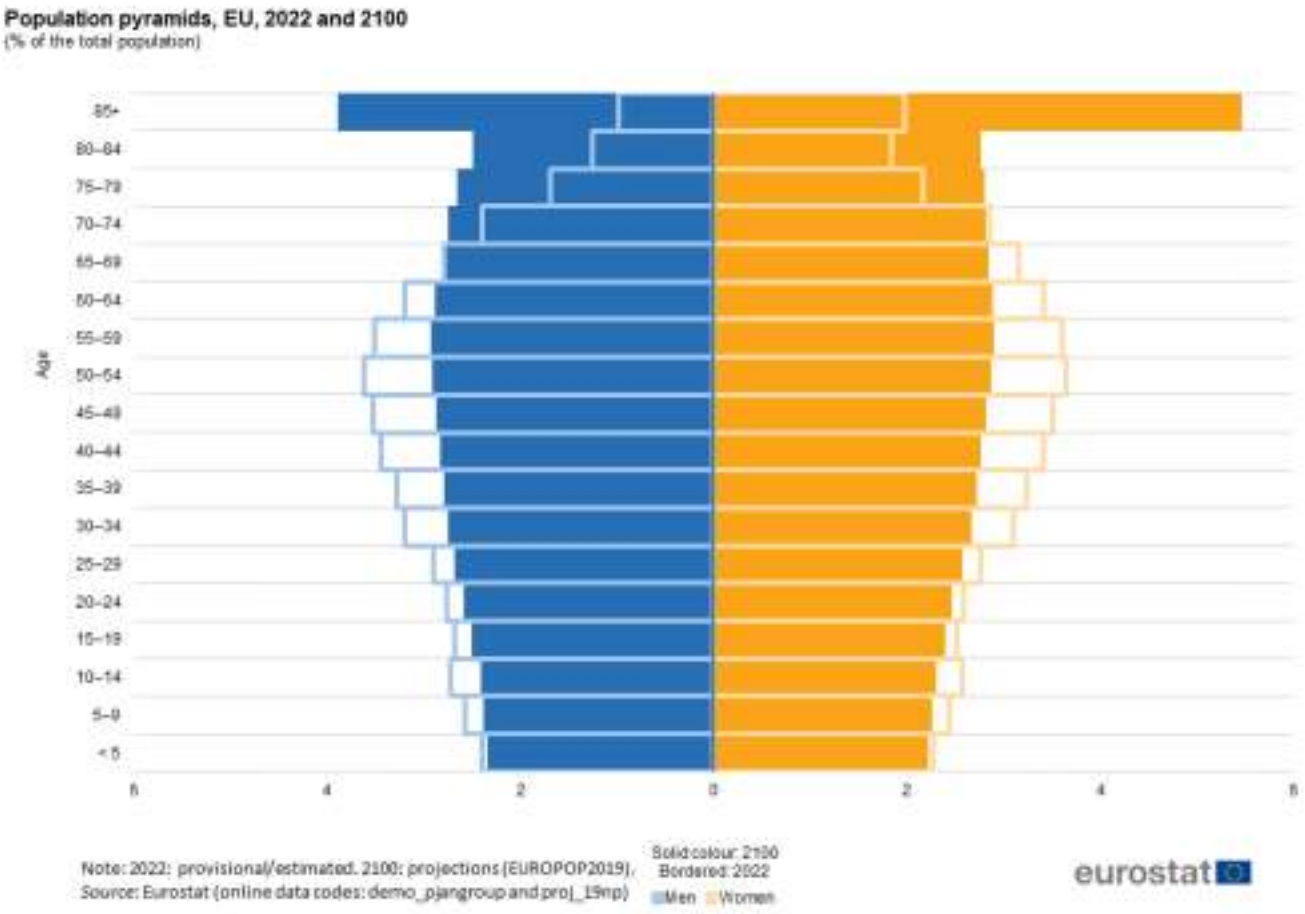
Old-age dependency ratio: is the number of individuals aged 65 or older per 100 people of working age, defined as those aged between 20 to 64 years old.

Human life expectancy: is a statistical measure of the estimate of the average remaining years of life at a given age.

Past and future population ageing trends in the EU

- In 2022, more than one fifth (21.1 %) of the EU population was aged 65 and over.
- By the end of the century, more than 30% of the region's population is expected to be 65 or older.

Demographic aging – Some data



In 2022, more than one fifth (21.1 %) of the EU population was aged 65 and over.

By the end of the century, more than 30% of the region's population is expected to be 65 or older.

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E-activity 1

Until 20/01/2025

Based on the census, Eurostat, or other databases that you consider appropriate, you should look for the main statistical indicators of population ageing, such as the old-age dependency ratio, ageing index and longevity index. You can search for data from the latest Census (2021), past Censuses (e.g., 1991, 2001, 2011) or even projections for the coming years (e.g., 2030, 2060).

Then, choose one indicator and present the information (in text, graph or table as you prefer) in one slide/document and submit to the folder of e-activity 1.

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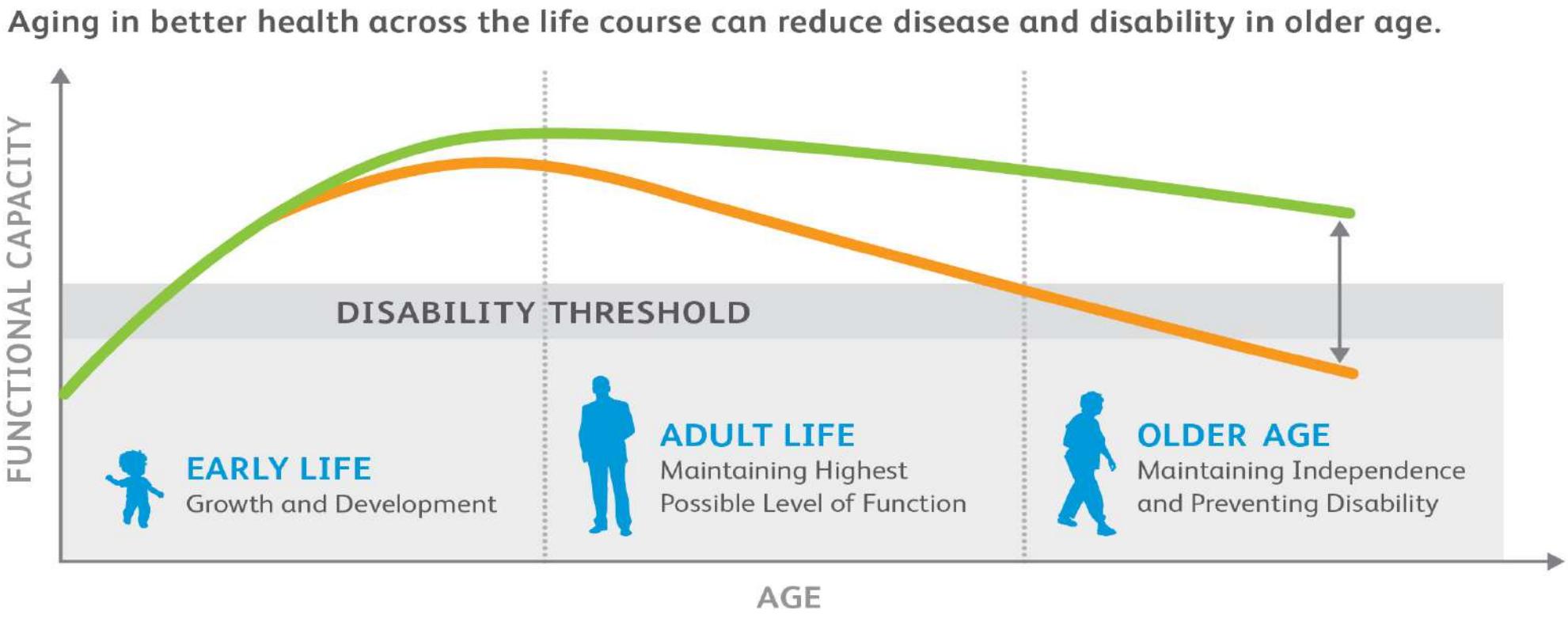
Challenges and opportunities of an aging society

GOOD and BAD News?

Opportunities and Challenges?

Challenges and opportunities of an aging society



Source: Adapted from Kalache, A., Kickbush, I. A Global Strategy for Healthy Ageing. World Health, 1997 50(4)-5.

Challenges and opportunities of an aging society

Challenges

As people age, they are more likely to experience several conditions at the same time.

- **Health and functionality**
  - Common conditions in older age include hearing loss, cataracts, back and neck pain, osteoarthritis, chronic obstructive pulmonary disease, diabetes, depression, and dementia;
  - Difficulties in performing daily life activities (ADL), both basic and instrumental.

- **Social functioning**
  - Loss of family and friends (by geographical distance or death);
  - Retirement can lead to a change in routines, loss of contact with colleagues;
  - Lower participation in social activities.

- **Well-being**
  - Difficulties in maintain a purpose, meaningful activities and relationships.

Challenges and opportunities of an aging society

Challenges

- At an individual level: reduction in quality of life
- At macro level, some key implications include areas such as:

Labour market

Health care systems

Social services

Informal care

Housing and infrastructure:

Territorial organisation

Business

Technologies

Cultural and social dynamics

Lifelong education and learning

Challenges and opportunities of an aging society

Opportunities

- **Knowledge Transfer and Mentorship**
  - Older adults possess a wealth of experience and expertise. This opens up opportunities for structured knowledge transfer, where seniors mentor younger generations, either in formal workplace settings or through community initiatives.

- **Volunteerism and Civic Engagement**
  - Many seniors have the time and inclination to contribute to society in meaningful ways. Programs that engage older adults in volunteerism or community activism can harness their skills and life experience for social good.

- **Silver Economy Growth**
  - Senior Employment: Many older adults are interested in working beyond traditional retirement age, creating a market for age-friendly employment opportunities, part-time work, consulting, or mentorship roles.
  - New Markets and Products (e.g., senior-friendly housing, assistive technologies, health and wellness products, and travel packages).
  - Financial services: Older adults often have accumulated wealth, presenting opportunities for investment management, insurance, and wealth preservation products.

2023-1-PT01-KA220-HED-000165596

E-activity 2

Until 20/01/2025

After viewing and analyzing the texts and the video on the challenges and opportunities arising from ageing (available in the resources section) you should participate in the

Forum for this e-activity, adding 1 challenge and 1 opportunity that you found most relevant and commenting on your colleagues' opinions.

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Challenges and opportunities of an aging society

Challenges → **Opportunities**

- The response to demographic ageing will depend greatly on the way in which we anticipate and respond to the challenges and elevate the opportunities it brings.
- By embracing these opportunities, we can create a more inclusive, productive, and sustainable society for all generations.

But for that…

we have to see older people as a potential resource

valuing their capabilities, knowledge, experiences, opinion

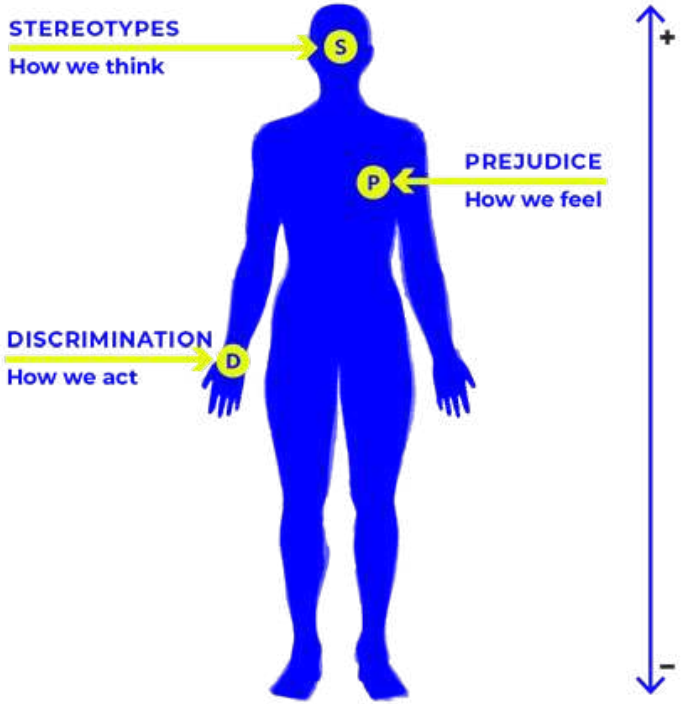
avoiding behaviours that exclude older persons

Combat - Avoid Ageism

Stereotyping (how we think),

prejudice (how we feel),

discrimination (how we act)



based on age (is “too young/old to...”)

- Towards older people is mos common
- COVID-19 has amplified these harmful attitudes

“you won’t be able to do that activity”

“it will take a long time to arrive”

“you won’t understand”

“you won’t want it”

Because...

Is an elderly, older person

Has 65 and more years old

Infantilize, Insult, Belittle, Exclude!

Consequences?

In the **health area**:

- Consider that certain problems exist just because of age
  - No diagnosis - no treatment.
- No investment in health promotion and literacy
  - People don't know fundamental information for their health and well-being, such as:
    - alimentation, physical activity, sleep, mental and cognitive stimulation, social interactions, etc.

Example (Hubert de Ravinel):
A 93-year-old man goes to the doctor because he has pain in his right knee.
The doctor’s response was “Oh my dear sir, at your age it is normal to have knee pain. Whatever, it’s old age!”
And you respond, “How do you explain that my right knee is old and my left isn’t?”

Consequences?

In the **social and professionals relationships**:

- Making activities too easy (poor stimulation);
- Doing for the person (blocking independence and autonomy);
- Do not encourage people to leave the house or participate (isolation and loneliness).

They prevent us from recognizing:

– real capabilities,
– potential,
– ability to recover,
– the value of critical judgment and
– own assessment of life from older persons.

“compassionate ageism”

Consequences?

View of older people people themselves

“Self-directed ageism”

when the person internalizes a negative attitude towards aging or their own age.

Older people themselves begin to think that they are two old for a serious of things, that It's not worth it anymore.

It leads to insecurity, inactivity and isolation.

Consequences?

This prejudice can worsen other associated forms of inequality:

gender identity and sexual identity,

inability,

ethnic origin,

poverty,

...


What we
see
depends
mainly on
what we
look for.
John Lubbock

Older person

Illnesses
Inability
Dependency
Alone
Retired
Sitting and watching TV
Listen badly
See badly
Walk slowly

OR

Experience
Activity
Contribution
Value
Specials
Beauty
Charm

We urgently need

A society without stereotypes

In which people regardless of their age

can…

Look the way they like

(www.mimiplange.com)

Be bold

(Centro Comunitário Gafanha do Carmo)

Be with other generations

(Centro Comunitário Gafanha do Carmo)

Live faith

(Associação Pró-Outeiro)

Have fun

(Associação Pró-Outeiro)

Learn do to new things

(Tempo XL)

Be curious

(Centro Comunitário Gafanha do Carmo)

Fall in love

(Associação Pró-Outeiro)

Even get married

(www.telegraph.co.uk)

Fulfill dreams

(Centro Comunitário Gafanha do Carmo)

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Doubts?
Suggestions?

Speak now or lately on the Forum (moodle) or by email – liajaraujo@esev.ipv.pt

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COBLAGES

Thank you!

Agreement number: 2023-1-PT01-KA220-HED-000165596

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Coblages

Emergent Societal Challenges and sustainable Development

PEDRO RITO (RITO@ESEV.IPV.PT)

:: Digital technologies for society

- The impact of digital technologies on society, focusing on coding, artificial intelligence, and data visualization.
- Additionally, we will discuss the importance of digital literacy in addressing (dis)information and promoting critical thinking in the digital age.

:: The Impact of Digital Technologies

- **Part 1, Coding:**
  - Foundation of the digital world, enabling the creation of applications, websites, and systems.
  - Empowering innovation in diverse fields, from healthcare to entertainment.
- **Artificial Intelligence (AI):**
  - Transforming industries with automation and predictive capabilities.
  - Ethical considerations: Bias, privacy, and the future of work.
- **Part2, Data Visualization:**
  - Simplifying complex data to aid understanding and decision-making.
  - Increasing transparency and accessibility for all societal sectors.
  - Visuals: Icons or charts representing coding, AI, and data visualization.

:: Digital Literacy in the Information Age

- **Part 3, Digital Literacy:**
  - Teaches individuals to verify facts and cross-check sources.
  - Helps individuals identify biases in online content.
- **Combatting (des)information:**
  - Examples: Fake news detection tools and fact-checking websites.
  - Emphasizes the role of social media literacy.
- **Critical Thinking:**
  - Encourages skepticism: “Who created this, and why?”
  - Boosts decision-making in personal and professional life.

:: Building a Digitally Literate Society

- **Part4, Using IA:**
  - Digital technologies are tools for societal good if used ethically and inclusively.
  - Everyone has a role in promoting digital literacy and awareness.
- **Call to Action:**
  - Advocate for digital education in schools and workplaces.
  - Support policies that close the digital divide.
  - Encourage personal responsibility in digital interactions.

:: The e-activities

:: E-activity 3

- **E-activity 3 – Analyzing Narrative and Mixed-Format Podcasts: A Critical Listening Exercise**
  - After watching the videos and the explanations on how to create podcasts, you should choose a narrative non-fiction podcast or a mixed podcast (narrative and interview, for example) from your country, listen to it and analyze it, answering a short questionnaire that will be made available to you.
  - You should avoid analyzing monologue, dialogue or entertainment podcasts.

:: E-activity 4

- **E-activity 4 – Leveraging Generative AI to Address the Challenges of Population Ageing: Content Creation and Critical Reflection**
- Based on the proposed activity, participants are encouraged to leverage Generative Artificial Intelligence tools, such as ChatGPT, GPT-4, DALL·E, or Synthesia, to explore topics related to the challenges of population aging.
- The activity is structured into two key steps: content creation and critical reflection.
  - In the first step, participants select a theme aligned with COBLAGES, such as "Active Ageing and Digital Inclusion" or "Technologies to Support Older Adults," and craft a clear prompt to guide the AI tool in generating text, images, audio, or video content that delves into the chosen topic.
  - The second step involves analyzing the generated content and highlighting its strengths, weaknesses, and potential biases. Participants must also reflect on their choice of tool and theme, evaluate the quality of the AI-generated output, and propose practical applications in areas like sustainability and longevity.
  - The final output, including the generated content and reflection, should be compiled in a single document or slide and shared in the E-activity 4 forum.
  - Additionally, participants must engage with their peers by commenting on at least one colleague's work, fostering collaborative learning and deeper insights into the implications of AI in addressing issues related to aging populations.

ANNEX C - Support document on Writing Code

COBLAGES

ANYONE CAN BE A CODER NOW

:: THE EVOLUTION OF CODING

- Coding has traditionally been a specialized skill, requiring extensive training and expertise.
- The advent of artificial intelligence (AI) is transforming this landscape.
- AI-powered tools are lowering barriers, enabling more individuals to engage in coding.
- This democratization is fostering innovation across various sectors.

:: AI AS A CODING ASSISTANT

- AI tools can now understand natural language inputs, translating them into executable code.
- These assistants help in writing, debugging, and optimizing code efficiently.
- They serve as collaborators, enhancing the capabilities of both novice and experienced programmers.
- This synergy accelerates the development process and reduces errors.

:: EMPOWERING NON-PROGRAMMERS

- With AI, individuals without formal programming education can create software solutions.
- This accessibility encourages diverse perspectives in technology development.
- It enables professionals from various fields to develop tools tailored to their specific needs.
- Consequently, AI-driven coding is bridging the gap between ideas and implementation.

:: ENHANCING EDUCATION AND LEARNING

- AI-powered coding platforms are becoming integral in educational settings.
- They provide personalized learning experiences, adapting to individual student needs.
- These tools offer real-time feedback, facilitating a deeper understanding of programming concepts.
- As a result, students can progress at their own pace, enhancing learning outcomes.

:: CHALLENGES AND ETHICAL CONSIDERATIONS

- The integration of AI in coding raises questions about job displacement and the future of work.
- It is crucial to ensure that AI tools are designed and used ethically, promoting fairness and transparency.
- Ongoing discussions are necessary to address potential biases in AI algorithms.
- Establishing guidelines and policies will help in mitigating adverse effects.

:: THE FUTURE OF AI IN CODING

- The continuous evolution of AI promises further advancements in coding assistance.
- Future tools may handle more complex tasks, pushing the boundaries of software development.
- Collaboration between humans and AI will likely become the norm, enhancing creativity and efficiency.
- Embracing these changes will be essential for staying competitive in the evolving tech landscape.

ANNEX D - Presentation on Data Visualization

Data visualization: presentation and communication of data accessible to all. The concept; the principles and some tools

Teacher: Filipa Rodrigues Pereira

february, 2025

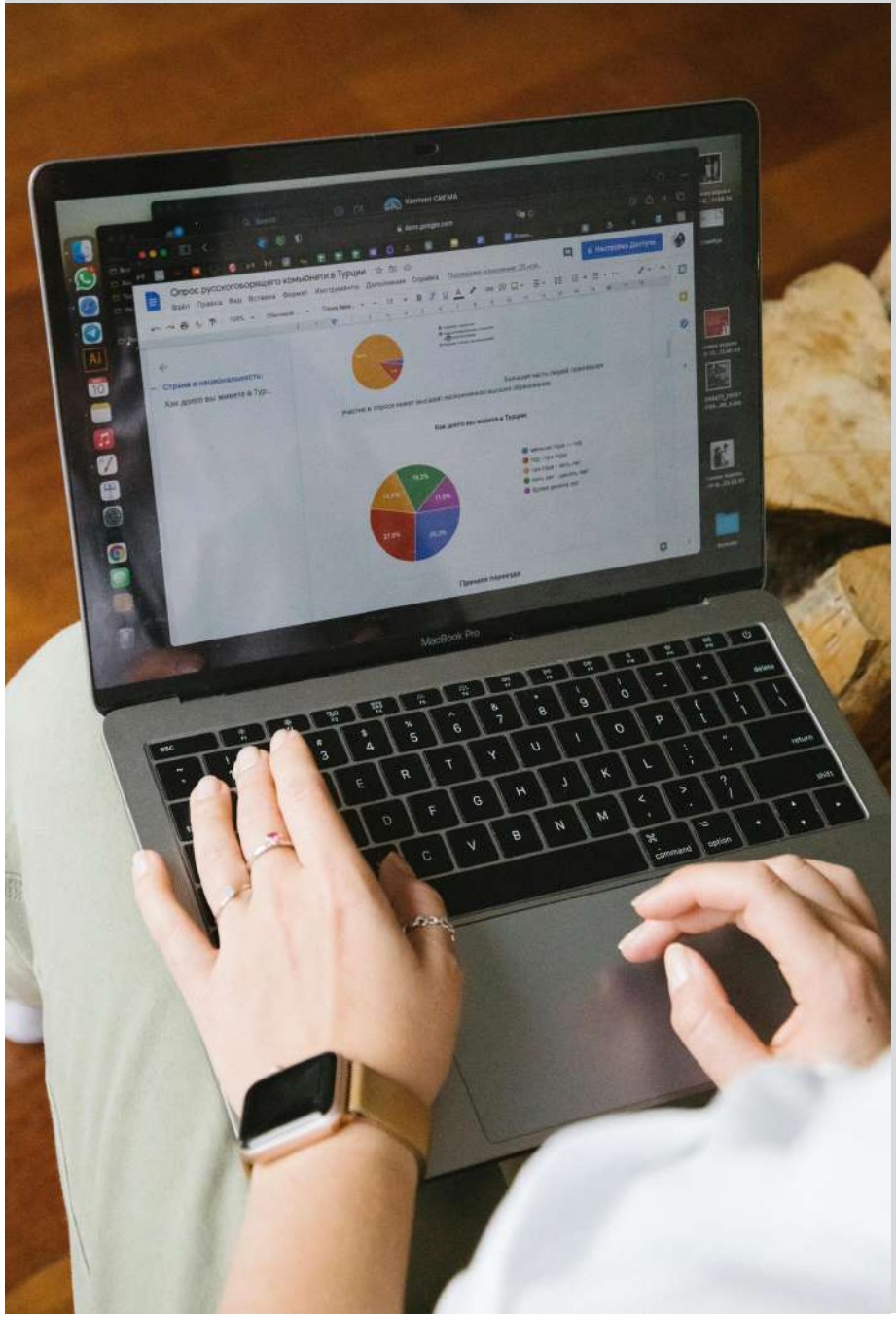
Introdution

With a view to the general public having access to all types of information, whether it is more entertaining or complex, data visualisation is a more attractive and simpler way of communicating, allowing everyone to access data and various types of information and thus gain access to knowledge.

