Sustainability and Metaverse in Education and Training: Barriers, Opportunities and Environmental Impact

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PIAZZA COPERNICO
LEARNING EXPERIENCE EVOLUTION

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TODAY

METAVERSE
IS ONE OF MOST INTERESTING APPLICATION IN EDUCATION AND TRAINING

Metaverse is considered “a decentralized network of computer-generated worlds, where users feel a genuine sense of being in these spaces for work, leisure and learning”.

In future trends in training metaverse play a controversial role, being recognized both as an important tool and contextually losing the central role it had in recent years as a disruptive technology.

METAVERSE PHENOMENA

what is

Authors who are positive about using metaverse, identify great educational opportunities in creating a virtual and interactive equivalent to the physical world through exploration on Extended Reality (XR) platforms.

Extended reality (XR) is an umbrella term for **any technology that alters reality by adding digital elements to the physical or real-world environment.**

AR - AUGMENTED REALITY

technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view.

MX - MIXED REALITY

immersive computer-generated environments in which elements of a physical and virtual environment are combined.

VR - VIRTUAL REALITY

computer-generated simulation of a 3D environment that can be interacted with equipment in a seemingly real or physical way.

METAVERSE

principles

CORPOREALITY

allows people to represent themselves through avatars

INTERACTIVITY

facilitates the construction of autonomous and collaborative learning scenarios;

PERSISTENCE

enables the construction of a virtual world that mimics the real world and keeps people interconnected over time

IN LEARNING

the use of immersive technologies enables educational experiences and allows a deeper and longer learnin

METAVERSE

opportunities

INTERACTION

Metaverse provides more interactive education without compromising the classroom experience

QUALITY

Metaverse provides a more accessible way for communication, improving educational quality

IMMERSIVE

Metaverse provides immersive, higher participation, experiences and reducing isolation

KNOWLEDGE CREATION

Students can become knowledge creators.

DOES IT DEPEND ON USED METHOD OR TECHNOLOGY?

NECESSITIES

- TEACHERS' SKILLS
- INVESTMENTS
- FEASIBILITY
- ACCESSIBILITY

RESOURCES

Educational resources will be plentiful and increasing

QUALITY

Online 3d metaverse campuses can realize rich, liquid, integrated learning environments and provide rich educational opportunities

HOW TO ASSURE THAT?

METAVERSE

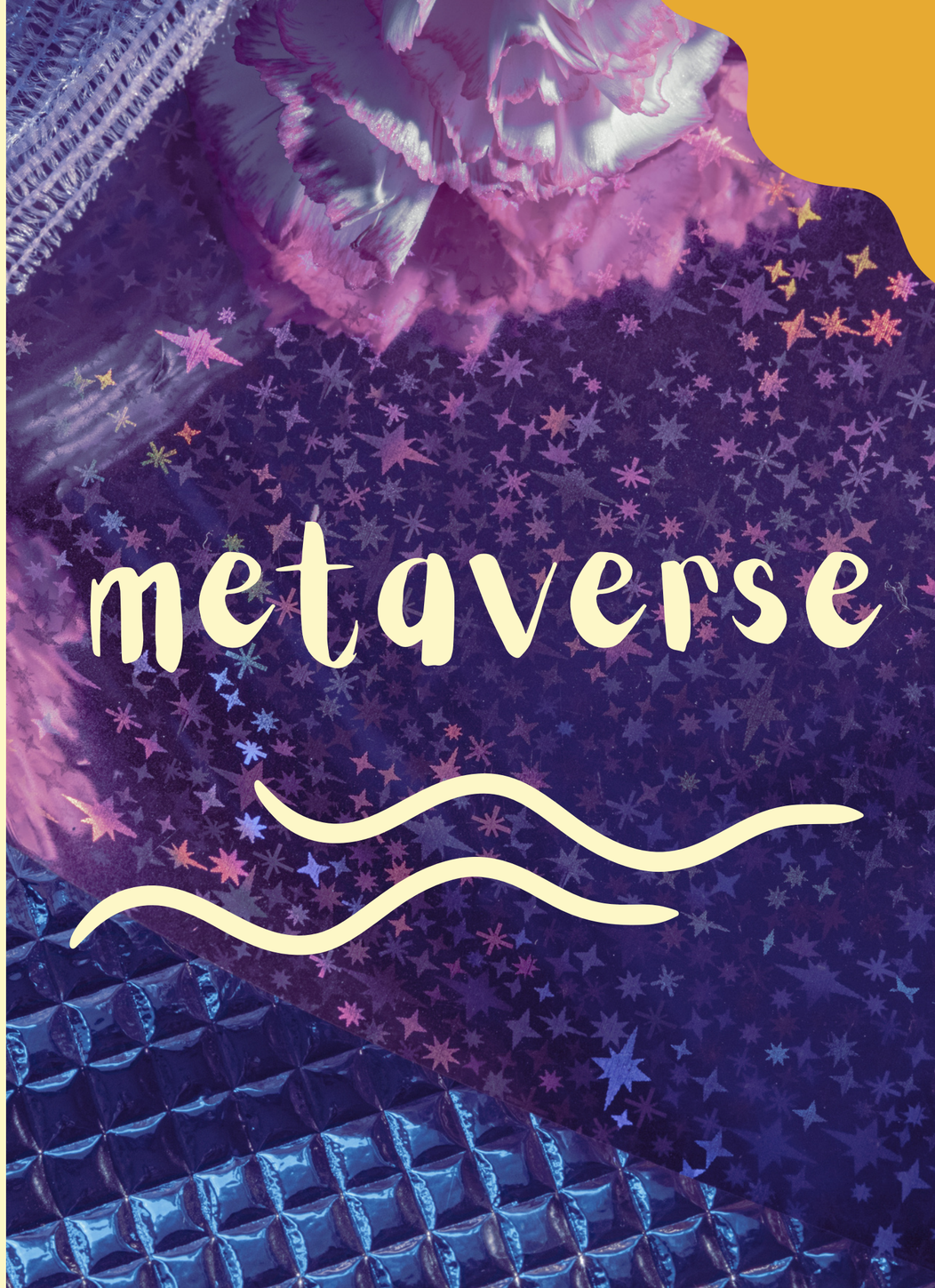
EMERGING topics

Data Management
Digital Copyright
Equity and sustainability of education
Impact of algorithms in educational processes

EMERGING opportunitues

- increase participant motivation and interest
- build comprehensive learning environments
- training activities that are difficult to replicate or implying high risk of injuries
- possibility to engage in trials with equipment, processing times, and quality control procedures, even interacting with each other and/or with instructors in real time
- learning can be adapted to users' background and prior skills or specific needs

METAVERSE CAN SUPPORT LEARNING PROCESSES PARTICULARLY IN SO-CALLED DANGEROUS, IMPOSSIBLE, COUNTERPRODUCTIVE, EXPENSIVE (DICE) SITUATIONS.



METAVERSE

in training

REQUIRES EXTENSIVE CONSIDERATIONS ON

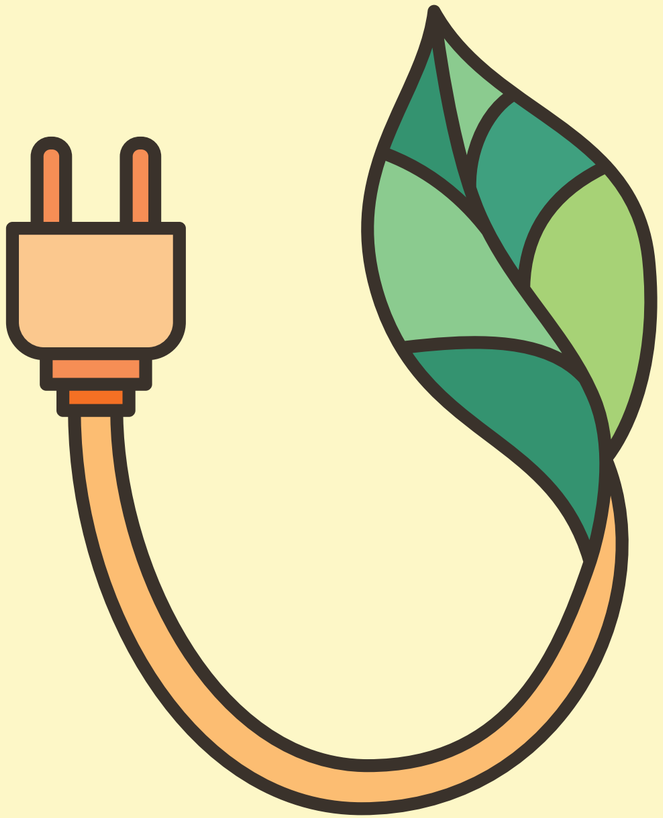
TRAINING OBJECTIVES AND MODELS

REAL TRAINING POTENTIAL.