Data visualization seeks to make clear what we often identify as more complex or difficult to understand and even analyse. From this perspective, this topic in our training programme seeks to demonstrate that over the years it has been possible to bring different audiences closer to a greater quantity and diversity of information.

In this case, data visualization. We will then introduce the concept of data visualization and point out some tools that can be useful for developing infographics or for presenting large volumes of data, the so-called big data.

The concept



Data visualization can be easily understood as a way of drawing graphics in order to show and present data. **This data can be more complex or less complex and always has the same goal** - to make it easier for people to understand and comprehend certain content. (Unwin, 2020)

According to Antony Unwin (2020), data visualisation can work as a way of cleaning data, i.e. with large amounts of data, it will be possible to clarify and make clearer the most pertinent information that can help people understand what is being presented.

That's why it's important to know how to choose the right graph, the right table and the right presentation scheme. This work is the result of research and knowledge of the principles of data visualization in order to better convey the information you want.

Principles of data visualization

Over the years, many researchers have put forward proposals for guiding principles in the creation and development of ways of presenting data. However, for our approach, which is directly linked to the possibility of information reaching the greatest number of people more quickly and easily, we present the proposed principles of data visualization put forward by **Edward Tufte** (2006)

Comparison

Causality

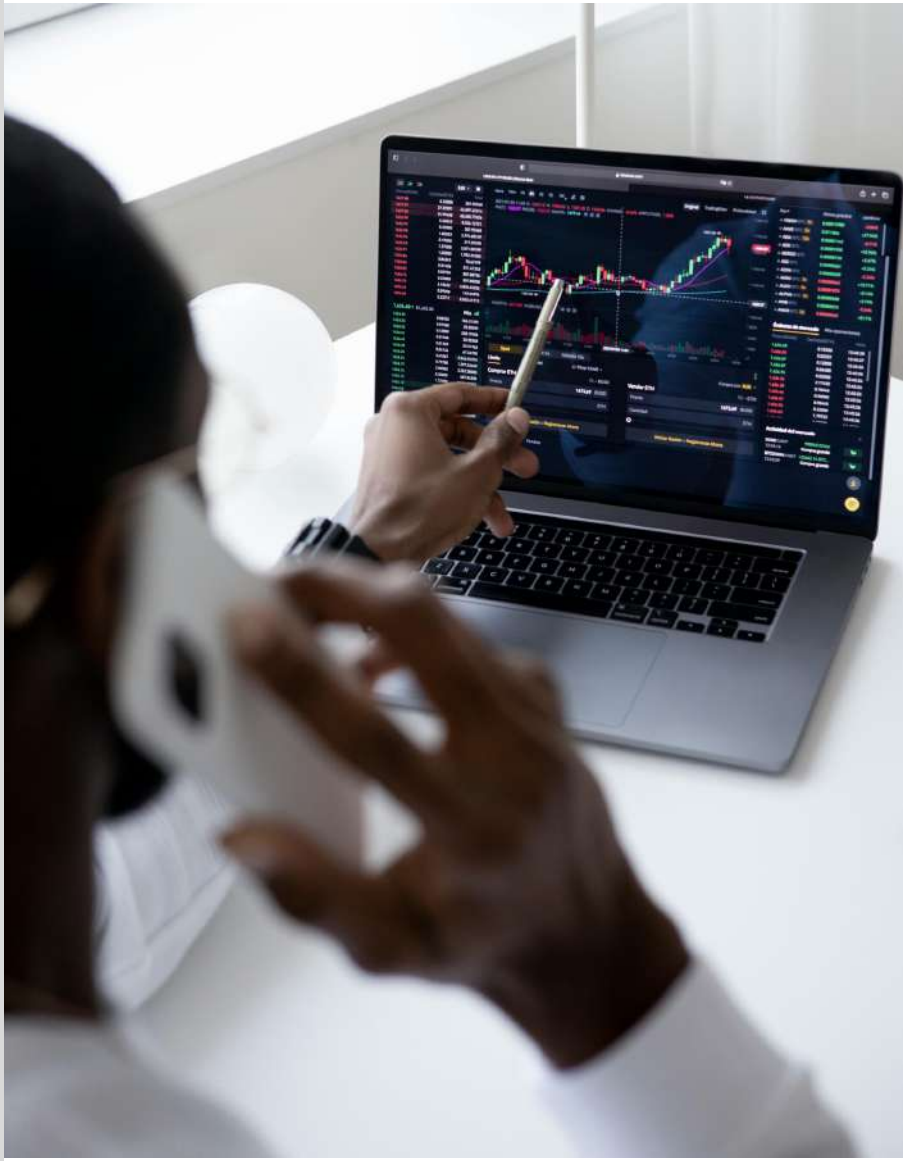
Multivariate analyses

Integration

Documentation

Focus on content

Principles of data visualization

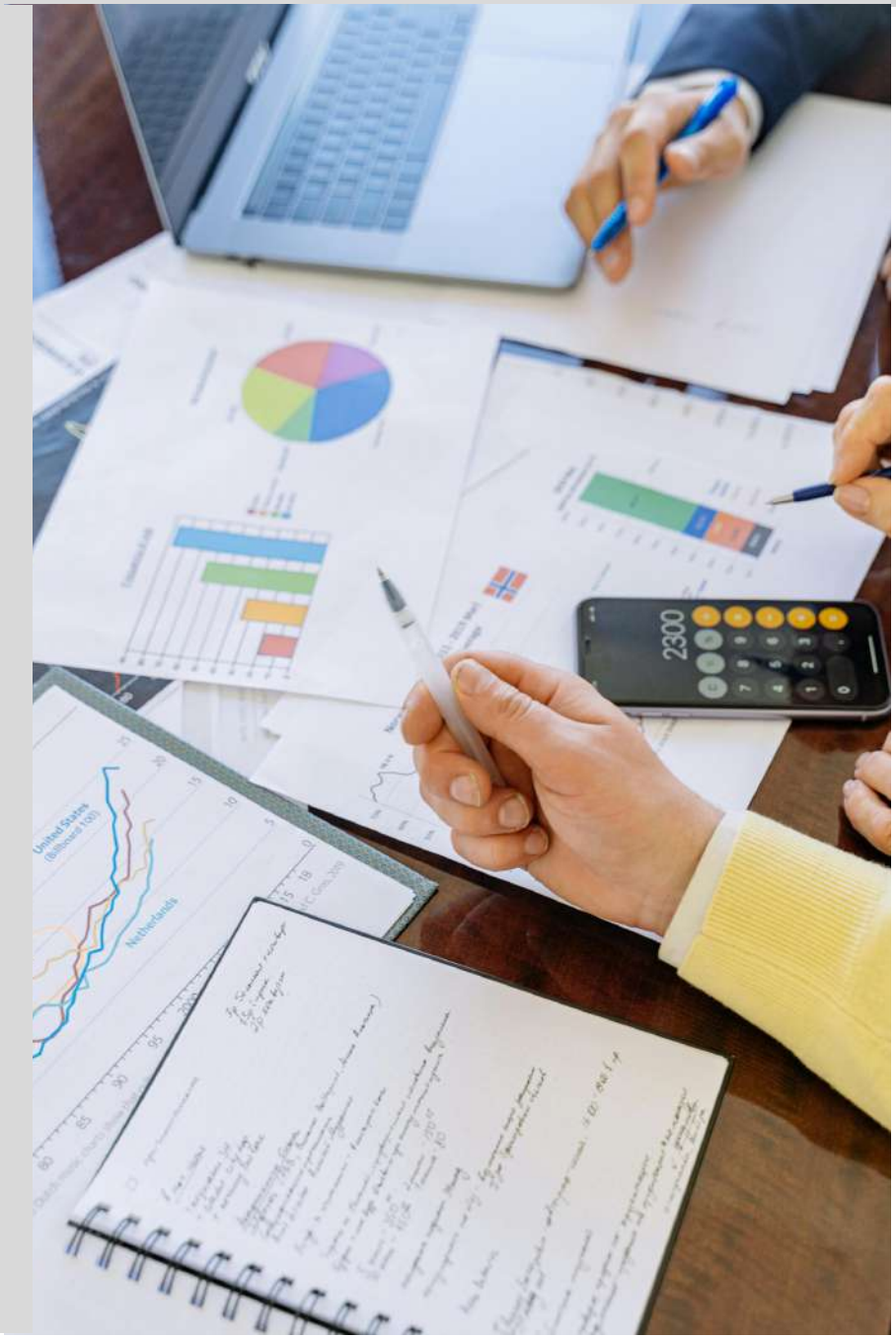


Comparison: data is analysed on the basis of comparisons, regardless of the type of analysis being carried out.

Causality: data is analysed on the basis of a cause-effect relationship. The reflections that can be made make it possible to demonstrate any casual relationships that may exist.

Multivariate analyses: based on chance, which is initially bivariate (only 2 variables being analysed) and then becomes multivariate (several variables) because the chance relationship can demonstrate the importance of including more variables, which is advantageous for the analysis.

Principles of data visualization



Integration: visual representation tends to be improved by including various elements such as text, images or numbers. This combination makes it possible to clarify the information.

Documentation: indicating the sources and authors of the data used in the analysis lends credibility to the information. It is important to create a relationship of trust with those viewing the information.

Focus on content: a detailed analysis of the data you want to present allows you to create rigour in the information you transmit. All research and analysis should focus on the content to be conveyed and not so much on aesthetic issues such as colours and shapes. That's important, but it's not fundamental!

Principles of data visualization

As far as more **technical or aesthetic** considerations are concerned, we can refer to the contents presented in Yellowfin's 2016 ‘Data Visualisation Best Practice Guide’:

Choose the graphic representation (think about the type of graphic that best works with the information we want to share. The type of data we have determines the type of graph to use).

Choose a formatting style (one that makes what we want to convey attractive and aesthetically pleasing). Be careful with secondary elements that can act as visual noise and add nothing to the main information).

Strive for as much clarity as possible (in titles, blocks of text and fonts). Know how to choose each element taking into account the content, the type of information and also the target audience for which it is intended).

Highlight what is most important (using different colours and sizes to direct the user to what is most important in that particular piece of content).

Tools to aid data visualization:

In a simple search on any search engine we are quickly presented with lots of tools. To make it easier, let's highlight just three (3).

Qlik Sense

Looker Studio

infogram

I challenge you to try them out and then send me your feedback, will you?

Here's my e-mail address filiparodrigues@esev.ipv.pt

Good work!

Thank you so much!!!
See you next time :)

filiparodrigues@esev.ipv.pt

Data visualization: presentation and communication of data accessible to all.

The concept; the principles and some tools

Teacher: Filipa Rodrigues Pereira

february, 2025

Media literacy and desinformation

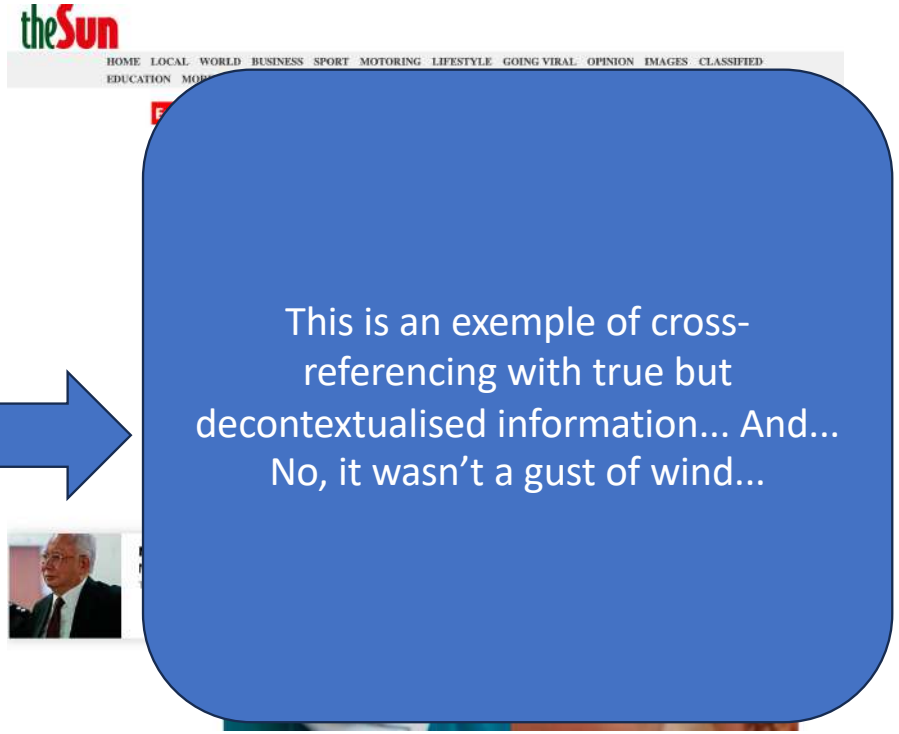
Miguel Midões

mmidoes@esev.ipv.pt

WHERE DOES THE LIE BEGIN?

- **IN THE TITLE - ALWAYS!**
- **FUNCTION:** to attract the reader's attention;

- **HOW DO YOU FEED THE LIE?**
- With false information;
- Cross-referencing with true but decontextualised information;
- Decontextualised images that are not linked to the action of the news story;



MAIN OBJECTIVE/MOTIVATIONS?

ALMOST ALWAYS MONEY (FINANCIAL GOALS):

Scam: enters the site - spreads on the computers of those who visit it a specific type of malicious software - an affiliate, which allows the site administrators to receive money from online sales companies. Financing via advertising.

POLITICAL OBJECTIVES:

To harm or benefit a particular candidate or political perspective;

SOCIAL OBJECTIVES:

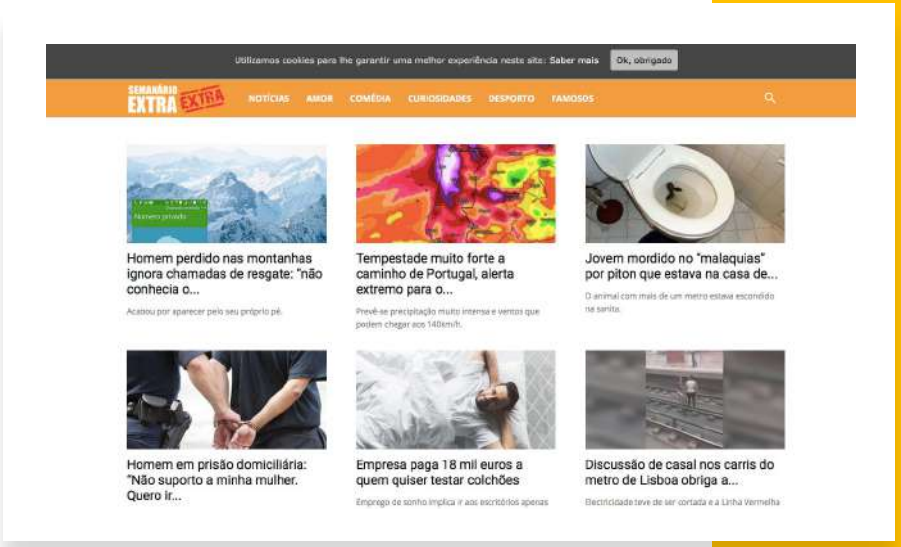
To interact with a certain group or people - entertainment (satire);

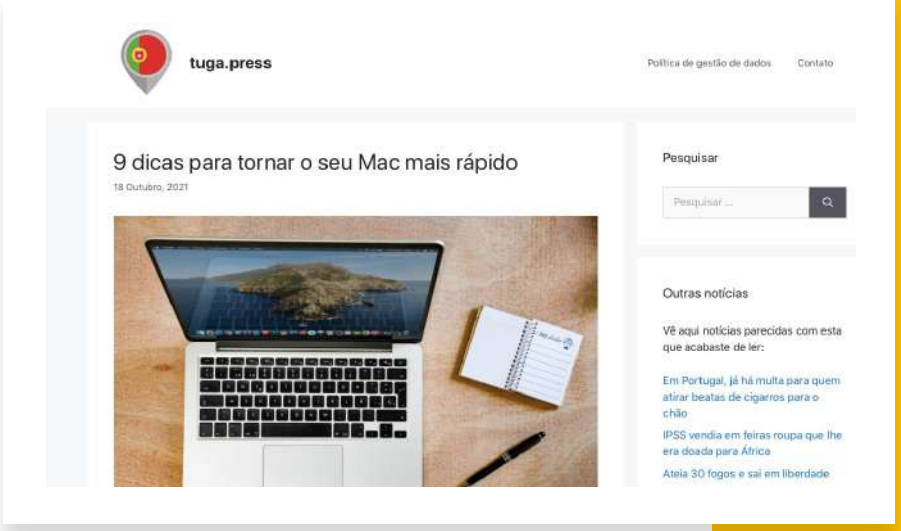
PSYCHOLOGICAL OBJECTIVES:

To seek prestige - emotional issue;

How do they present themselves?

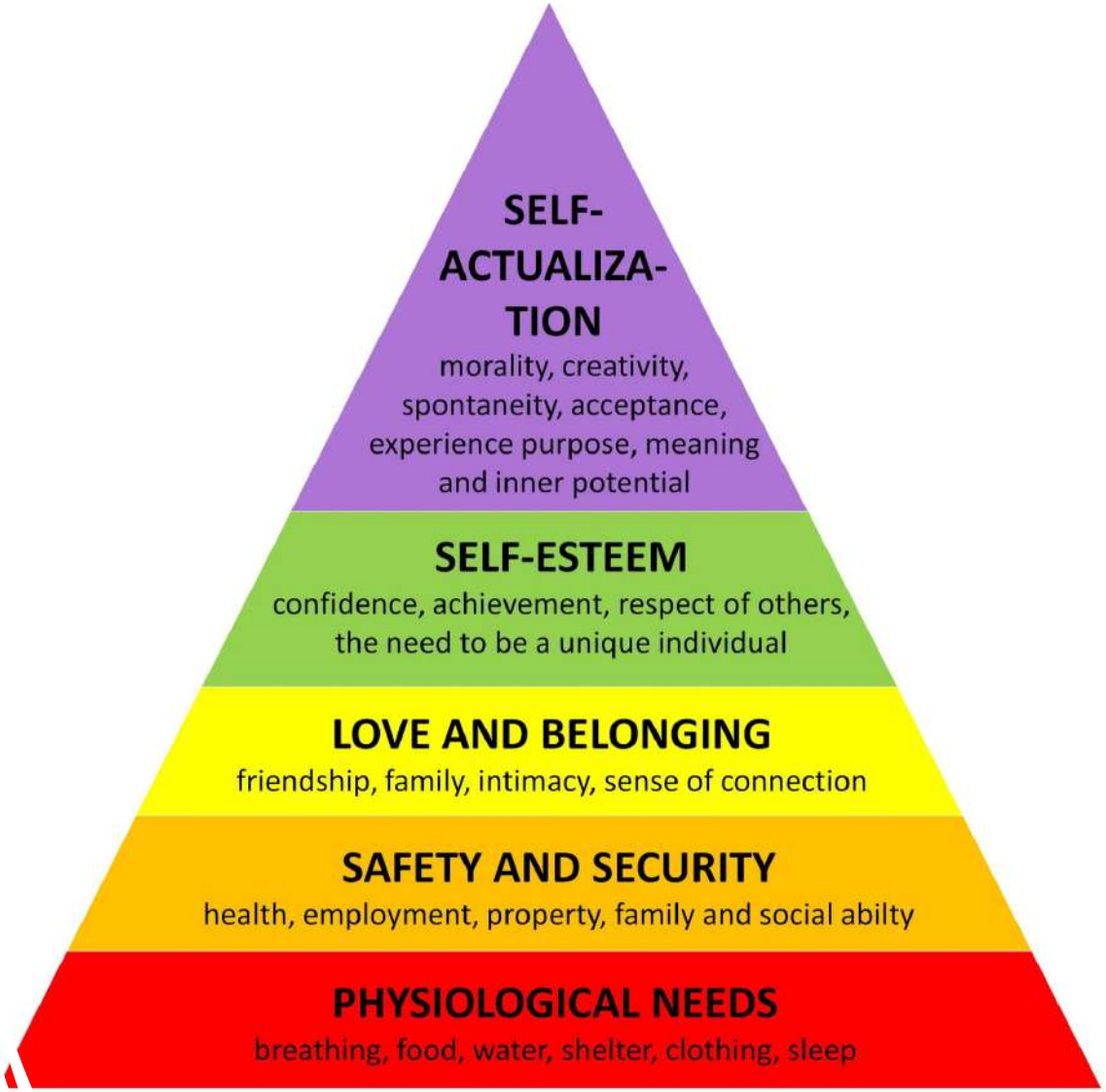
- As much like the media as possible (layout - image);
- With names that are very similar to official media organisations or with ‘word games’ that allude to well-known media and the ‘jargon’ of the media world;
- Portuguese examples: Semanarioextra / Jornaldiario / Noticiario.com / Magazinelusa.



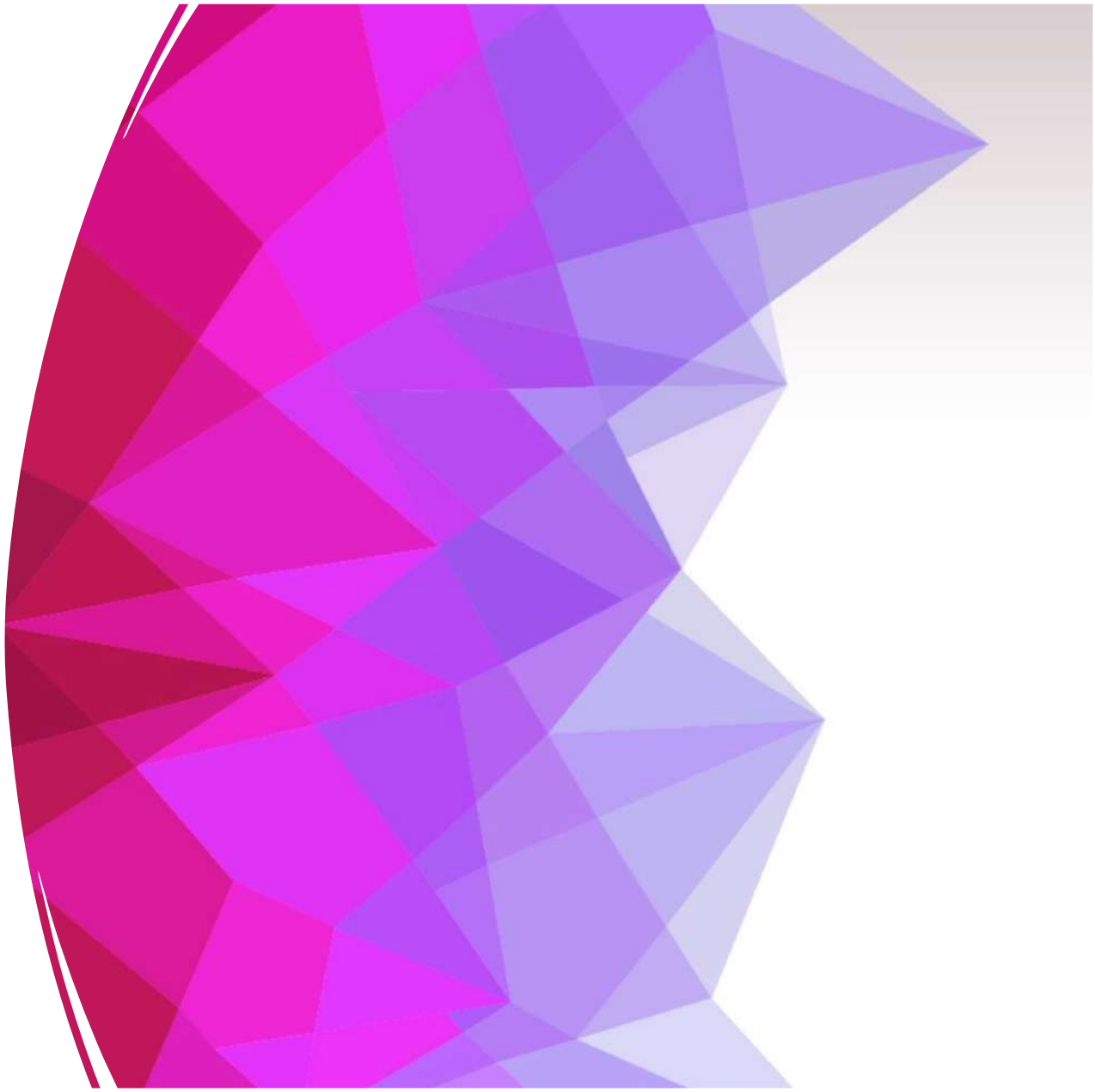


Dominant themes in disinformation

- Animals
- Security
- Corruption
- Politics
- Issues related to Maslow's pyramid of basic needs, because it touches on what people consider to be essential to their lives, for example security.

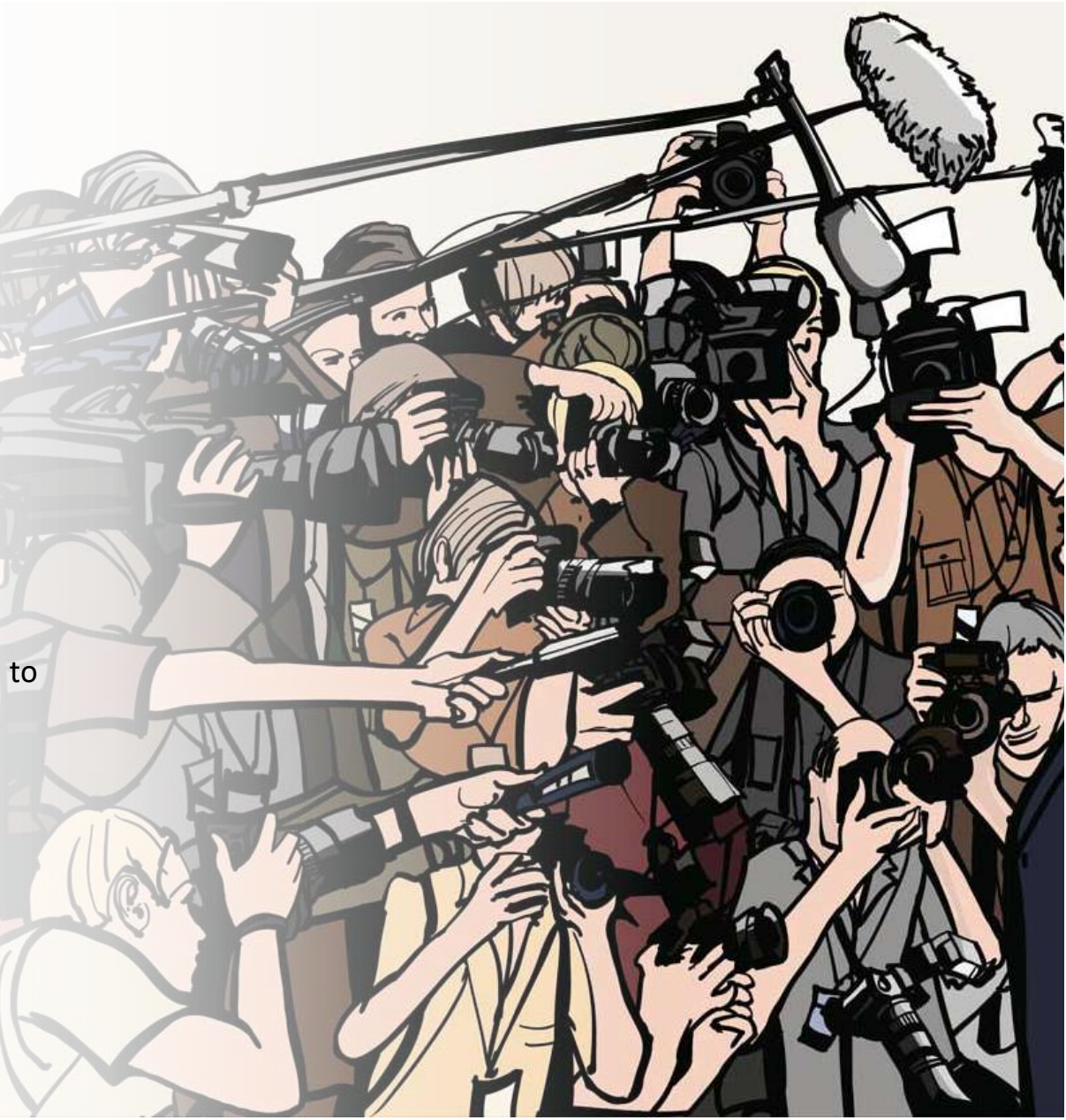


Tools to combat fake news



Check the sources of information

- **DIRECT** (who was involved in the matter)
- **INDIRECT** (who watched or arrived while it was happening)
- **DOCUMENTARY** (legal, health, financial documents, etc.)
- **THE REPORTER ON THE SITE** (FUNDAMENTAL - the first and main source. When they can, they go directly to the location to confirm the information)



- **IDENTIFYING THE AUTHOR/JOURNALIST IS ESSENTIAL.**
- If the name of the newspaper doesn't appear, if there's only ‘Newsroom’ or the name of the ‘supposed’ newspaper, you have to be suspicious.

Test the credibility of sources:

- Their involvement in the facts
- The ability to comment on the facts
- Credibility ‘accumulated’ in previous contacts with journalists

Does the source misrepresent facts? When and why?

- Because of emotion
- Vanity
- Excessive humility
- Fear of sanctions
- Confusion of the facts

Watch the vídeo:

Social networks and *fake news*

- New context:
- New technologies with an impact on society;
- ‘Information pollution’ on a global scale;
- Complex network of motivations for the creation, dissemination and consumption of these ‘polluted’ messages;
- New possibilities and techniques for amplifying content;
- Vast array of platforms that make it possible to host and reproduce this content;
- New forms of rapid communication between peers;

Desinformation

(Wardle & Derakhshan, 2017)

“Malinformation”

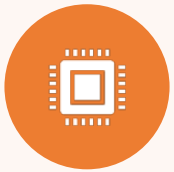
Deliberate publication of false information, revealing private or corporate interests to the detriment of the public interest, deliberate misrepresentation of context, dates and content;

“Misinformation”

Unintentional errors, such as the wrong description of images, the wrong allusion to dates, the wrong interpretation of statistical data or when satirical elements are taken as serious information;

What changes? The intention, because both are disinformation.

Challenges in the Portuguese context



Difficulties for the regulator to intervene in the Internet field

Legal/constitutional framework;

Extraterritorial and supranational phenomena

Difficulty adapting to innovation

The risk, even if unintentional, of limiting freedom of the press and expression;

Journalism's role in combating disinformation

- Social functions of journalism: to educate, inform and entertain;
- Journalism values and standards (credible sources, impartiality, fact-checking, etc.)
- Challenges facing journalism (economic power and political power);
- Understanding disinformation as a social problem;
- The role of investigative journalism;

Media literacy

01

A set of competences capable of fostering critical engagement with the messages produced and disseminated by the media;

02

Ability to actively and critically reflect on the messages we produce and receive;

03

Building common sense and empowering people to think critically, contributing positively to their communities and engaging in meaningful change;

04

Community component/individual responsibility

Literacy for the news
(kajimoto & Fleming, 2019)

- Skills rooted in the theory and practice of journalism, essential for an informed citizenry;
- A sub-field of media literacy
- Ability to access, evaluate, analyse and appreciate journalism
- Knowledge and motivations needed to engage with journalism
- Critical thinking skills to assess the reliability and credibility of information, whether it comes from the press, television or the internet.
- Teaching news consumers to interpret news with a healthy scepticism, applying journalistic skills to verify the information in front of them

Literacy for the news
(Ashley, 2019)

- Set of competences needed to navigate the complex news and information environment of the 21st century;
- Knowing how to check sources;
- Examining facts;
- Awareness of the personal goals and motivations behind news consumption;
- Know the limitations of human cognition;
- Understand the political, economic, social and cultural contexts in which news is produced and disseminated;

PODCAST E PODCASTING

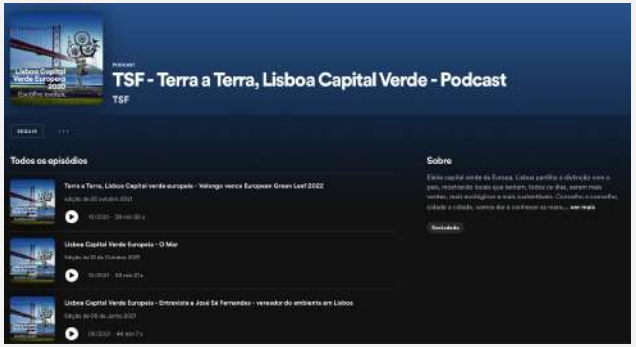
Miguel Midões

Jornalista, docente do ensino superior e formador

WHAT'S A PODCAST?

The audio of a TV programme hosted on a platform?

A radio programme hosted on a podcast platform?

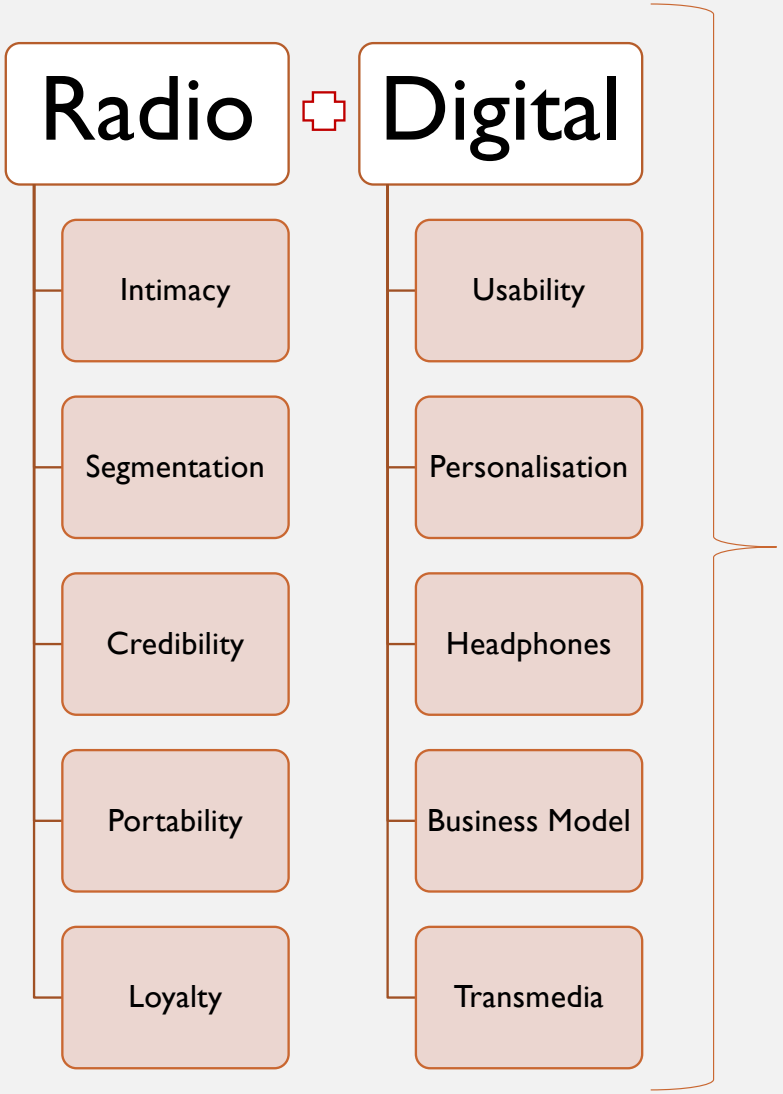


Audio for streaming or a downloadable file?

LUIS MIGUEL PEDRERO ESTEBAN (UNIVERSIDADE DE NEBRIJA – MADRID)

- ‘new digital creature’;
- It emerged in connection with the blogging community: themed content more geared towards entertainment;
- Becomes popular when large companies (Spotify, Amazon, etc.) realise that the new format could arouse advertising interest and generate immediate income;
- 17,000 podcasts a day (worldwide);
- 30 to 39 per cent of Portuguese already consume podcasts (2021);

WHY THE SUCCESS?



- Content that doesn't get much play on the radio, such as culture, children's and youth programmes, brand awareness, original and adapted fiction...
- Podcast trasmedia - television series that are then followed up with podcast content;
- Narrative and investigative podcasts - which recapture the essence of reporting, but with other ways of telling the story, with attractive and well-crafted themes that don't have space on traditional radio programme schedules;

1. PODCAST AND PODCASTING

- ‘In the golden age of podcasting, there are so many programmes, inspiring ideas and exciting voices. Yet, at the same time, many of them sound the same to us. Or worse, they sound **unfocussed and boring** (Nuzum, 2019, p.19).

1. INTRODUCTION

- A podcast should be (according to Eric Nuzum, 2019):
- **FOCUSED** and **CENTREED** on themes and styles;
- **FUN** and **APPEALING** - in journalistic genres and techniques, guests, different angles of approach, etc.

- What is the biggest challenge for a podcast and a podcaster?

1. INTRODUCTION

- To be **ORIGINAL**;
- This is the most difficult task of all;
- To work in this direction, Nuzum (2019) considers it essential that podcasts have:
- **- STORY**
- **- CHARACTERS**
- **- VOICE**

1. INTRODUCTION

- **STORY** - knowing how to compile stories and ideas;
- **CHARACTERS** - creating engaging characters;
- **VOICE** - a unique, original, impactful voice;

- (All this, regardless of format or style)

2. FEATURES

- According to Spinelli & Dann (2019) there are 11 characteristics that define podcasts:
- 1. They are a more interior and intimate way of listening. It is conceptually and qualitatively different from radio listening because it facilitates a number of different relationships;
- 2. It is primarily a mobile medium. It is usually consumed 'on the move';
- 3. It offers greater control to the listener. It is extremely easy to (re)listen to ('replay') and to do so repeatedly;

2. FEATURES

- 4. Requires more active participation on the part of the consumer in choosing their listening options;
- 5. Targets niche audiences;
- 6. They are considered social media because of their ability to increase and activate audience involvement;

2. FEATURES

- 7. It is produced and distributed without the approval of an information editor, programme director or gatekeeper;
- 8. They are distributed as a freemium model (free + premium);
- 9. (Theoretically) they are always available, but they face more obstacles in achieving greater liveliness;

2. CARACTERÍSTICAS

- 10. Não tem por base um texto fixo ou um modelo formatado para determinado episódio. Podem ser cometidos erros, podem pedir-se desculpas e o som remisturado. Há, de facto, uma maior liberdade criativa;
- 11. Não tem os constrangimentos de escala ou de tempos que existem nos *media* de radiodifusão.

3. EUROPEAN STYLE AND AMERICAN STYL

- More sophisticated audio production, musical, rich sound (sound design), more laboured, even more masculine.
- A style that also tends to be associated with European radio, even before it was associated with podcasts.

- A softer style, more chatty, familiar, fluid, personal and sometimes even more intimate.

4. PODCAST PRODUCTION

- It enables to creative practices that we don't find on the radio;
- The relationship between producers and listeners is closer, but it became ‘clouded’ when advertising and sponsors began to be introduced into this content. There is a perception that, after this, the podcaster no longer tells his audience what he understands or wants, because he is being paid to do so.

4. PODCAST PRODUCTION

- Many podcasts today are also marked by personal, social, political and cultural agendas;
- Most podcasts have strong links with social networks, which they use to publicise and communicate;

5. AUDIENCE RECEPTION, PARTICIPATION AND INVOLVEMENT

- Multiple relationships are created between producers, listeners and subjects/themes - same cases prioritise patron or followers questions to guests;
- Being a more abstract product than radio, it is open to more considerations and perceptions;
- There is an easy and natural acceptance of the inconstancy of the editions;

5. AUDIENCE RECEPTION, PARTICIPATION AND INVOLVEMENT

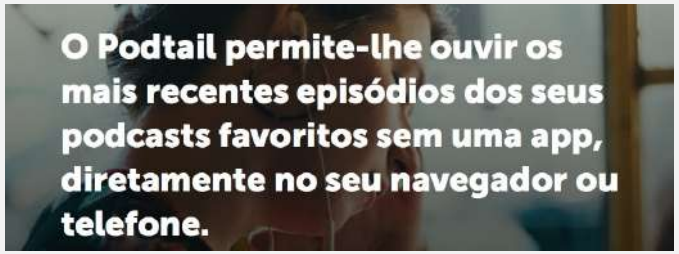
- The podcast **audience, being niche, is more 'knowable'** than the radio audience. Specific subjects aimed at very specific audiences. For example, art, design, etc.

5. AUDIENCE RECEPTION, PARTICIPATION AND INVOLVEMENT

- It's difficult to quantify listeners because they are very unstable, not least because podcast downloads don't mean exactly the same thing as listeners;
- Most podcast authors base their content on their **own interests, tastes and curiosities**, and don't try to cater for the (supposedly) abstract audience and their tastes.

5. AUDIENCE RECEPTION, PARTICIPATION AND INVOLVEMENT

- There is an openness to **new forms, new concepts, new production aesthetics**, motivated by the production system based on archives and content aggregators;



6. STRONG SOUND IDENTITY

- It's the 'brand' of the podcast - the listener hears it and associates that sound with the content - it creates a mental image;
- Original
- Short and dynamic
- Can contain voices, tracks, curtains, separators, music, etc.
- Can contain a jingle

Rita Colaço – https://open.spotify.com/show/28a8sbb4xWkcC1JkOUbykJ

Pedro Paulos e Marta Rocha – https://open.spotify.com/show/317smsTeFgPTIupYwk6aG4

EXAMPLES OF PODCASTS CREATED AT ESEV - POLYTECHNIC UNIVERSITY OF VISEU - AND WITH A STRONG AND CONSTRUCTED SOUND IDENTITY

LISTEN HERE

https://open.spotify.com/episode/2XNEU1kzYkByHNAcLAcVEZ

LISTEN HERE

https://open.spotify.com/episode/3Ogykv0s32gEroXftSE1DR

6.1. JINGLE

- Audio spot built as music;
- Facilitates memorisation by the listener
- Higher production costs: lyrics, arrangements, musical band for recording, etc;
- Longer time, with a high number of repetitions for the music to ‘sink in’ and therefore higher costs;
- Often used to promote the brand of the radio station/podcast itself;

Extremamente Desagradável:

https://open.spotify.com/show/6NhXT8X7ps2AxjbPeInidM

7. PODCAST TYPOLOGIES

1. One-to-one interview - the most common format and the easiest to carry out

2. Panel - with more than one guest - more work, more expensive (e.g. in terms of the microphones needed, sound desk, etc.)

3. Individual commentary - huge challenge of rhythm - boring monologue

4. Co-hosts - the difference with the 'panel' is that they are not interviews, the participants are co-hosts of the programme. One of the hosts takes on the role of anchor for better control and organisation.

8. PODCAST TYPOLOGIES

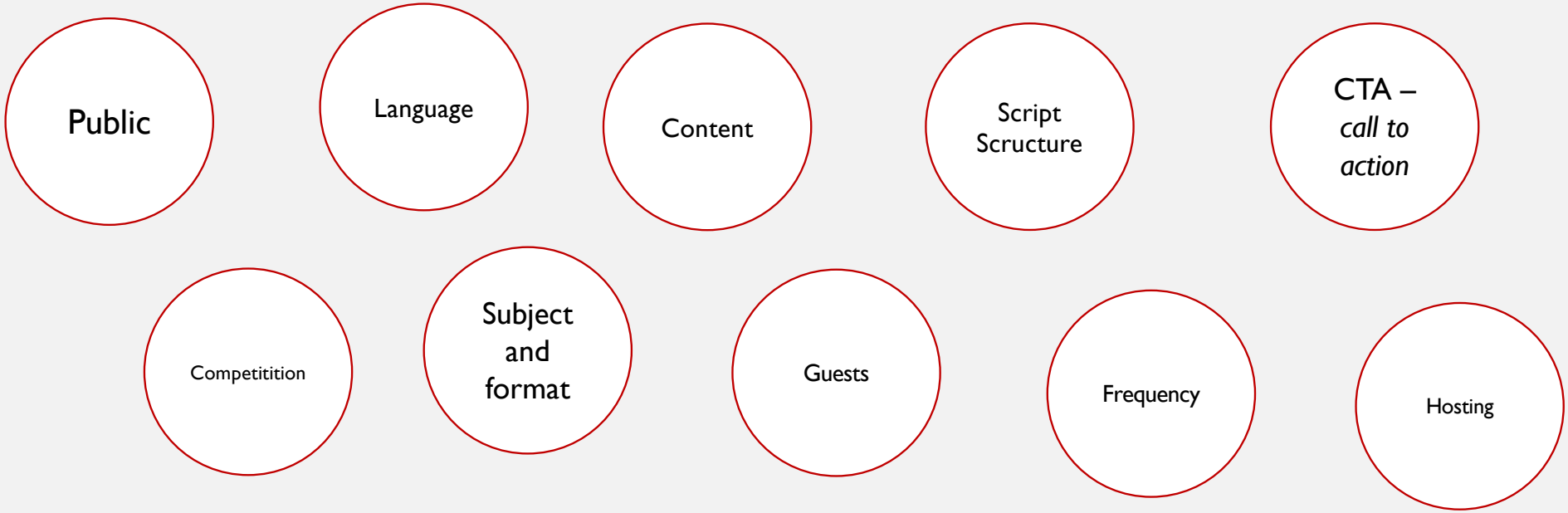
5. *Non-fiction storytelling* - more appealing to audiences, but more challenging. Style closer to journalism and with more elaborate editing. Anchored in reportage - in other people's stories.

6. *Storyfictional storytelling* - stories that are not based on fact. With casts of actors, a plot and the aim of pure entertainment.

7. Mixed - Combines two or more of the above formats.

8. 'Recycled' content - old programmes that are recovered to distribute to a new audience. Lectures, seminars, workshops...

9. PLANEAR UM PODCAST. O QUE FAZER?



How do university students use podcasts to find out more? A case study with Portuguese communication and journalism students about choosing content in this medium and the link with news and information podcasts.

Miguel Midões – Polytechnic University of Viseu & CECS - Communication and Society Research Centre

Teresa Gouveia - Polytechnic University of Viseu & CI&DEI – Center for Studies in Education and Innovation

PORTUGAL

II Conference Young people and news: Breaking boundaries across Europe

CICANT Centre ROG (or Faculty of Law), Ljubljana

Podcast Consumption Trends

1

Portugal

Podcast listening is growing in Portugal, with a significant percentage of young adults listening regularly.

2

United States

Podcast listening is particularly high among young adults in the US, with a majority having listened in the past year.

3

Brazil

Brazilian university students also show a high rate of podcast consumption, highlighting its popularity in the region.

Global Trends in Podcast Consumption

Brazil

In 2019, a study by IBOPE found that individuals aged 16-24 were the most frequent podcast listeners.

United Kingdom

A 2021 study by the National Literacy Trust revealed that young people use podcasts to access diverse perspectives, learn new information, and improve their mental well-being.

United States

Young adults in the US, aged 12-34, are avid podcast listeners, particularly while driving or at home, with comedy podcasts being the most popular.

Podcast Consumption Among University Students

1 University of Brasília

A 2021 study found that the majority of undergraduate students at the University of Brasília listened to podcasts at least once a month, often while engaging in other activities or seeking information.

2 University of Oregon

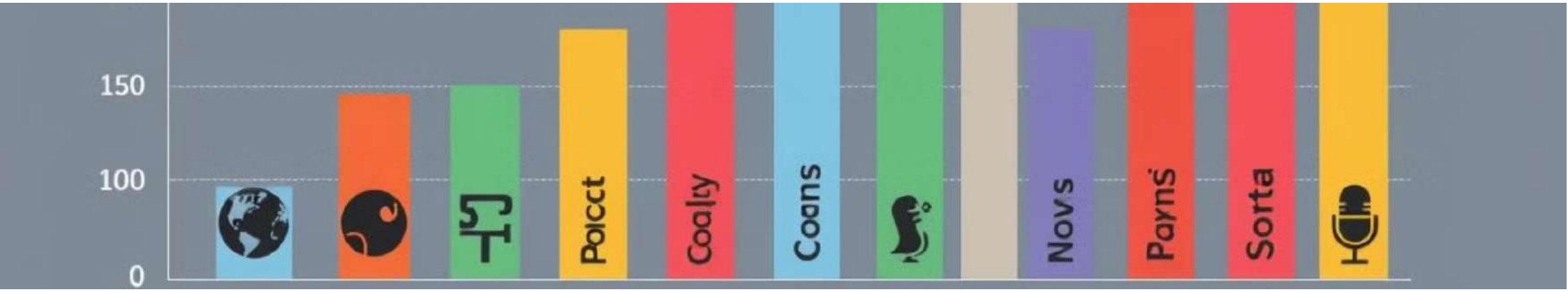
A 2007 study revealed high levels of podcast consumption among journalism and communication students at the University of Oregon, with a significant portion listening frequently.

3 Motivations

Students often use podcasts to access diverse opinions, find solutions to specific issues, reinforce school learning, and manage anxiety and sadness.

4 Future Implications

As future media professionals, young adults in communication and journalism programs will have access to podcasts as a potential tool for reaching niche audiences.



Podcast Content Preferences

Category	Portugal (2023)	United States (2022)
Specialized (Science, Technology, Business, Health)	Most Popular	Less Popular
Lifestyle, News, Contemporary Issues	Popular	Popular
Sports	Least Popular	Popular
Comedy	Not Mentioned	Most Popular

Sample Characteristics: Communication Studies Students

This study examines a sample of Communication Studies students enrolled at the Polytechnic University of Viseu - School of Education. The sample offers insights into demographic aspects of this student cohort.

Gender Representation

The sample predominantly comprises female students, with a 67% representation. Male students constitute 32% of the sample. A small percentage of students identify with other genders.

Age Range

The majority of students fall within the 17-22 age group. A significant proportion is between 17-19 years old, followed by 20-22 year olds. A small number of students are older, with a few in the 23-25 age range and one student 26 years or older.

Year of Study

The sample demonstrates a balanced distribution across academic years. Approximately one-third of the students are in their first, second, and third years of study, respectively.

Podcast Listening Frequency

1 **Daily**

4 participants (3.57%) listen to podcasts **daily**.

2 **Multiple Times a Day**

6 participants (5.36%) listen to podcasts multiple times a day.

3 **Several Times a Week**

23 participants (20.54%) listen to podcasts several times a week.

4 **Several Times a Month**

26 participants (23.21%) listen to podcasts several times a month.

Podcast Listening Times

Morning

9 participants (8.04%) listen to podcasts in the morning.

Afternoon

30 participants (26.79%) listen to podcasts in the afternoon.

Evening

49 participants (43.75%) listen to podcasts in the evening.

Work/Study

5 participants (4.46%) listen to podcasts while working or studying.

Podcast Themes

Music

27 participants (24.11%) listen to music-themed podcasts.

Educational

27 participants (24.11%) listen to educational podcasts.

Information & News

28 participants (25%) listen to information and news podcasts.

Podcast Formats

1

Dialogue

76 participants (38%) prefer dialogue-based podcasts.

2

Interview

43 participants (21.5%) prefer interview-based podcasts.

3

Monlogue

40 participants (35.71%) prefer monologue-based podcasts.

4

Debate

25 participants (22.32%) prefer debate-based podcasts.

5

Non-Fiction Storytelling

23 participants (20.54%) prefer non-fiction storytelling podcasts.

Podcast Consumption Methods

Streaming

92 participants (82.14%) prefer streaming podcasts directly online.

Downloading

7 participants (6.25%) prefer downloading podcasts to their devices.

Podcast Preferences

1

Popular Podcasts

The most popular podcasts among students include "Watch.tm", "Extremamente Desagradável", and "Bate pé".

2

Podcasters

Pedro Teixeira da Mota is the most listened-to podcaster, followed by Joana Marques, Mafalda Castro, and Rui Simões.

3

Content Preferences

Students prefer podcasts related to culture, sports, news, music, and education.

4

Listening Habits

Students primarily listen to podcasts in the evening, for entertainment and learning purposes.

Politécnico de Viseu

CECS centro de estudos de comunicação e sociedade

Importance of Visual Elements

Audiovisual Content

Students value audiovisual content, with a significant majority finding it important or very important.

Sound Identity

A strong sound identity is highly valued, with most students considering it crucial for podcast recognition.

Visual Identity

A strong visual identity is also considered important, as it helps create a positive first impression and attract new listeners.

Podcast Attributes

Originality

Students value podcasts that offer unique and innovative content.

Credibility

Trust in the information and the presenter is crucial for students.

Intimacy

Students appreciate a personal connection with podcast hosts.

Personalization

The ability to tailor content to individual preferences is important.

Podcast Duration

Duration	Percentage
30-45 minutes	**40.18%**
10-30 minutes	31.25%
45 minutes-1 hour	14.29%
Over 1 hour	1.79%
Up to 10 minutes	8.04%

Podcast Definition

Audio Format

Podcasts are primarily an audio format, often featuring dialogue or monologues.

Interaction

Podcasts encourage dialogue and exchange of ideas between hosts, guests, and listeners.

Learning

Podcasts offer a relaxed and accessible way to learn new things.

Companionship

Podcasts provide companionship, especially during solitary moments.

Key Findings

Growing Popularity

This study confirms the growing popularity of podcasts among young adults, particularly among Communication students.

Sound and Visual Identity

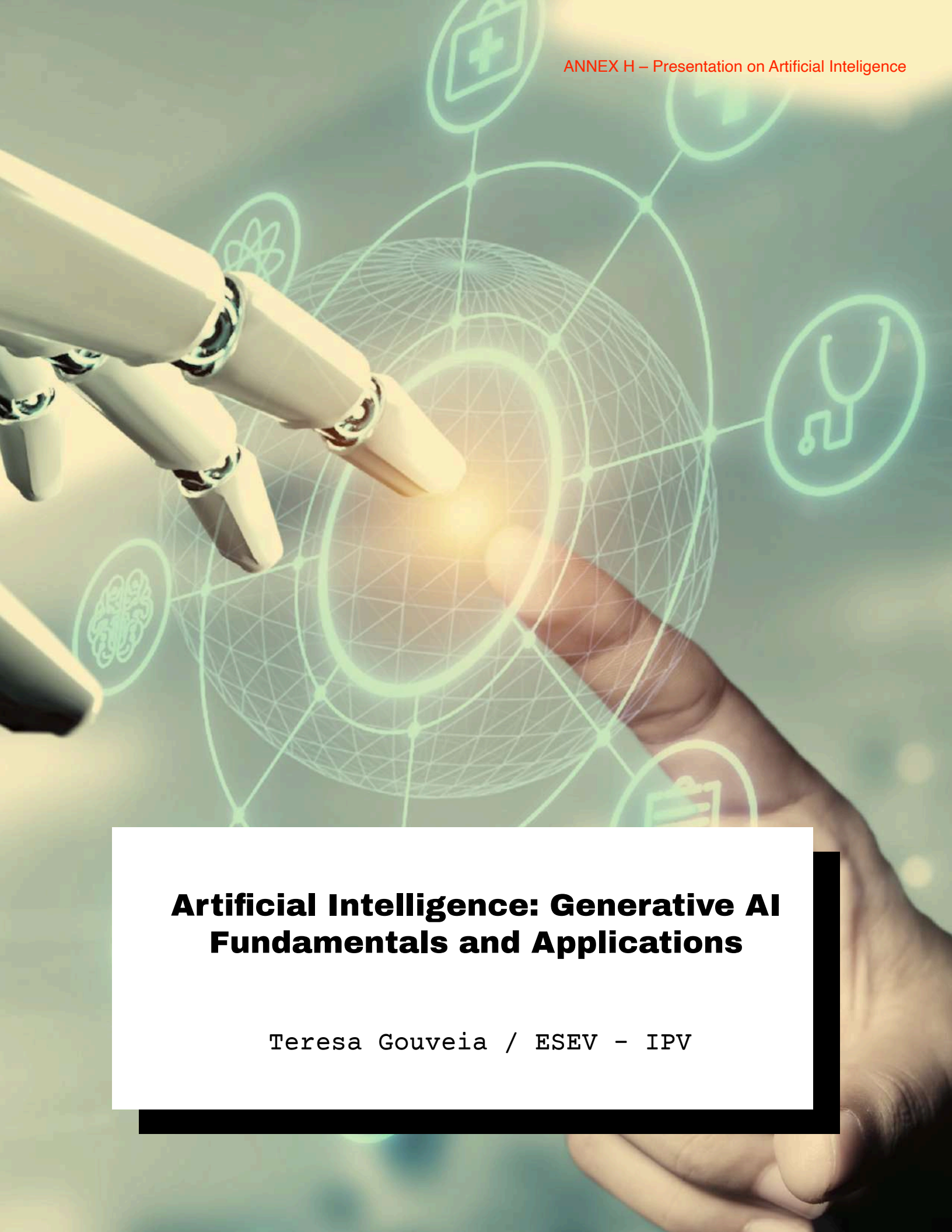
Students prefer podcasts with a strong sound and visual identity, and they appreciate audiovisual content.

Podcast Preferences

Students value originality, credibility, intimacy, and personalization.

Podcast Duration

The study also highlights the importance of podcast duration, with a preference for episodes lasting between 30 and 45 minutes.



Artificial Intelligence: Generative AI Fundamentals and Applications

Teresa Gouveia / ESEV - IPV

Table of Contents

Introduction

This training covers the Fundamentals of Artificial Intelligence (AI) and delves into Generative Artificial Intelligence (GAI). AI is one of the most relevant pillars for developing innovative solutions that address current societal challenges, including the need for digital, green, and longevity skills — core values of the COBLAGES project.

In this 1h30 asynchronous course, we aim to:

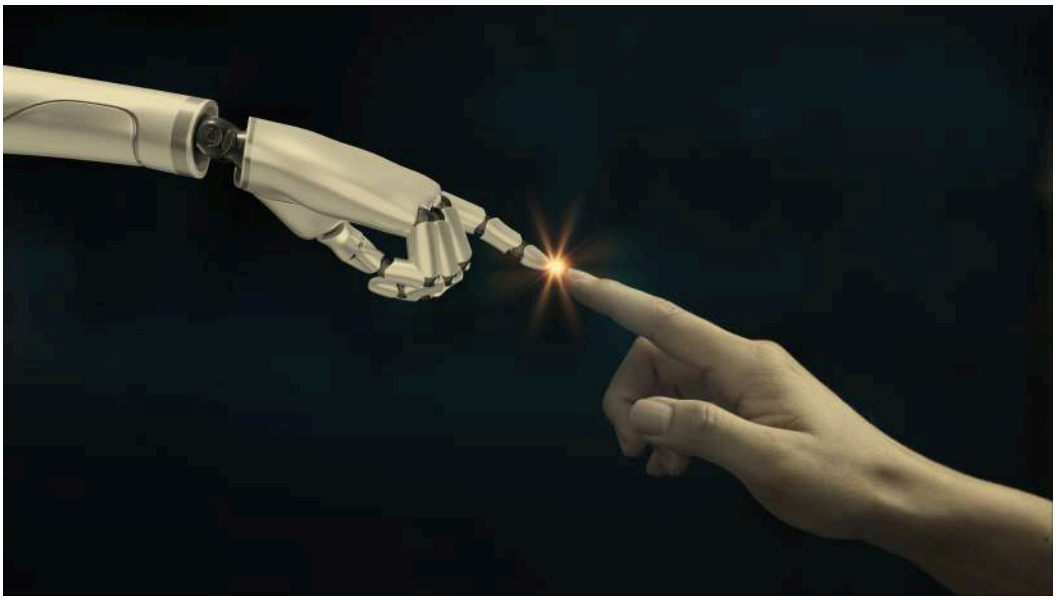
- Explore the foundations of AI, from its definition to its historical evolution;
- Understand the distinction between AI, Machine Learning (ML), and Deep Learning (DL);
- Learn about Generative AI (GAI), its models, and tools such as ChatGPT, GPT-4, Bard, DALL·E, Midjourney, Stable Diffusion, Synthesia, and Voice.ai;
- Reflect on ethical, regulatory, and social challenges associated with the use of generative systems;
- Carry out a practical exercise that fosters creativity and critical thinking, in line with COBLAGES' collaborative methodology.

Learning Objectives

1. Understand the concept of Artificial Intelligence, its historical evolution, and the distinction between AI, Machine Learning, and Deep Learning.
2. Identify the fundamentals of Generative Artificial Intelligence, recognizing how it works and its main applications.
3. Familiarize yourself with popular GAI tools (ChatGPT, GPT-4, Bard, DALL·E, Midjourney, Stable Diffusion, Synthesia, Voice.ai), focusing on their uses and limitations.
4. Reflect on the ethical implications of AI, including issues of privacy, bias, and copyright.
5. Apply practical knowledge in creating or analyzing content generated by AI, responsibly and aligned with COBLAGES' objectives.

Chapter 1

Fundamentals of Artificial Intelligence



1.1. What Is AI?

Artificial Intelligence (AI) is a branch of computing that seeks to develop systems capable of performing tasks that traditionally require human intelligence (Nilsson, 2010). Examples include:

- Voice and image recognition;
- Natural language processing and understanding;
- Data-based problem-solving and decision-making;
- Robotics, among other fields.

THE TERM "ARTIFICIAL INTELLIGENCE" WAS POPULARIZED IN THE 1950S BY JOHN MCCARTHY, WHO PROPOSED THIS CONCEPT TO DESIGNATE MACHINES WITH THE ABILITY TO LEARN AND REASON.

1.2. Historical Evolution of AI

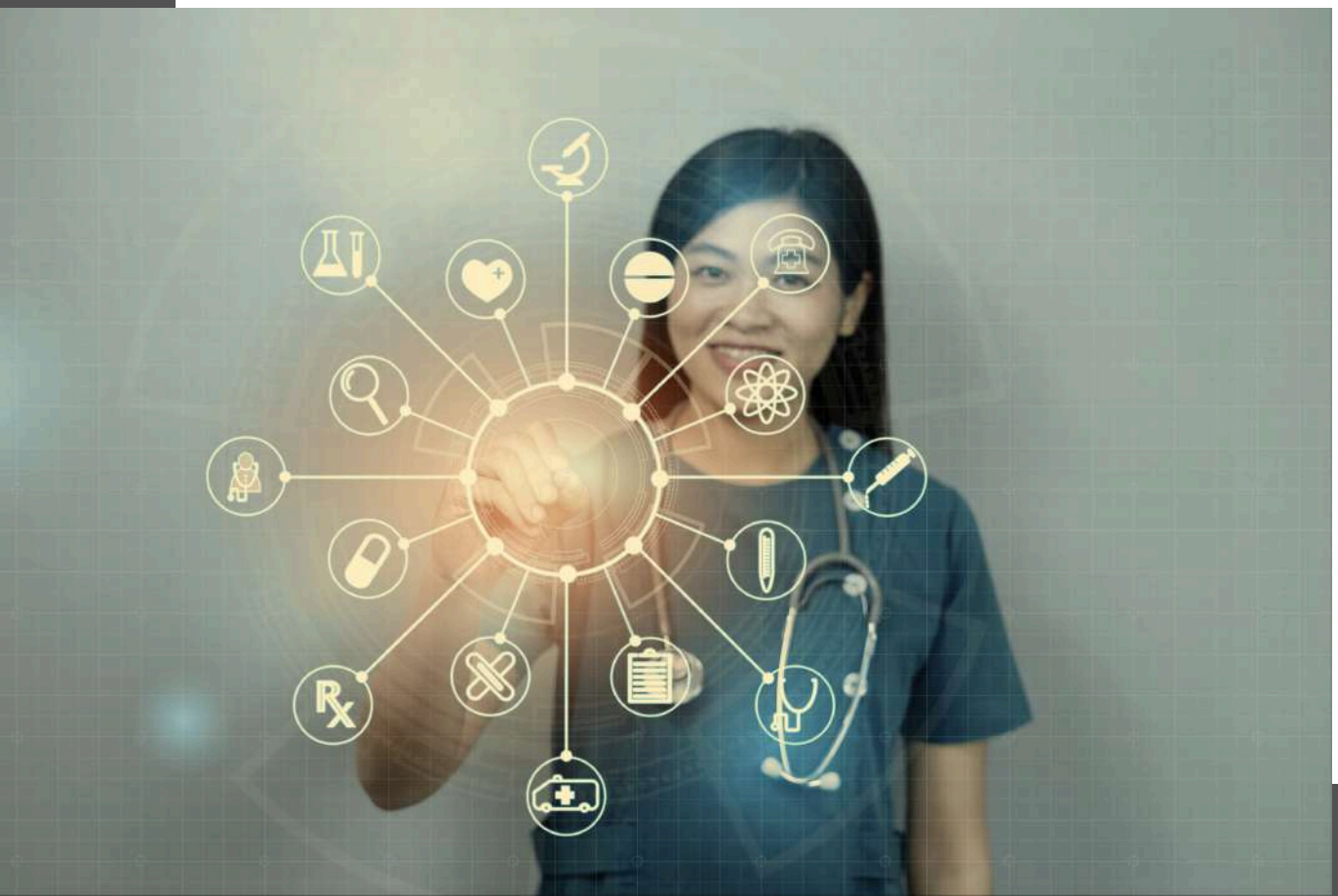
- **1950s:** The first formal AI studies emerge, focusing on symbolic reasoning and rule based methods.
- **1970s-1980s:** Development of expert systems, but the so-called "AI winters" also occur, due to unfulfilled promises and resulting disillusionment.
- **1990s:** Advances in Machine Learning algorithms, such as simpler neural networks, regressions, and decision trees.
- **21st Century:** Expansion of Deep Learning, boosted by increased computing power and the availability of large-scale data (Goodfellow, Bengio, & Courville, 2016).

1.3. AI, Machine Learning, and Deep Learning

Artificial Intelligence(AI): A broad area encompassing any method to make machines “intelligent” (capable of reasoning, perceiving, and acting).

Machine Learning (ML): A subset of AI that enables algorithms to “learn” from data without being explicitly programmed for each task (Stanford University, 2023). Examples include Linear Regression, Decision Trees, and classic Neural Networks.

Deep Learning (DL): A subset of ML that uses deep neural networks with multiple layers, capable of extracting complex patterns from large amounts of data. Applications include image recognition, speech recognition, and natural language processing.



Chapter 2

Generative Artificial Intelligence

2.1. Key Concepts and Models

Generative Artificial Intelligence (GAI) focuses on creating new content (text, image, audio, or video) based on learned patterns. Unlike discriminative models, which only classify or recognize information, generative models produce something entirely new.

• **Transformers:** Models like GPT (Generative Pre-trained Transformer) have dominated Natural Language Processing (NLP), generating coherent text (OpenAI, 2023).

• **Diffusion Models:** (e.g., Stable Diffusion) create images from random noise, converging toward detailed visual compositions.

• **GANs (Generative Adversarial Networks):** Competing networks (generator vs. discriminator) that can produce photorealistic or stylized images.

Benefits for COBLAGES

• Creation of pedagogical resources to stimulate digital skills among students;

• Sustainability: digital prototypes can replace physical resources in several project stages;

• Longevity: voice synthesis or avatar creation tools can assist older adults in communication and well-being activities.

2.2. Generative AI Tools

1. ChatGPT (OpenAI)

- Available at: https://chat.openai.com
- Generates text in various contexts and languages (including European Portuguese).
- Useful for dialogue, draft creation, and brainstorming.

2. GPT-4 (OpenAI)

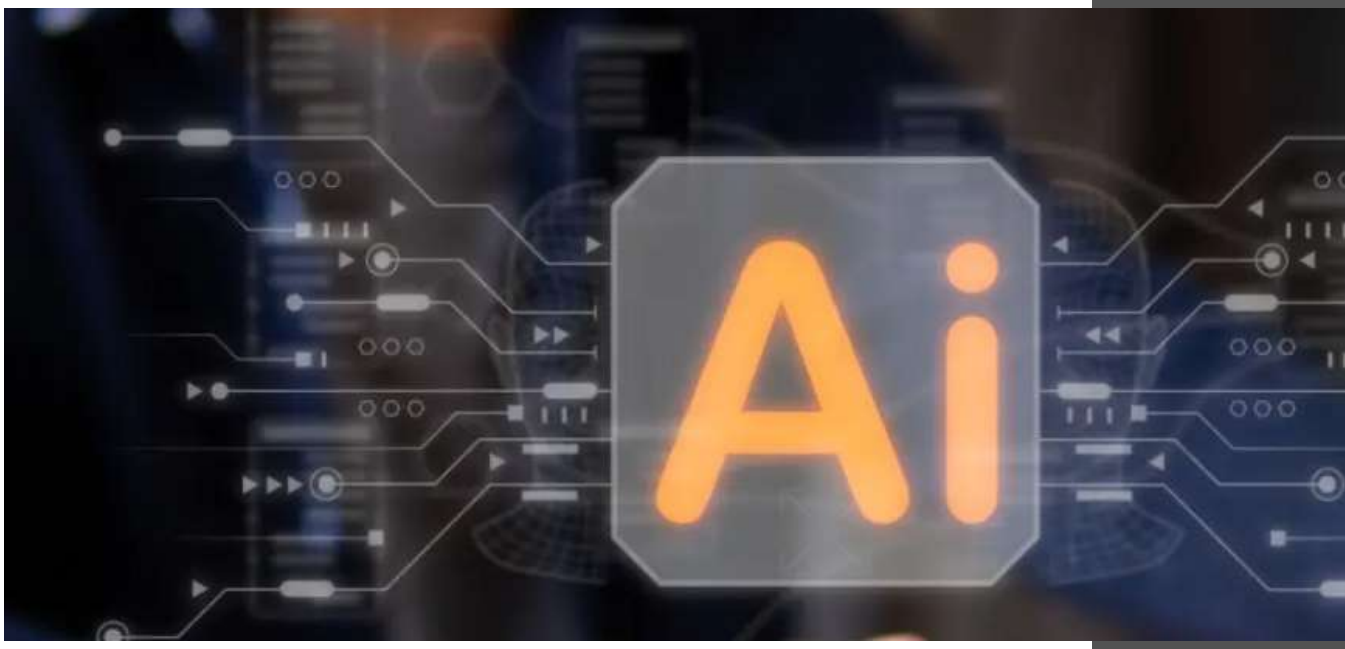
- The most recent and advanced version of GPT, with greater reasoning capabilities.
- Typically requires a subscription, but experimental access may be available.

3. Bard /Gemini (Google)

- https://gemini.google.com/
- Uses language models developed by Google, focused on search and text generation.

4. DALL·E (OpenAI) or OpenArt

- Generates images from textual instructions (prompts) (https://openart.ai).
- Suitable for creating illustrations and visual prototypes.



5. Midjourney

- Accessible via Discord (https://midjourney.com)
- Known for the high-quality images it produces, from concept art to photorealistic portraits.

6. Stable Diffusion

- Open-source software (https://stability.ai/) with web-based interfaces (DreamStudio).
- Provides greater control over the image generation process.

7. Synthesia

- Creates videos with digital avatars presenting spoken content (https://www.synthesia.io/).
- Useful for tutorials, e-learning, or institutional communications.

8. Voice.ai

- Alters or synthesizes voices for narration and accessibility purposes (https://voice.ai/).
- Potential applications in podcasts, educational videos, and support for individuals with speech limitations

Chapter 3

Applications and Ethical Challenges

3.1. Practical Applications

- **Education and Training:** Generating didactic content (text, video, animations), tutorials with avatars, and customized exercises.
- **Health and Longevity:** Summaries of medical information for caregivers or relatives, avatars accompanying older adults, medication reminders (UNESCO, 2021).
- **Sustainability:** Visualizations and simulations (weather, urban planning) for environmental studies, ecological awareness campaigns.
- **Creative Industry:** Digital art, product design, concept art for games and films, etc.

3.2. Ethical Challenges

1. Misinformation and Deepfakes

- Generative AI can create false and convincing content (OpenAI, 2023).
- Risk of manipulating public opinion, fraud, and identity theft.

2. Copyright

- The authorship of AI-generated content is legally controversial.
- The use of training data can infringe on third-party rights.

3. Bias

- Models may incorporate biases present in their training data (Goodfellow et al., 2016).
- Heightened impact in sensitive applications, such as recruitment or diagnosis.

4. Regulation

- Proposed laws and guidelines in the EU (European Commission, 2023).
- Ethical principles from international organizations (UNESCO, 2021; OECD).

3.3. Alignment with COBLAGES

The COBLAGES project's central goal is to foster a community-based learning methodology in higher education, aimed at developing contemporary transversal skills that encompass green, digital, and longevity dimensions. Integrating Generative Artificial Intelligence (AI) in this context can offer significant benefits:

1. Development of Digital Skills

- Using Generative AI tools (e.g., ChatGPT, DALL·E, Midjourney) allows students to master new data creation and analysis techniques, as well as "prompt engineering."
- This practical approach promotes digital literacy, problem-solving, and creativity, preparing learners for the challenges of a rapidly evolving job market.

2. Promotion of a Green and Sustainable Approach

- Generative AI can be used to prototype solutions and projects virtually, reducing the use of physical materials and the ecological footprint of experimentation.
- Modeling and scenario generation tools can support environmental education, helping communities understand the impact of decisions on natural resources and to plan sustainable strategies.

3. Focus on Longevity and Active Ageing

- Creating inclusive content (e.g., informational posters, support avatars) can facilitate intergenerational communication and learning, enabling students to work directly on solutions for older populations.
- Generative AI solutions can assist with accessibility, such as generating voice and subtitles for people with special needs, or personalizing support materials for older adults.

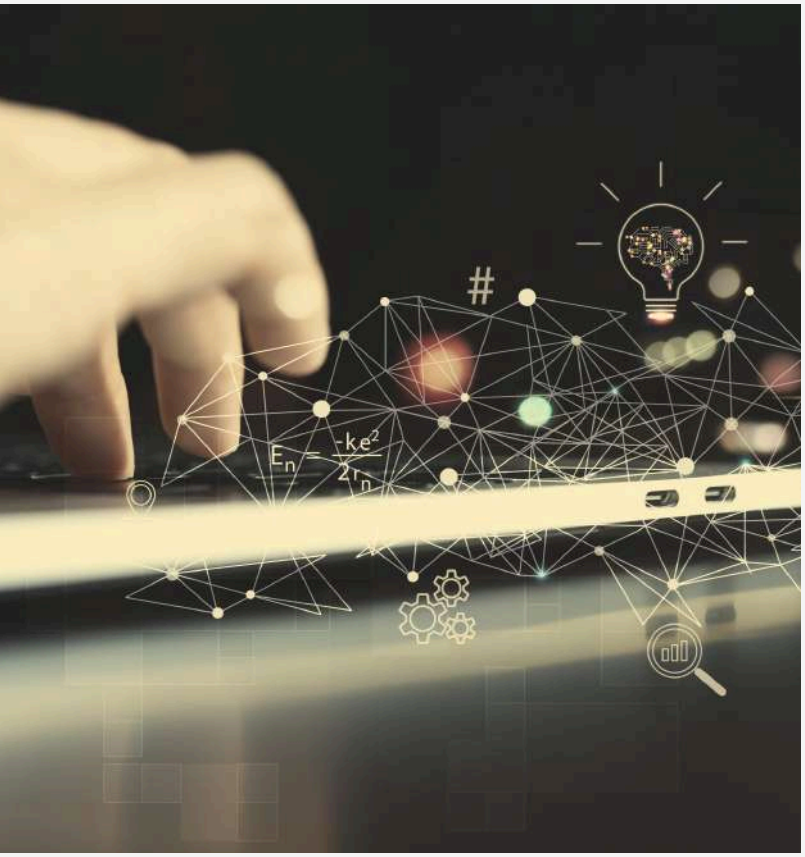
4. Community-Based Learning

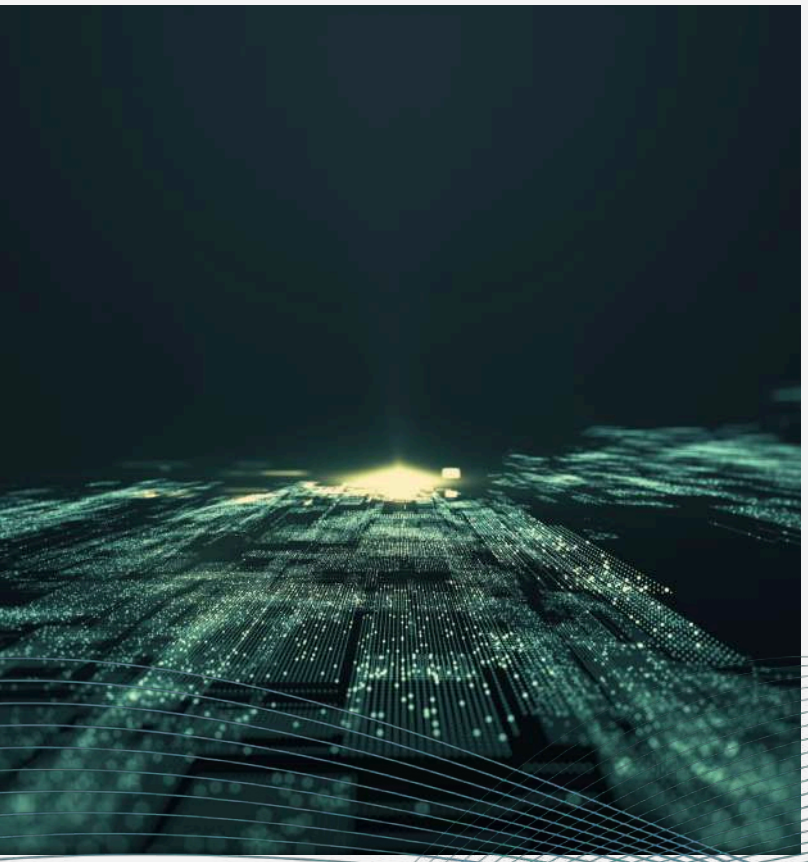
- Generative AI expands collaborative possibilities: students from different courses can join forces to create digital projects (e.g., videos, infographics, simulators) that address the needs of different age groups.
- Engaging stakeholders (e.g., elderly care institutions, environmental associations, government entities) enriches the process, bringing academia closer to real-life societal dynamics and providing practical feedback for continuous improvement of the proposed solutions.

5. Ethical and Social Reflection

- Using Generative AI requires considering ethical impacts, from privacy to potential reproduction of bias. Under COBLAGES, this reflection is done jointly with the community, ensuring that digital solutions uphold values such as dignity, inclusion, and active participation by everyone, including older populations.

https://easi-socialinnovation.org/projects/current-projects/coblages/





In short, the alignment of Generative AI with COBLAGES enables students and educators to develop <u>active, collaborative, and ethically responsible learning projects</u>, where longevity, sustainability, and digital transformation intertwine to promote social innovation and enhance the quality of life across all age groups.

Chapter 4

Practical Activity

4.1. Objective

Strengthen digital skills applied to Generative AI, reflecting on its usefulness, limitations, and ethical risks within the COBLAGES project.

4.2. Instructions

1. Choice of Tool

o Text (ChatGPT, GPT-4, or Bard) or Image (DALL·E, Midjourney, Stable Diffusion) or Video/Audio (Synthesia, Voice.ai).

2. Define a Theme Linked to COBLAGES

o Example: "Improving the quality of life for older adults through sustainable digital tools."

3. Create the Content

o Formulate a specific prompt. For instance:

- **"Create a 300-word text explaining how digital avatars can support older adults in their daily care, addressing benefits and risks."**

Or, for images:

"Generate an image where a digital avatar interacts with an older adult in a sustainable home environment."

4. Analyze the Outcome

o Check the content's coherence and relevance.

o Look for biases, inaccuracies, or inappropriate language.

5. Critical Reflection

o Write a short commentary (200-300 words):

Process: Which tool was selected and why?

Quality: Advantages and disadvantages of the generated content.

Application: How might this solution be useful/feasible for the community, including ethical challenges? Suggest possible practical applications in the context of population ageing and sustainability.

Finally, share the outcome (screenshot, file, or link) along with your reflection in the **E-activity 4** forum and comment on at least one colleague's work, contributing to the collective construction of knowledge.

4.3. Assessment

- Prompt Quality and Clarity: Objectivity and suitability for the theme.
- Content Consistency: Whether the result is coherent and free of serious factual errors.
- Ethical Reflection: Recognizing possible risks (misinformation, bias) and privacy considerations.
- Contribution to COBLAGES: How the activity fits into digital skills, longevity, and sustainability dimensions.

Additional Resources and Readings

1. OpenAI - Documentation and Tools

- ChatGPT

2. Midjourney

- Midjourney via Discord

3. Stable Diffusion

- Platform

4. Synthesia

- Official Website

5. Voice.ai

- Platform

6. AI Regulation and Ethics

- European Commission - European AI Alliance
- UNESCO - Recommendation on the Ethics of Artificial Intelligence (2022)
- OECD AI Principles

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R
ZONE:A
VISION:
Anonymous
USER: Anonymous Guest:Code:M5w098
ZONE:AB
R
ROTATION-BALANCE-SPEED
CONNECTED

2023-1-PT01-KA220-HED-000165596

COBLAGES

3. Climate change and action

Isabel Brás, ESTGV - IPV

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COBLAGES

2023-1-PT01-KA220-HED-000165596

Main Goals

Climate change is a pressing global issue caused by human activities. This presentation explores its causes, impacts, and potential solutions.

Aspects to be tackled

- Sustainability;
- Climate Change: Understanding the Global Challenge
- Explore the science of greenhouse gases, their sources and impacts, and strategies for mitigating their effects on the planet

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Let's Start!!

For you, what is Sustainable Development, in one word.

https://www.menti.com/alf1g2z1rezx

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For you, what is Sustainabe Development, in one word.

9 responses

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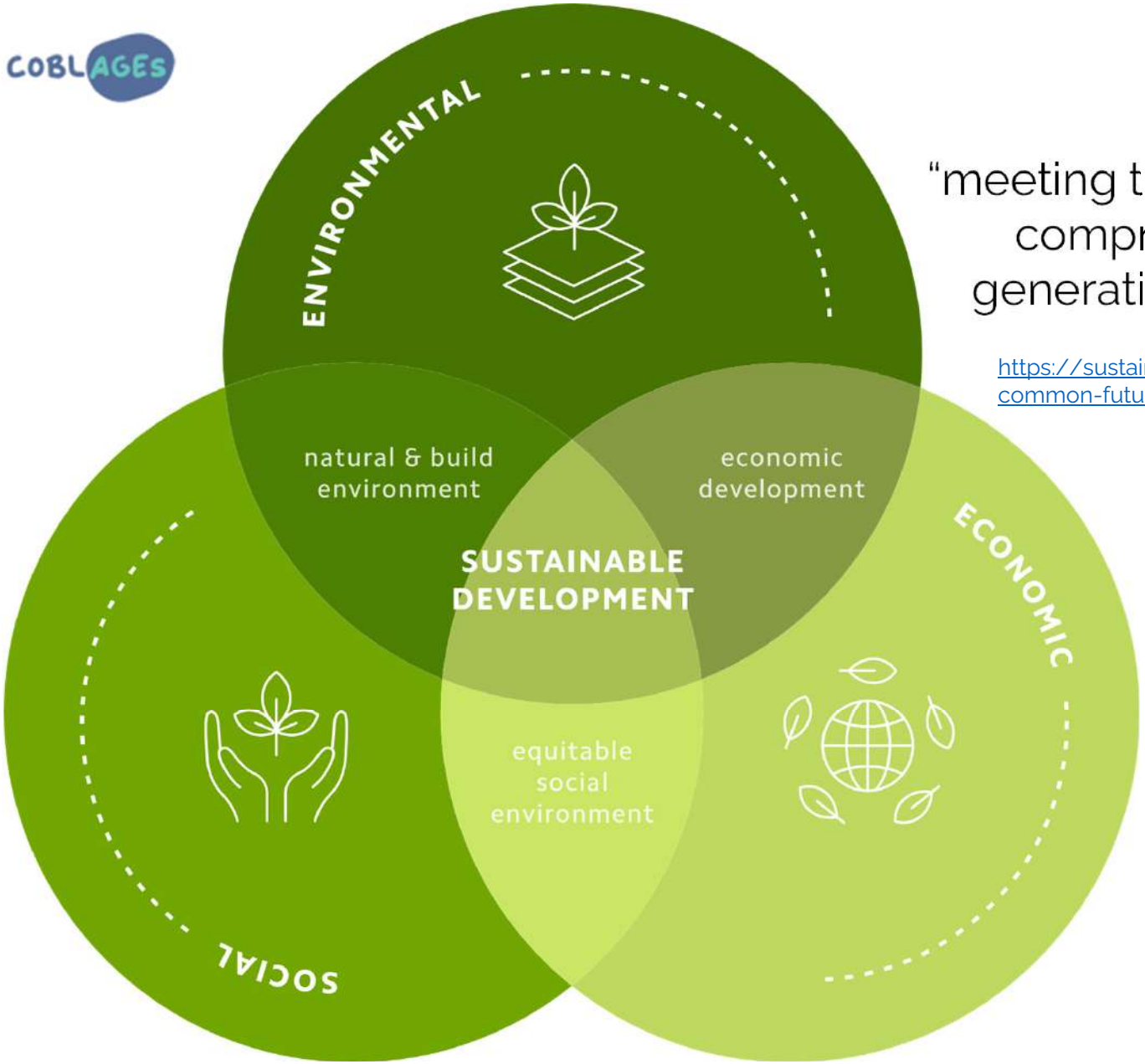

"meeting the needs of the present without compromising the ability of future generations to meet their own needs."

https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

Brundtland Report

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CHALLENGE

In the Chat window relate one of the 17 Sustainable Development Goals (SDGs) With a Pillar of the Sustainable Development

"SDG = Pillar"

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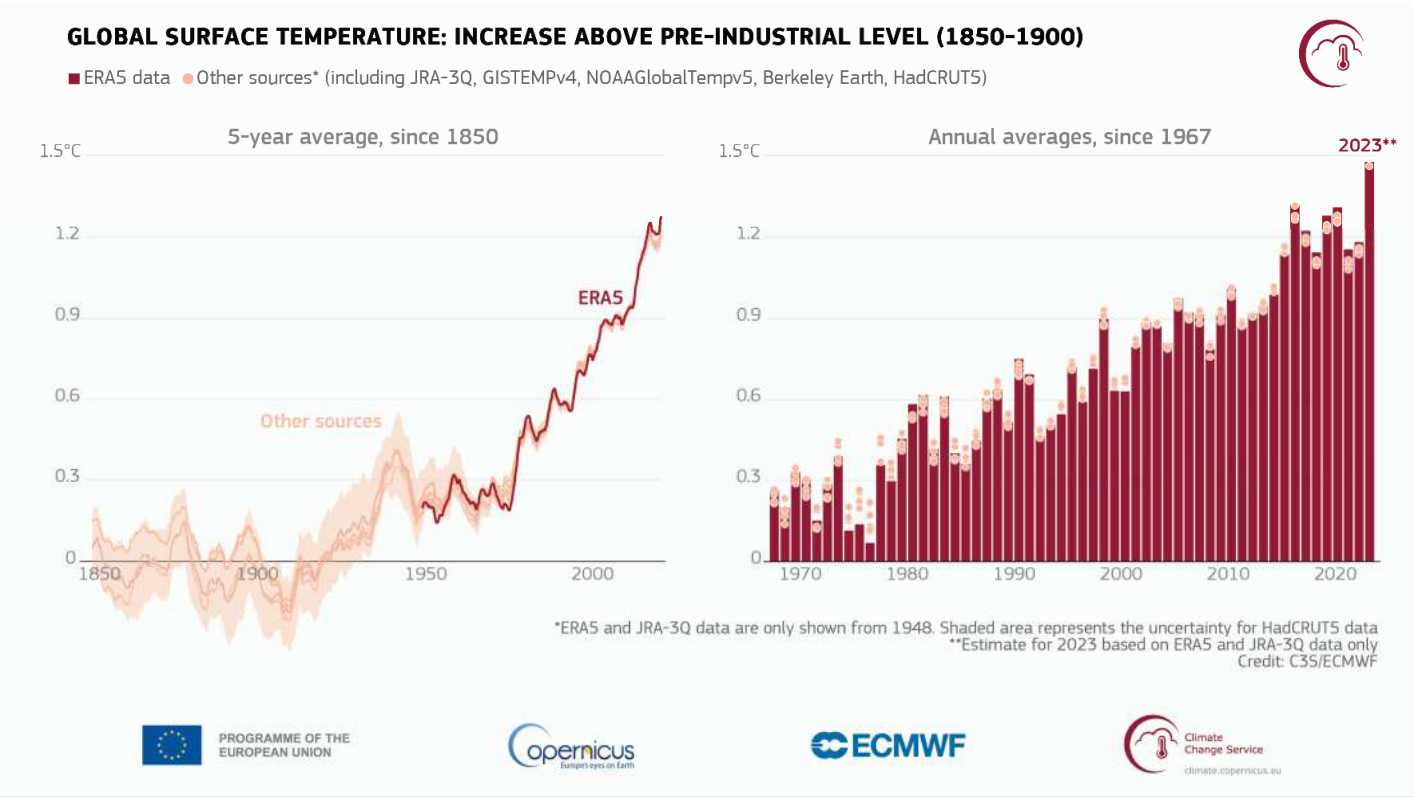

https://climate.copernicus.eu/copernicus-2023-hottest-year-record

But, what is Climate Change (CC)? Why?

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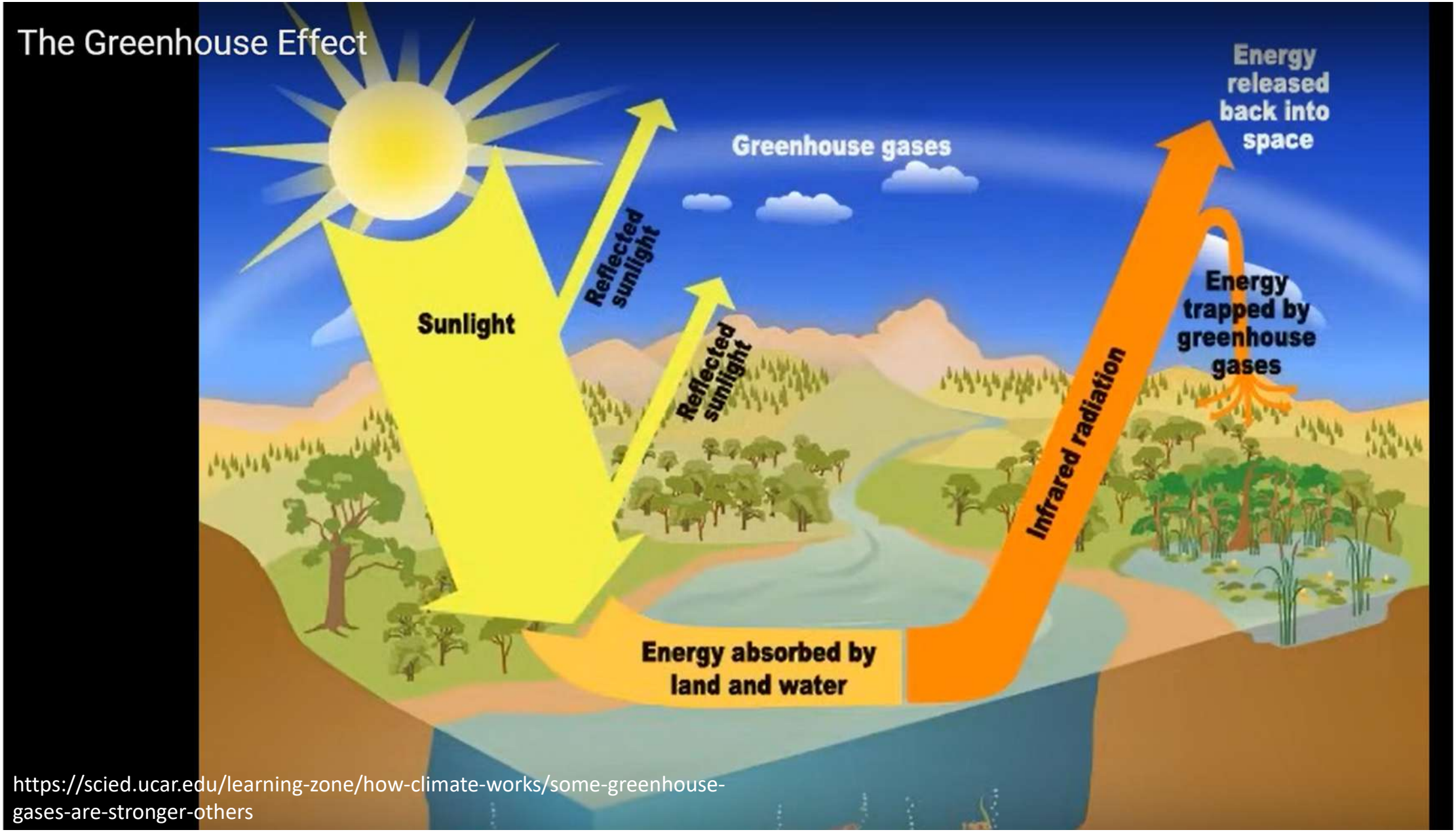


https://scied.ucar.edu/learning-zone/how-climate-works/some-greenhouse-gases-are-stronger-others

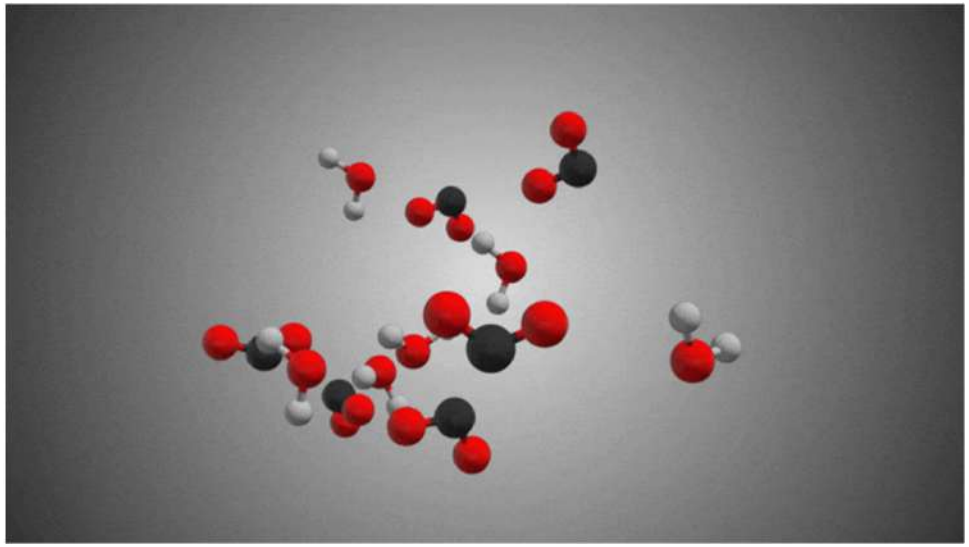
First.....

2023-1-PT01-KA220-HED-000165596

Carbon Dioxide (CO_2)

Importance

Is a naturally occurring gas that has been a part of Earth's atmosphere for billions of years. It is produced through various natural processes, such as volcanic eruptions, respiration by animals and plants, and the decomposition of organic matter.



But.....

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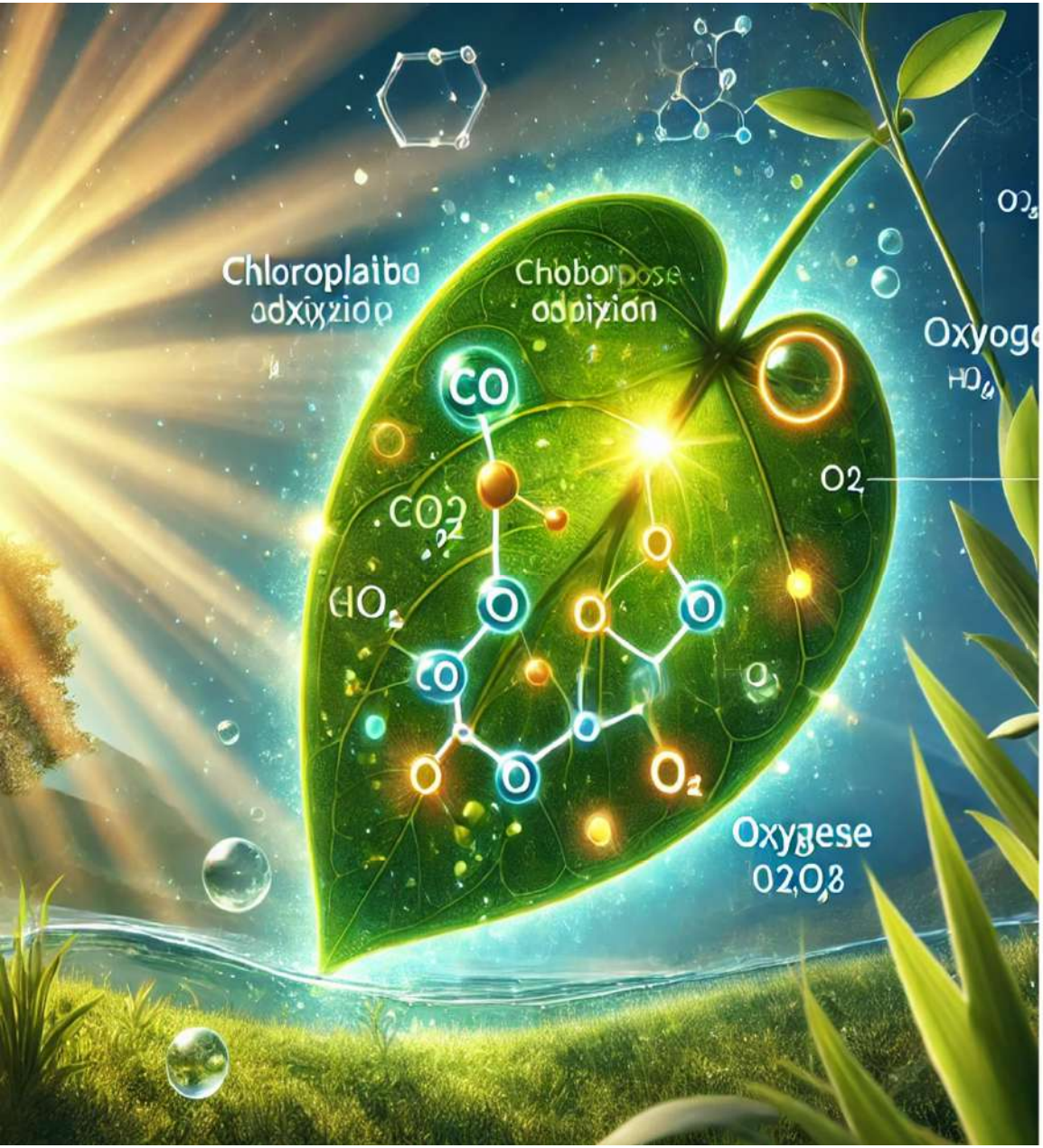

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Photosynthesis, a process essential for life on Earth.

It occurs in the **chloroplasts** of plant cells, where the green pigment **chlorophyll** absorbs sunlight. This light energy drives a series of chemical reactions that convert **carbon dioxide (CO_2)** from the air and **water (H_2O)** from the soil into **glucose ($C_6H_{12}O_6$)**, a sugar that serves as energy for the plant. During this process, **oxygen (O_2)** is released as a byproduct.

Photosynthesis can be summarized in the following chemical equation, the **carbon cycle**:

$$6CO_2 + 6H_2O + \text{light energy} \rightarrow C_6H_{12}O_6 + 6O_2$$

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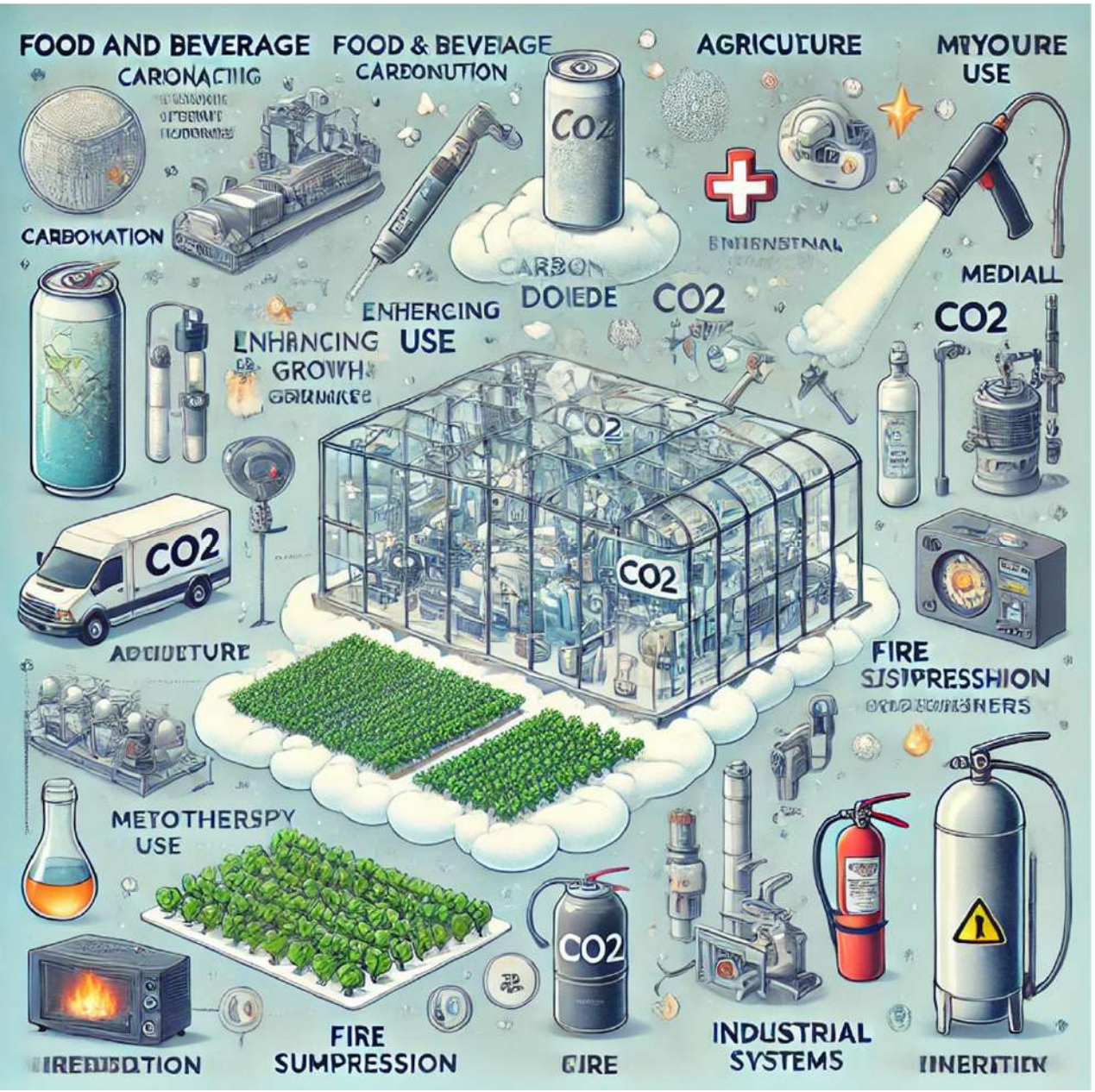

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The Importance of Carbon Dioxide: A Necessary and Useful Gas

Carbon dioxide (CO_2) is often demonized as a harmful greenhouse gas, but it plays a crucial role in life on Earth. This presentation explores the importance of CO_2, showcasing its necessity and numerous applications.

The right amount of CO_2 is important so that people, animals, and plants can breathe.

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The Many Applications of Carbon Dioxide

Food and Beverages

CO_2 is used in carbonated drinks, as a preservative in packaged foods, and in the production of dry ice for freezing and transportation.

Industry and Manufacturing

CO_2 is used in welding, laser cutting, and as a cleaning agent. It's also essential in the production of various chemicals and plastics.

Agriculture and Horticulture

CO_2 enrichment enhances plant growth, increasing yields in greenhouses and improving the quality of fruits and vegetables.

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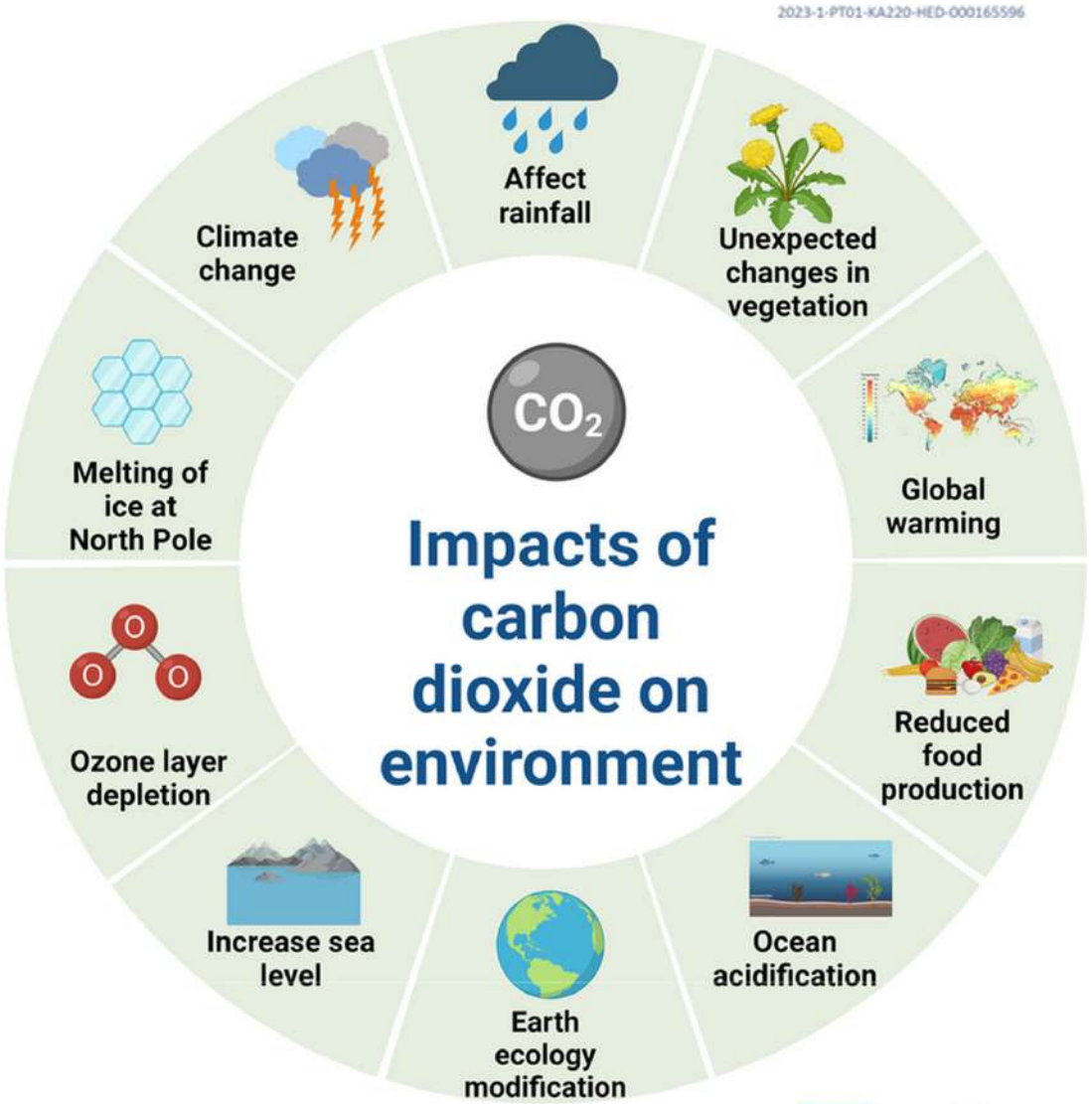
But.....

Carbon Dioxide (CO_2)

Sources

Combustion of fossil fuels for energy, deforestation, and industrial processes.



Ravichandran, Mythili & Kumar, Thipramalai & Dineshkumar, R.. (2024). Carbon dioxide capture, sequestration, and utilization models for carbon management and transformation. Environmental Science and Pollution Research. 31. 55895-55916. 10.1007/s11356-024-34861-y.

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Methane (CH_4)

Potent

Methane is a powerful greenhouse gas, trapping heat in the atmosphere far more efficiently than carbon dioxide.

Agriculture

Livestock, rice cultivation, and manure management are significant sources of methane emissions.

Energy

Natural gas production, oil and gas infrastructure, and coal mining contribute to methane emissions.

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Nitrous Oxide (N2O)

Industry

Industrial processes, such as the production of nitric acid and nylon, release nitrous oxide into the atmosphere.

Agriculture

Agricultural activities like fertilizer application and livestock manure management contribute to nitrous oxide emissions.

Fluorinated Gases

High Global Warming Potential

These gases have a significantly higher warming potential than carbon dioxide, trapping heat far more effectively.

Industrial Processes

Refrigerants, aerosols, and foam-blowing agents are key sources of fluorinated gases in the atmosphere.

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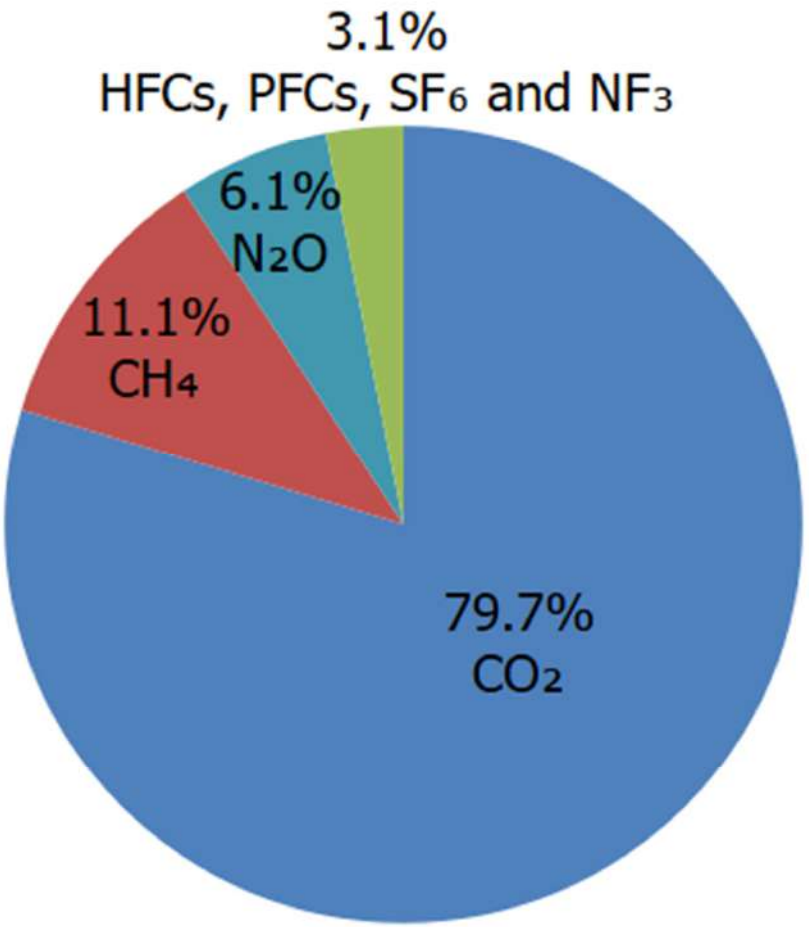
Abundance of greenhouse gases in the atmosphere

- Concentration, or abundance, is the amount of a particular gas in the air.
- Larger emissions of greenhouse gases lead to higher concentrations in the atmosphere.
- Greenhouse gas concentrations are measured in parts per million, parts per billion, and even parts per trillion.
- One part per million is equivalent to one drop of water diluted into about 13 gallons of liquid (roughly the fuel tank of a compact car).



https://www.epa.gov/ghgemissions/overview-greenhouse-gases

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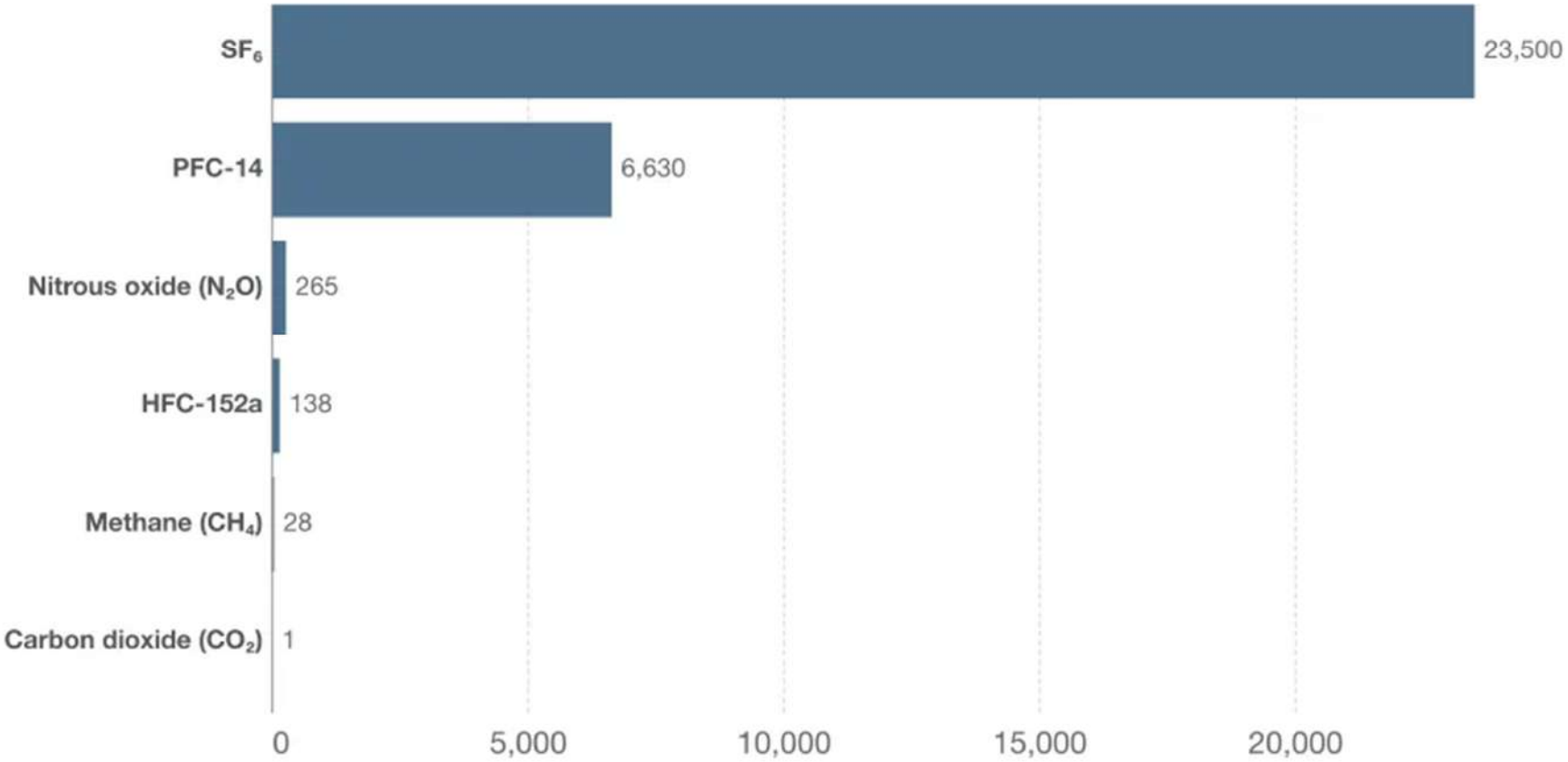
Global warming potential of greenhouse gases over 100-year timescale (GWP100)

Our World in Data

I220-HED-000165596

GWP measures the relative warming impact of one unit mass of a greenhouse gas relative to carbon dioxide. A GWP_{100} value of 28 therefore means one tonne of methane has 28 times the warming impact of one tonne of carbon dioxide over a 100-year timescale. These figures do not include climate change feedback effects.



Source: IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

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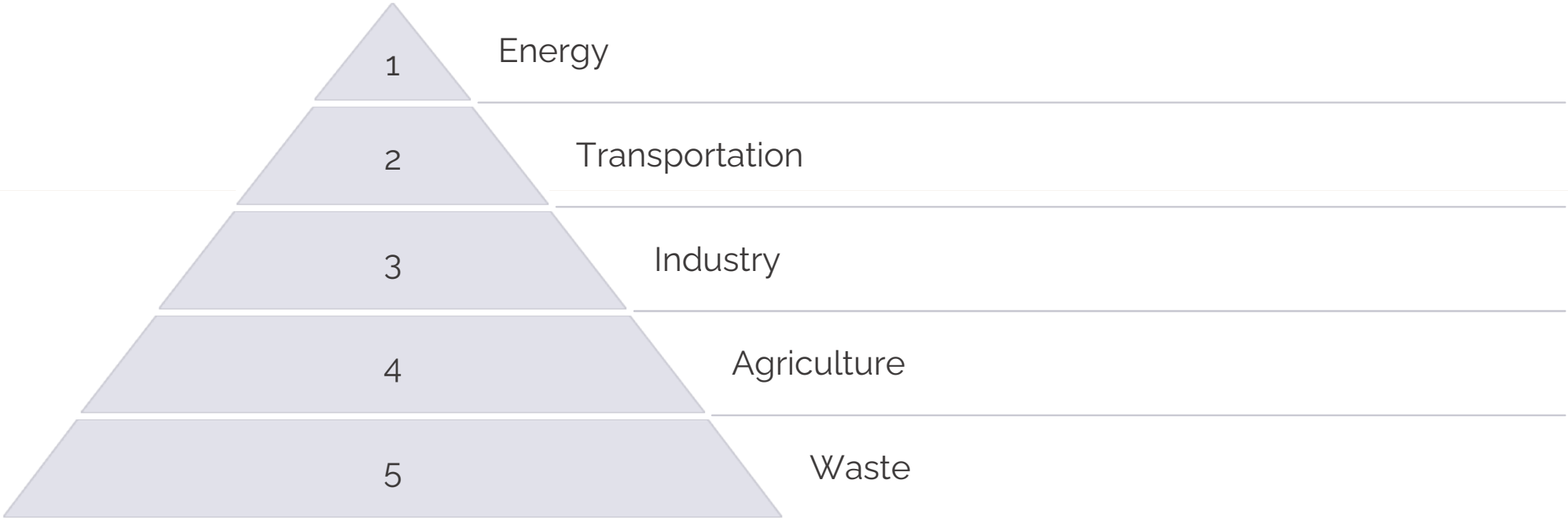
Greenhouse Gas Sources



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Greenhouse Gas Sinks

1

Forests

Forests absorb carbon dioxide from the atmosphere through photosynthesis, acting as natural carbon sinks.

2

Oceans

Oceans absorb a significant amount of carbon dioxide from the atmosphere, but this capacity is limited.

3

Other Natural Sinks

Soil, wetlands, and grasslands also play a role in absorbing and storing carbon.

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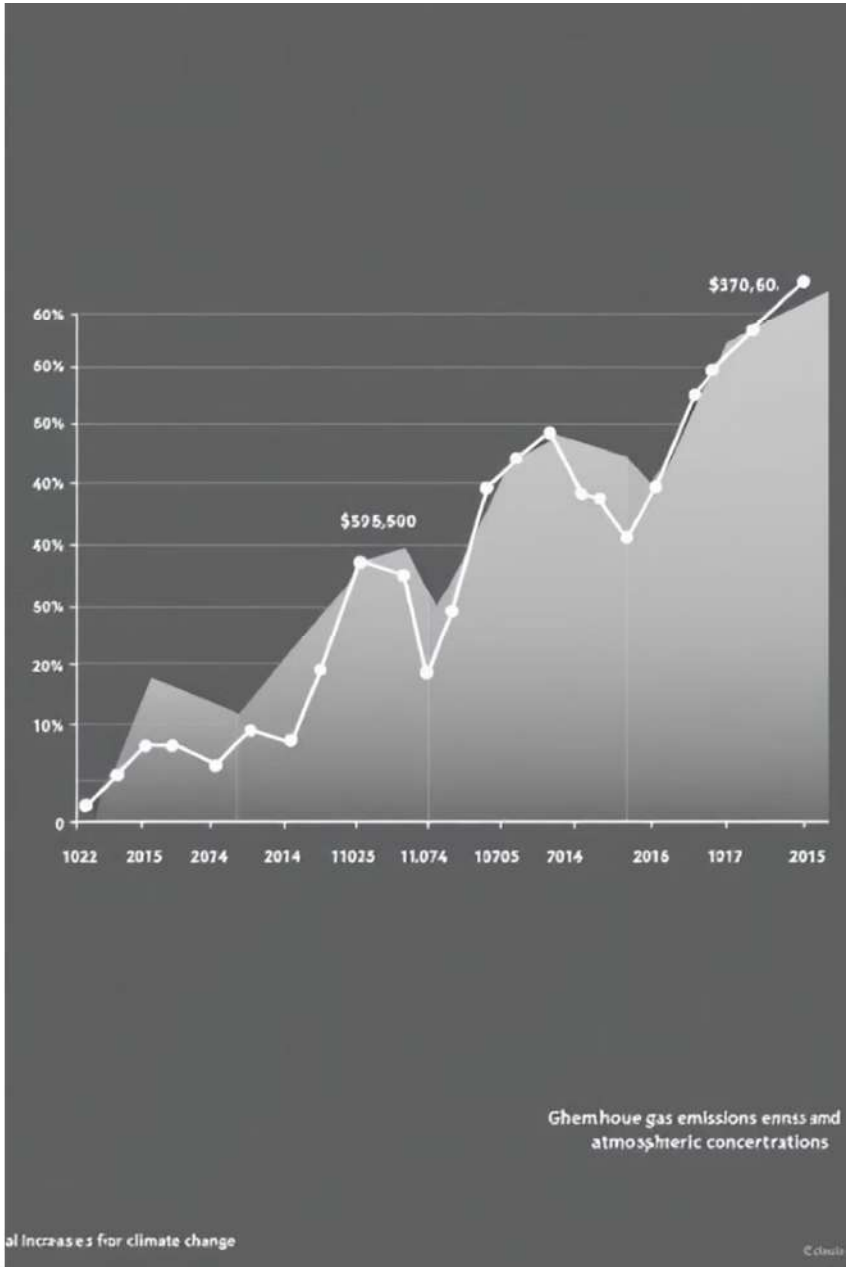
Global Trends

415 ppm

CO_2 Concentrations

1.1 ˚C

Temperature Increase



Defining Climate Change

Natural Process

Climate change can occur naturally over long periods.

Human-Induced Warming

Current rapid warming is primarily due to human activities.

Greenhouse Gas Effect

Emissions act like a blanket, trapping heat and raising temperatures.

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Summary
Sources of Greenhouse Gas Emissions

Transportation

Burning gasoline for driving cars.

Industry

Industrial processes and energy production.

Deforestation

Clearing land and forests releases carbon dioxide.

Waste

Landfills are a significant source of methane.

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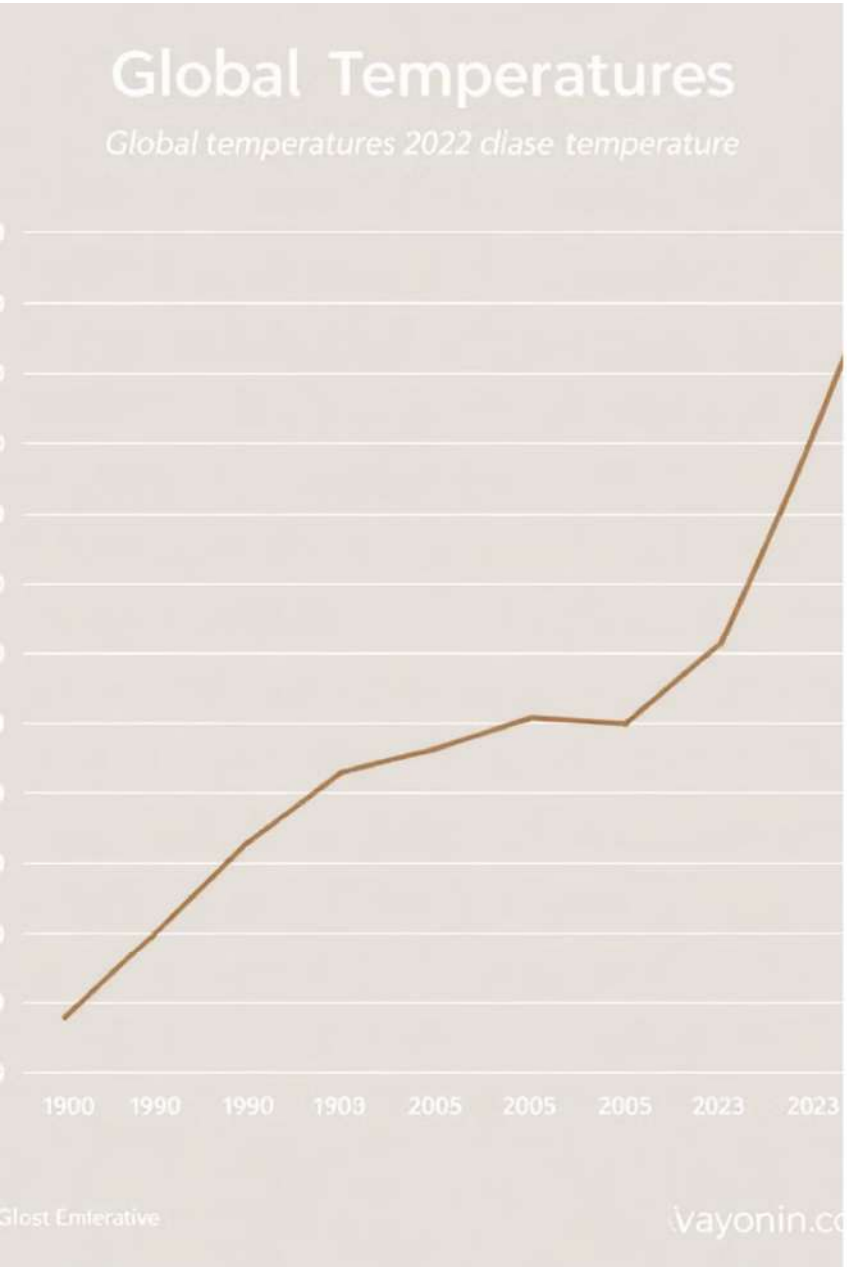

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The Scale of the Problem

1.1°C

Temperature Rise

Earth is warmer than in the 1800s.

2M

Years

Highest greenhouse gas levels in 2 million years.

10

Years

Last decade was the warmest on record.

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Impacts of Climate Change

1. Rising Temperatures
2. Sea Level Rise
3. Extreme Weather Events

Impacts of Climate Change

Environmental Impact

Intense droughts, severe fires, rising sea levels, flooding, melting polar ice.

Biodiversity Loss

Declining biodiversity due to changing habitats and ecosystems.

Human Impact

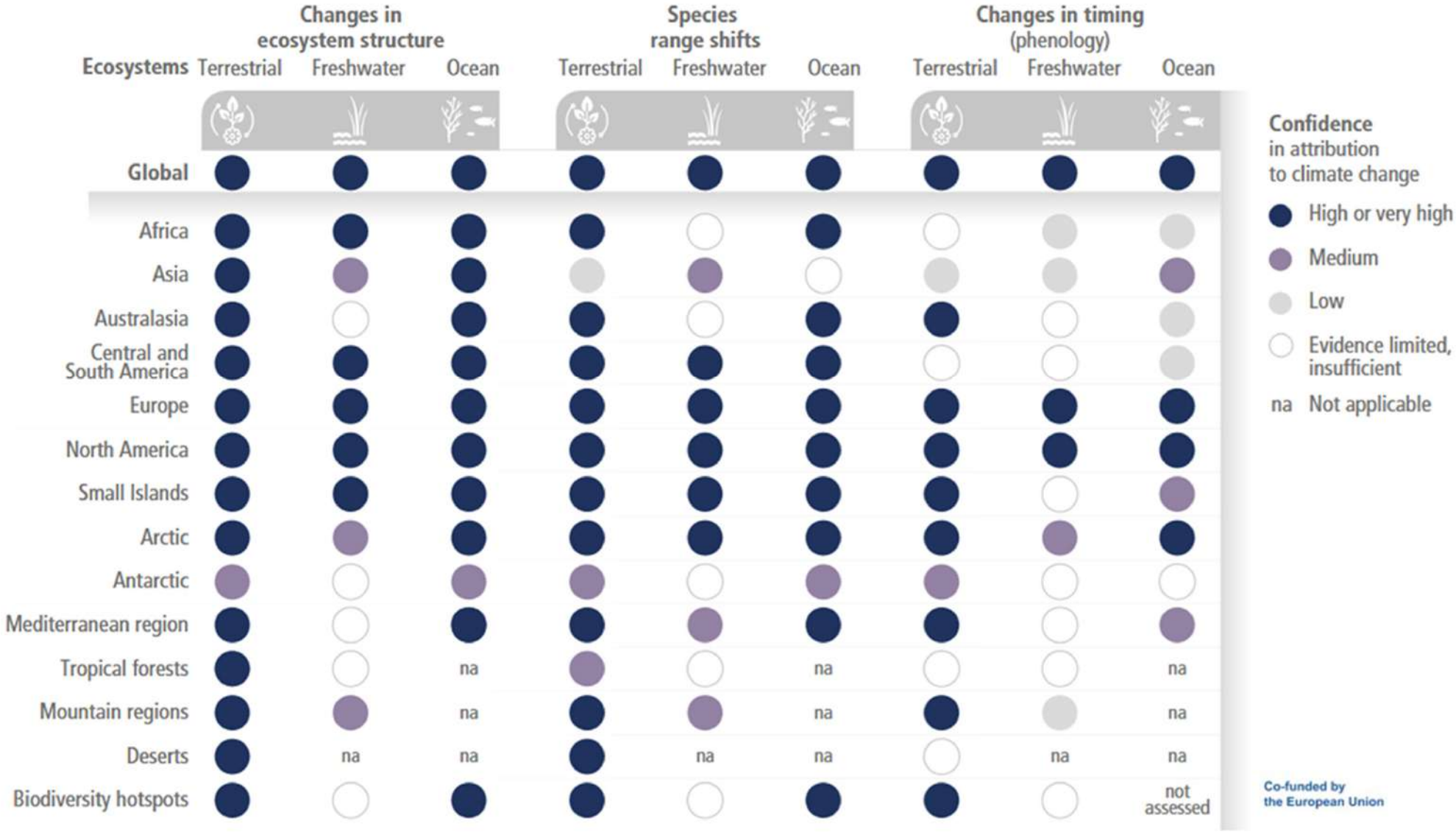
Affects health, food production, housing, safety, and work.

Climate Refugees

Whole communities relocating due to sea-level rise and saltwater intrusion.

https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/

Observed impacts of climate change on ecosystems



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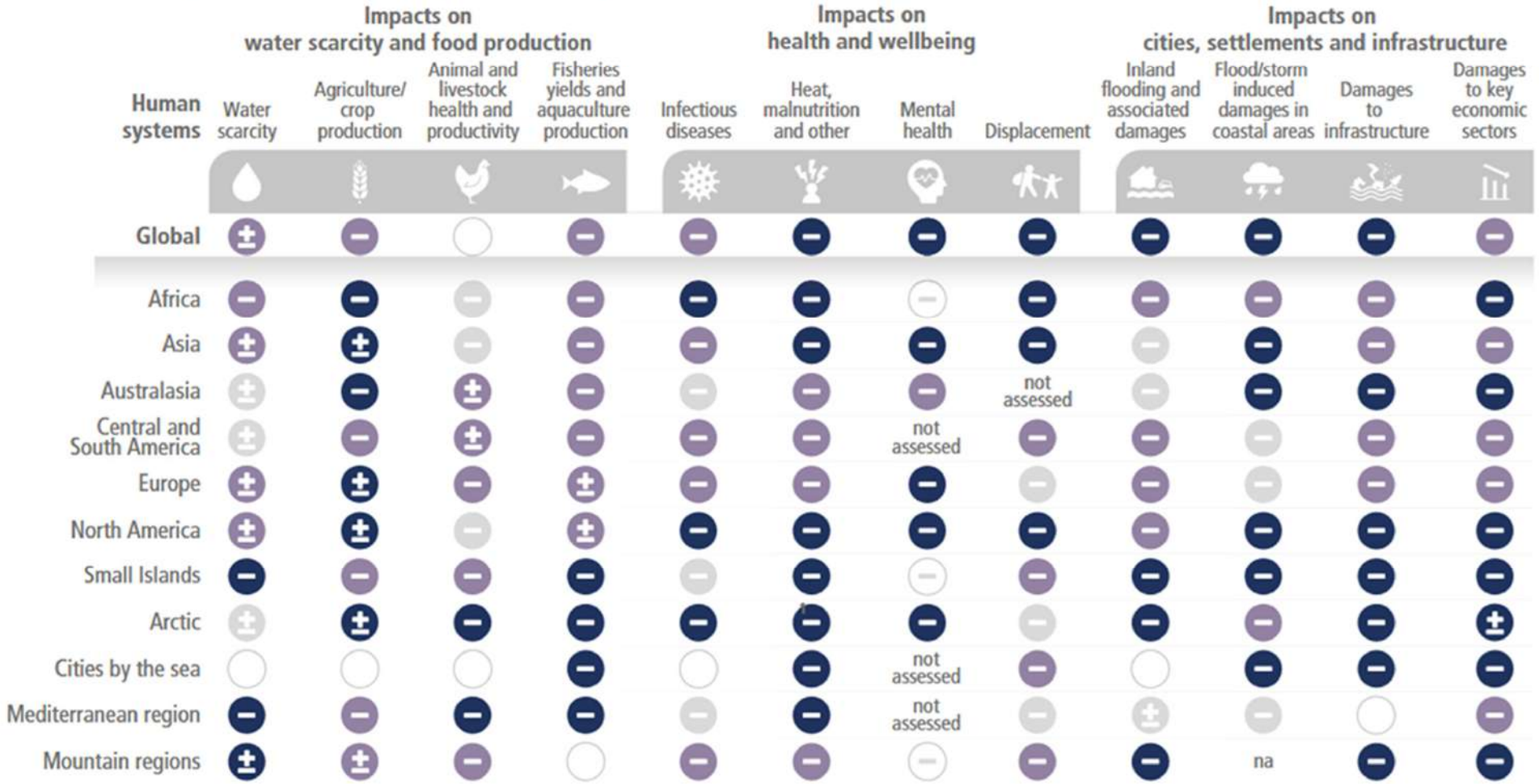
Observed impacts of climate change on human systems



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Strategies for Reducing Emissions




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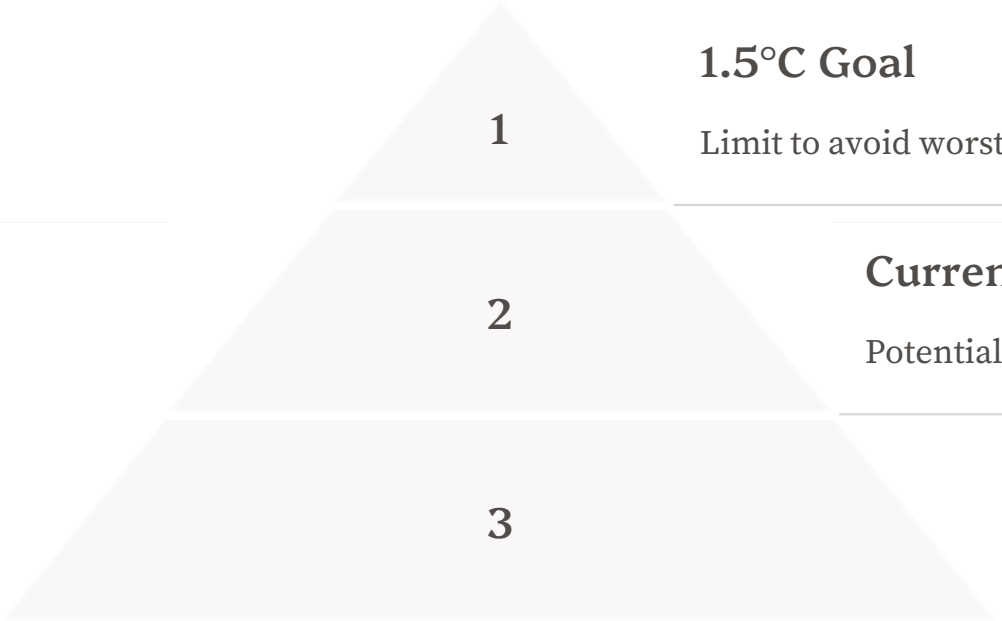
The Importance of Every Degree



1.5°C Goal

Limit to avoid worst impacts.

Current Path

Potential 4.4°C rise by 2100.

Urgent Action Needed

Reduce emissions drastically.

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Global Responsibility

Top Emitters

10 largest emitters contribute 68% of total emissions.

Low Emitters

100 least-emitting countries generate only 3% of emissions.

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Solutions and Action

1

Cut Emissions

Switch to renewable energy sources.

2

Adapt

Protect people and ecosystems from impacts.

3

Finance

Invest in climate action and green economies.

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Urgent Timeline for Action

1

2030

Half of emissions cuts must be in place to keep warming below 1.5°C.

2

2020-2030

Fossil fuel production must decline by 6% per year.

3

2050

Growing coalition of countries committing to net zero emissions.

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The Cost of Action vs. Inaction

1

Invest Now

Pay for climate action today.

2

Adapt Early

Early warning systems save lives and property.

3

Future Costs

Climate inaction is vastly more expensive.

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Sources of information:

EEA greenhouse gases — data viewer
https://www.eea.europa.eu/en/analysis/maps-and-charts/greenhouse-gases-viewer-data-viewers

What Is Climate Change?
https://www.un.org/pt/node/97790

Overview of Greenhouse Gases
https://www.epa.gov/ghgemissions/overview-greenhouse-gases

Some Greenhouse Gases Are Stronger than Others
https://scied.ucar.edu/learning-zone/how-climate-works/some-greenhouse-gases-are-stronger-others

Climate Change 2022: Impacts, Adaptation and Vulnerability
https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/

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Activities

E-activity 5 - What is Climate Change?

- Students upload a photo, video or text, or any other file, that show what is climate change and how it is felt in their own region. Submit the file with the student name,
- Each student make a post in the Forum to explain the file uploaded within the scope of the subject;
- Colleagues are encouraged to comment the colleagues posts.

The E-activity will be supported in literature and resources presented, namely in the report and the factshets of the IPCC about the climate change impacts, adaptation and vulnerability.

https://www.ipcc.ch/report/ar6/wg2/about/factsheets/

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Activities

E-activity 6 – Our effort in the climate Change mitigation process

- Watch the movie form the IPCC https://www.youtube.com/watch?v=SDRxfuEvqGg&t=1s.
- Interact with the video and answer the questions that are being asked.
- Ask your own questions when you see fit (NOTE: To work on VideoAnt you have to make a registration - you can log in with a GMAIL account) https://ant.umn.edu/zbgiftfxeq
- Considering one of the IPCC Fact Sheets from the regional impacts (https://www.ipcc.ch/report/ar6/wg2/about/factsheets/) , choose one related to the previous video and submit a little text about one impact of CC in your region and a mitigation strategies suggested.

Activities

Face-to-Face Program

Date 13/2/2025, ESTGV, 9,30 H to 12,30 H

- Answer in group to several challenges to engage in emergent societal challenges and sustainable development;
- Study answers to design and construct sustainable and local waste and water management, resilience and adaptability.

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Thank you!

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Sustainable rural communities

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RURAL

Rural landscape refers to an area of land that is predominantly used by farmers, ranchers, and other agricultural activities. It is typically characterized by low human population, open fields, wooded areas, and small communities.

*Rural landscapes provide both ecological and economic **benefits to the region**. But there are several **challenges to the ones living there** that must be considered.*

The **rural-urban gap** still existed in the whole world. Some of the problems affecting rural areas are:

- Lack of employment
- Lack of health care
- Less competitiveness
- Poverty
- Population sparsity
- Isolating geographies
- Fewer educational and cultural opportunities
- Remoteness from key services, activities and social networks
- Among others

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More VULNERABLE GROUPS

- **Young people - 18-29 years old**: They suffer more than other age groups from unemployment, difficult access to education and training, obstacles to set up new businesses, and lack of basic service, often causing young people migration to bigger towns and cities.

- **Older people - 65 years and over**: They often face isolation, social exclusion and difficult access to basic services.

- **People with disabilities**: people with long-term physical, mental, intellectual, or sensory impairments may, in interaction with various barriers, be hindered in their full and effective participation in society on an equal basis with others. The lack of specialised support services for people with disabilities is a major barrier to their independent living in rural areas.

- **Migrants** as well as linguistic/ethnic and religious minorities: mostly working in temporary and precarious agricultural jobs. Migrants and minorities are a particularly vulnerable group mostly left out from decision-making processes and practices.

- **Long-term unemployed people** (who are out of work and have been actively seeking employment for at least a year): Long-term unemployment in rural areas is worsened by limited job options and poor infrastructure, which hinders skill acquisition and perpetuates joblessness and social exclusion.

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The process of managing these disadvantages and taking advantage of the opportunities of rural areas happens through:

Promoting:

RURAL DEVELOPMENT

SUSTAINABLE RURAL COMMUNITIES

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RURAL DEVELOPMENT

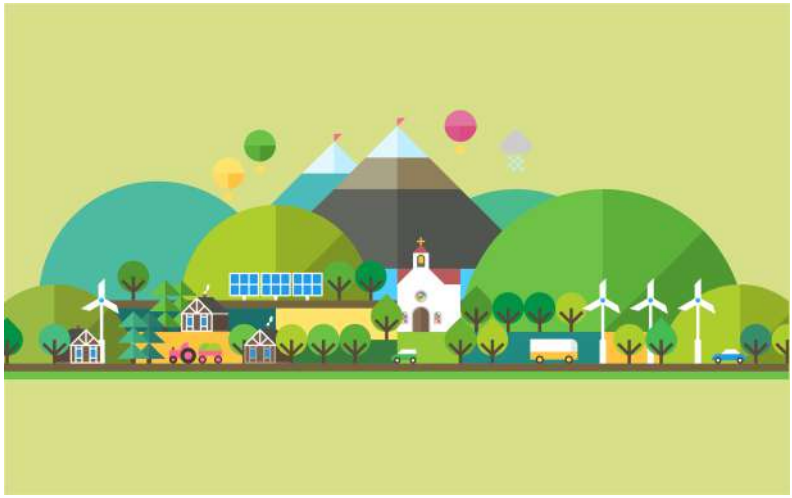
Is a process that seeks social change and sustainable economic development for the rural community´s ongoing progress.

The ultimate goal is to improve their life quality and preserve the environment, through:

1. Improving millions of people´s welfare that live in the country (nearly half of the world population), thus reducing the rural-urban gap, stamping out poverty and preventing city migration.

2. Protecting and preserving natural, landscape and cultural resources.

3. Ensuring universal access to food with a sustainable farming production.



RURAL DEVELOPMENT Drivers

(Ruractive, s.d.)

- **Sustainable agri-food and ecosystem management**

While rural agri-food systems and natural ecosystems are of primary importance for food production and ecosystem services, rural areas are still facing challenges in achieving sustainable agri-food transformations. Introducing nature-based and digital solutions for the whole food supply chain (including food production, processing, distribution, consumption and resource re-cycling), as well as for agroecological practices that contribute to sustainable ecosystem management, is crucial for maintaining ecosystem health and contribute to social wellbeing of all rural communities. Sustainable agri-food systems support building resilient communities by providing job opportunities and adequate livelihoods for allwhile supporting synergies with other Rural Development Drivers, such as nature-based and cultural tourism.

- **Nature-based and cultural tourism**

With an increasing interest in rural and proximity tourism raised during and after the COVID-19 pandemic, rural areas remain particularly suitable for nature-based and cultural tourism, responding to the willingness of travelers to learn about and experience the rural context. Nevertheless, rural communities still struggle to manage tourism in a sustainable and smart way and to align decision-making with local communities' needs and tourists' desires and expectations. These challenges can be tackled through the implementation of innovative solutions by provisioning services based on local resources that can be valued and organised to enhance tourism services.

- **Culture and cultural innovation**

While culture is recognised to be a fundamental dimension of sustainable development both in urban and non-urban areas, rural areas are still far from being seen as cultural hubs and centers for creativity. Both tangible heritage and intangible heritage, represented by arts, festivals, music, artisan and crafts, dance and local traditions, are crucial assets for sustainable and inclusive innovation. The use of digital, technological and social innovations can make culture accessible to a wide range of groups including young people, women, migrants, old people, and people with disabilities, and improve the quality of life for all in rural areas.

(Ruractive, s.d.)

- **Sustainable multimodal mobility**

Although sustainable transport services are key for the connection and wellbeing of rural inhabitants and for decarbonization goals, sustainable rural mobility has so far received less attention than urban mobility. Planning and provisioning of mobility services, such as demand-responsive transport and shared mobility, with the involvement of local stakeholders is key to answering site-specific challenges of rural areas and granting mobility solutions for all rural inhabitants.

- **Energy transition and climate neutrality**

While attention has been put on climate neutral strategies in cities, rural areas are often neglected by climate action despite playing a crucial role in the green transition, including through the generation of renewable energy and facilitation or management of principal carbon sinks, such as soil and peat carbon or woodland expansion. In the rural context, the energy transition is supported through the development of community-led solutions, including the creation of sustainable energy communities of prosumers, protection of carbon sinks by investing in Nature-Based Solutions, development of farm biogas/biofuel, efficient renewable energy use through forecasting services, extending the uptake of smart grids and smart meters to empower prosumers, promoting behavioral awareness and change.

A prosumer is considered a person who consumes and produces value, either for self-consumption or consumption by others.

- **Local services, health and wellbeing**

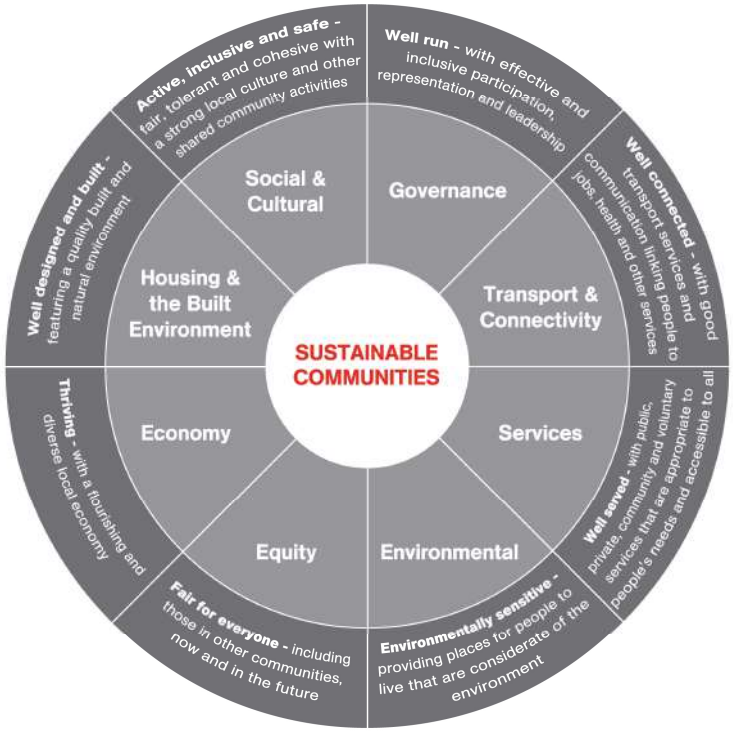
Lack of access to basic services such as housing, healthcare, or e-governance in combination with ageing and depopulation, are key issues that inhibit the sustainable development of rural areas. The introduction of innovations such as digital platforms for managing a wide range of services, or solutions for further increasing the provisioning of services, can mitigate barriers to accessing care and improve quality of life and wellbeing of all rural inhabitants.

(Ruractive, s.d.)

Sustainable rural communities

Places that are able to support the needs of all residents, providing a decent quality of life in the present, as well as for future generations.

According to Egan's Wheel model, for something to be sustainable it should meet most or all of the following criteria:



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SUSTAINABLE RURAL DEVELOPMENT

The main objectives of sustainable development in rural áreas are:

- Creating in the rural areas a self-developing economic systems based on the formation of the economic turnover of local resources:

- Development of a competitive and environmentally harmonious agriculture, forestry and water management;

- Diversification of agricultural production, increase in economic activity, the revival of traditional crafts and development of new activities and products, crafts and manufactures;

- The development of modern manufacturing and information infrastructure.

- Development of a local industry (production and services);

- All-round development of cooperation in production, sales, finance and other fields.

- The strengthening of the marketing and the corresponding supply-side relation-ships.

- The development of local self-government for responsible civil society in the countryside.

- Increasing the attractiveness of rural areas.

- Improving the competitiveness of rural areas.

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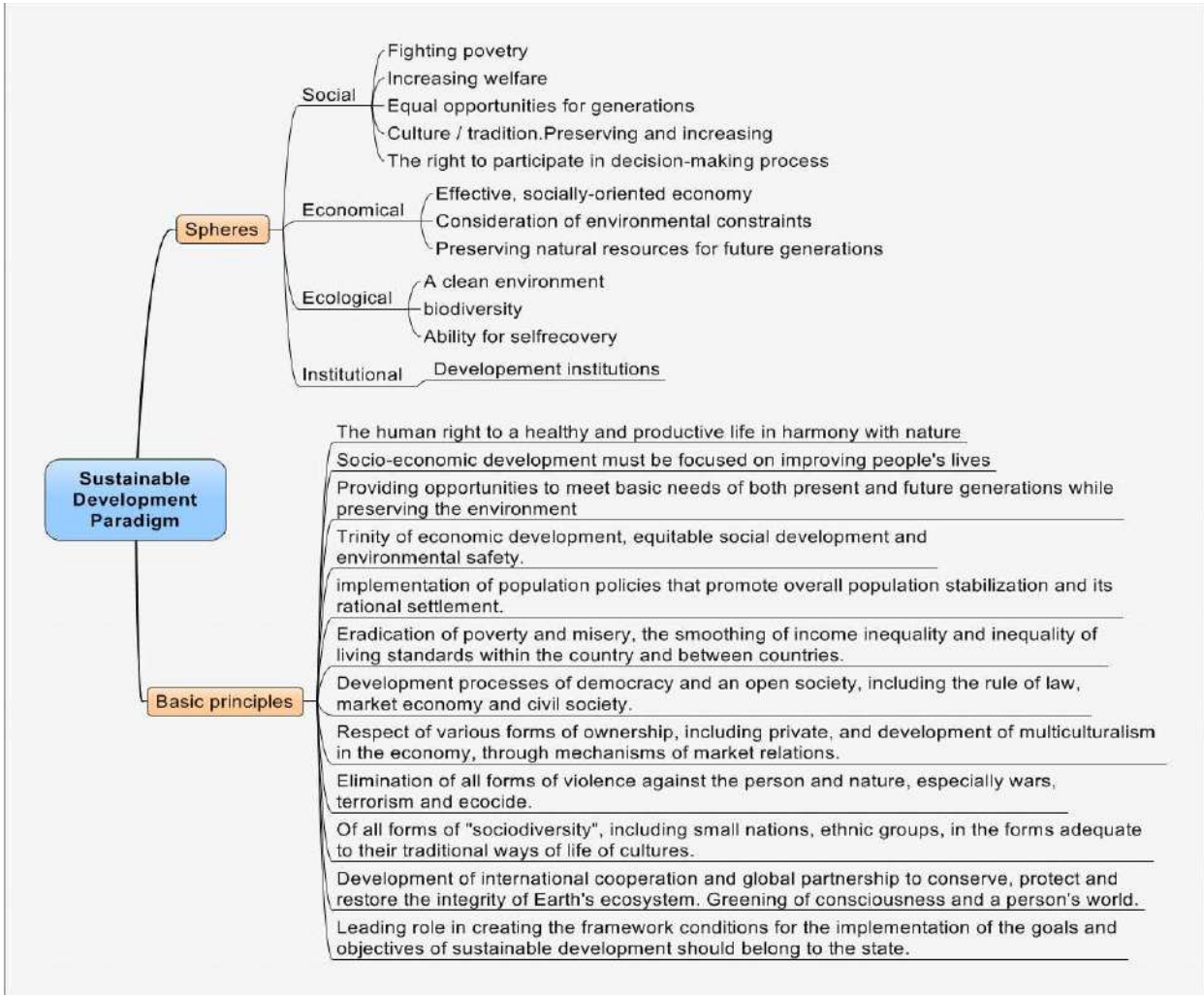
Components of the paradigm of sustainable rural development: trends, levels, areas



(Merzlov et al., 2012)

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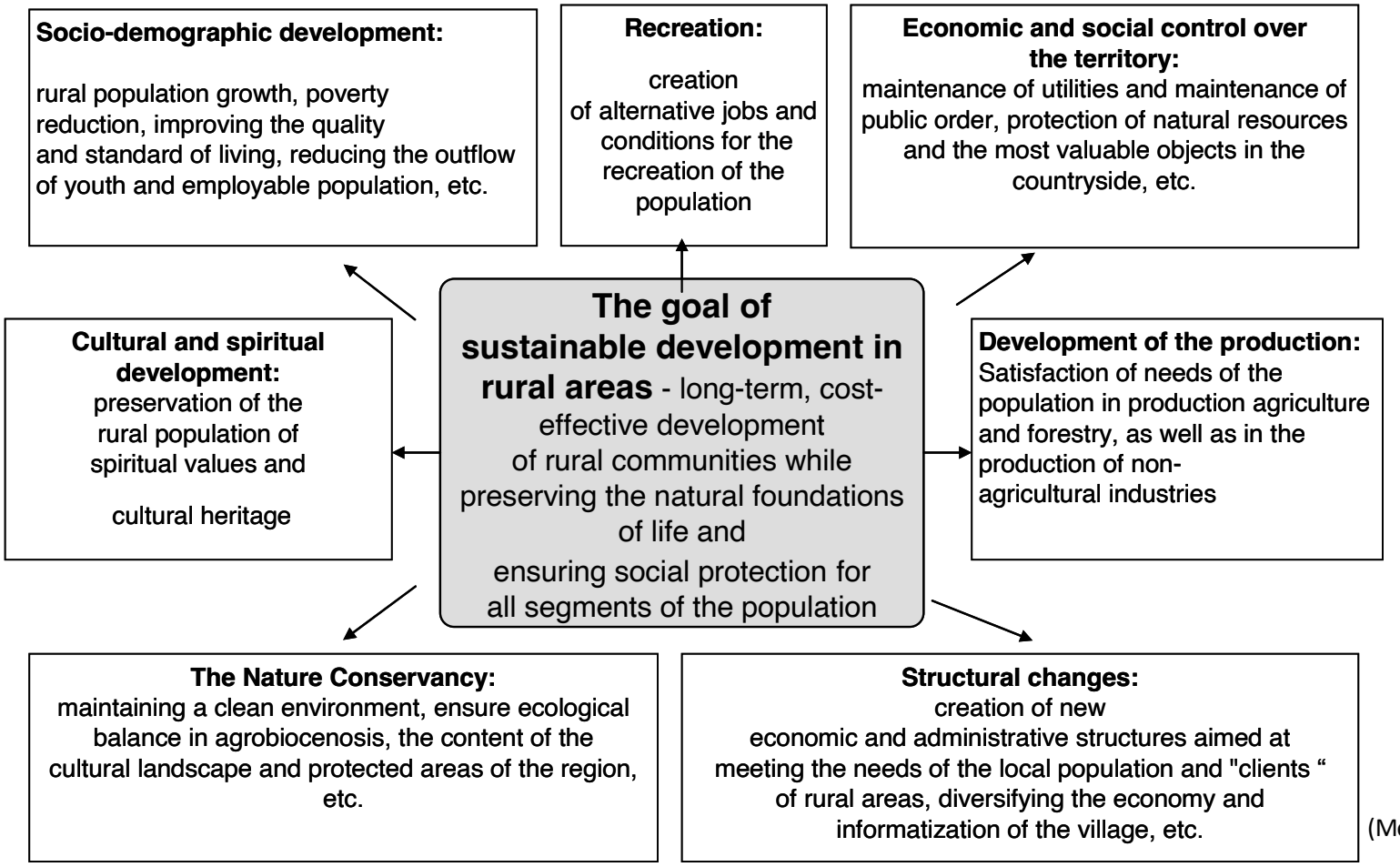
The purpose and objectives of sustainable development of rural areas



(Merzlov et al., 2012)

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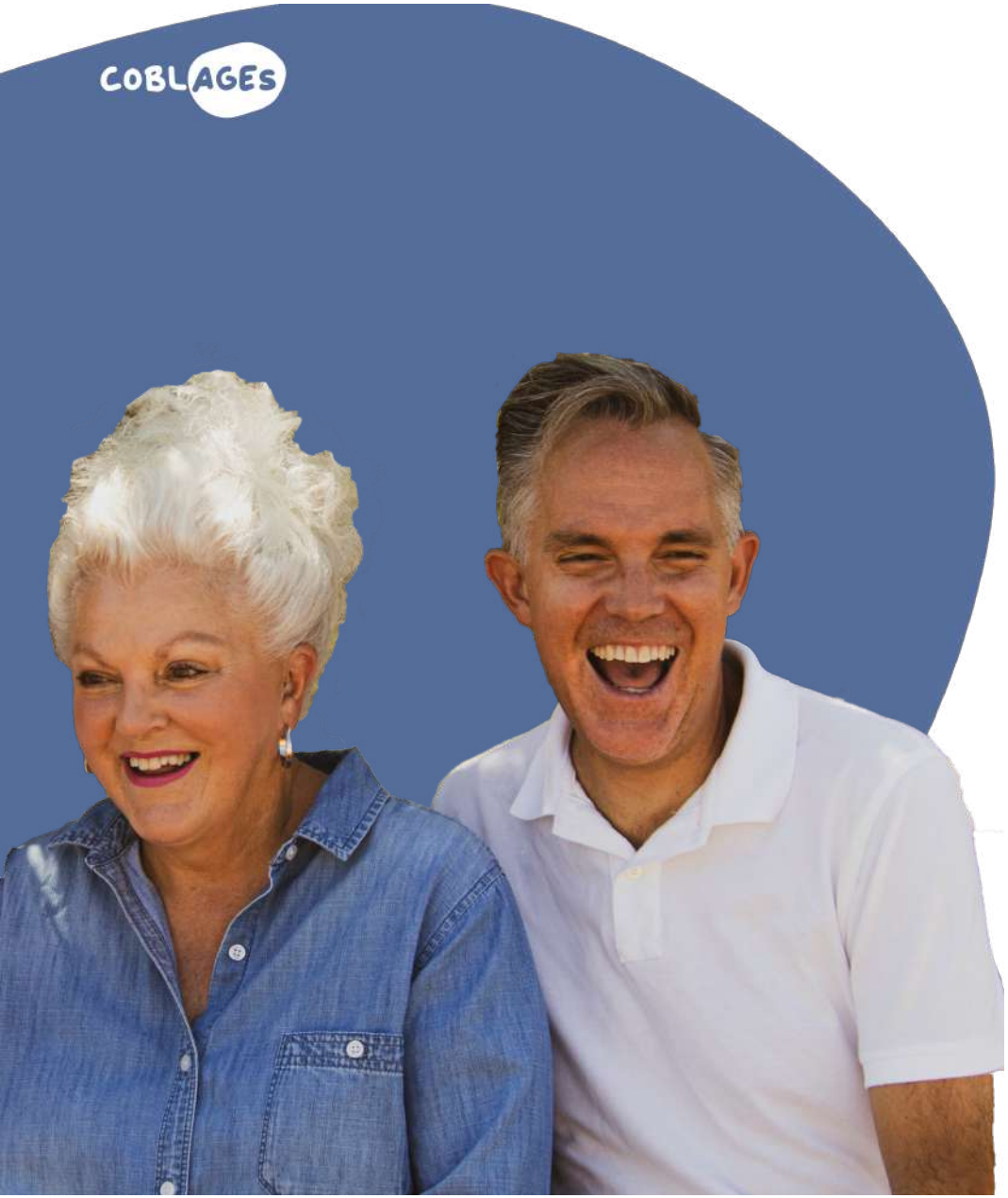

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Promoting sustainable rural communities requires the active involvement of all individuals, as **each person plays a crucial role** in fostering environmental, social, and economic sustainability.

Engaging all members of the community ensures diverse perspectives, skills, and resources are utilized to address local challenges effectively.

This inclusive approach empowers marginalized groups, builds social cohesion, and strengthens **community resilience**.

By involving everyone, **innovative solutions** can be co-created, ensuring that development is equitable and benefits the entire community.

Collaboration fosters ownership, accountability, and long-term commitment to sustainability goals, making progress more impactful and enduring.

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Thank you!

Lia Araújo

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