AS METAVERSE WILL GROW

experiences and content will emerge, and even appropriate instructional solutions could be tested **to ensure that the tool is not just another expensive and underutilized training application.**

ENVIROMENTAL IMPACT



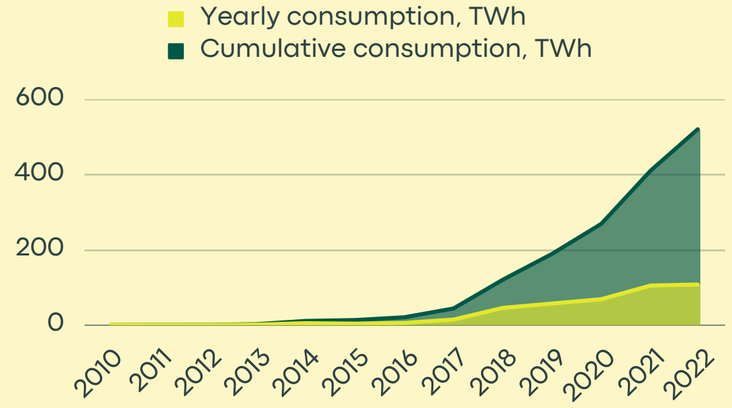
- Calculating the true environmental impact (EI) is a **huge problem**.
- It is the **sum of several factors** such as water consumption, gas emissions, raw material consumption, deforestation, urban sprawl, human and animal exploitation, and so on.
- And this calculation becomes even more difficult for something that does **not yet exist: the metaverse.**

To assess its impact, we assume that the metaverse relies on infrastructure based on

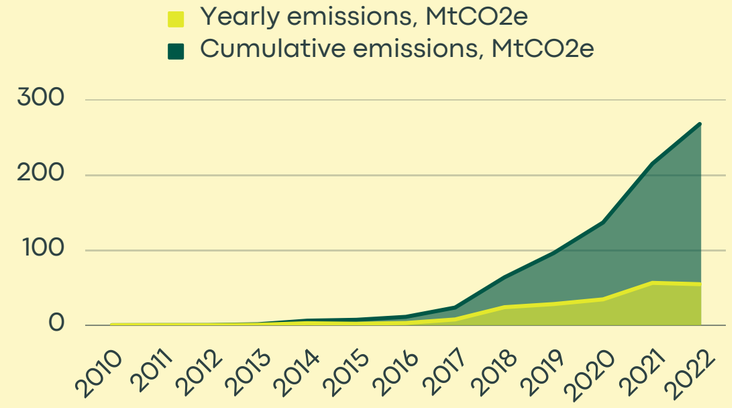
- **cloud computing**
- **blockchain**
- **artificial intelligence**

BLOCK CHAIN

Total BitCoin **electricity consumption**

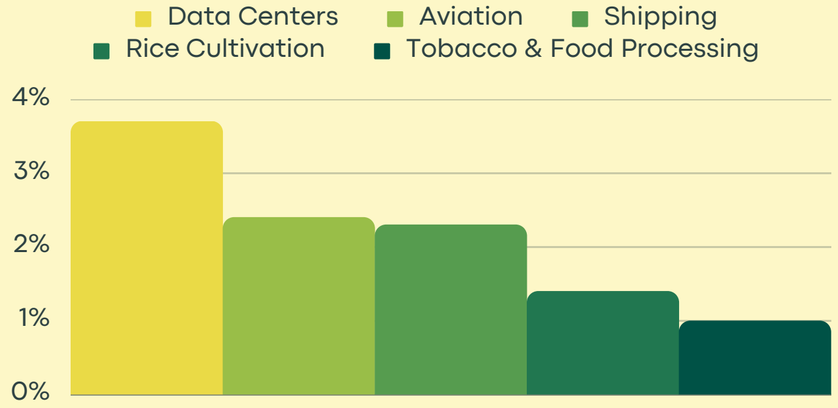


Total BitCoin **greenhouse gas emissions**

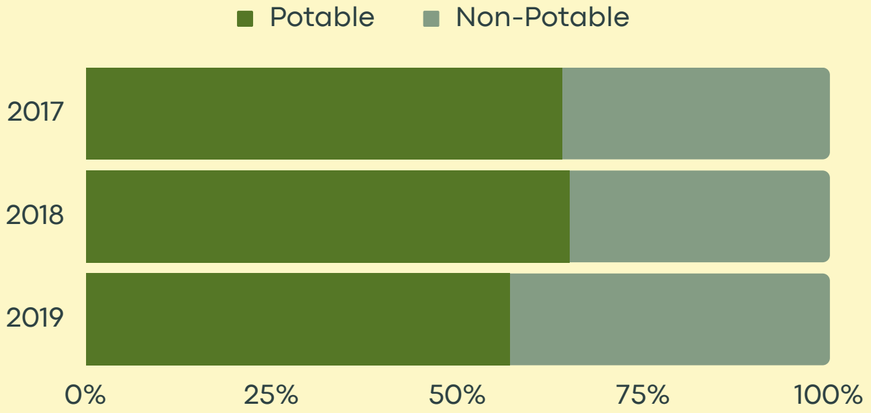


CLOUD COMPUTING

Share of global **CO2 emission** generated by sector

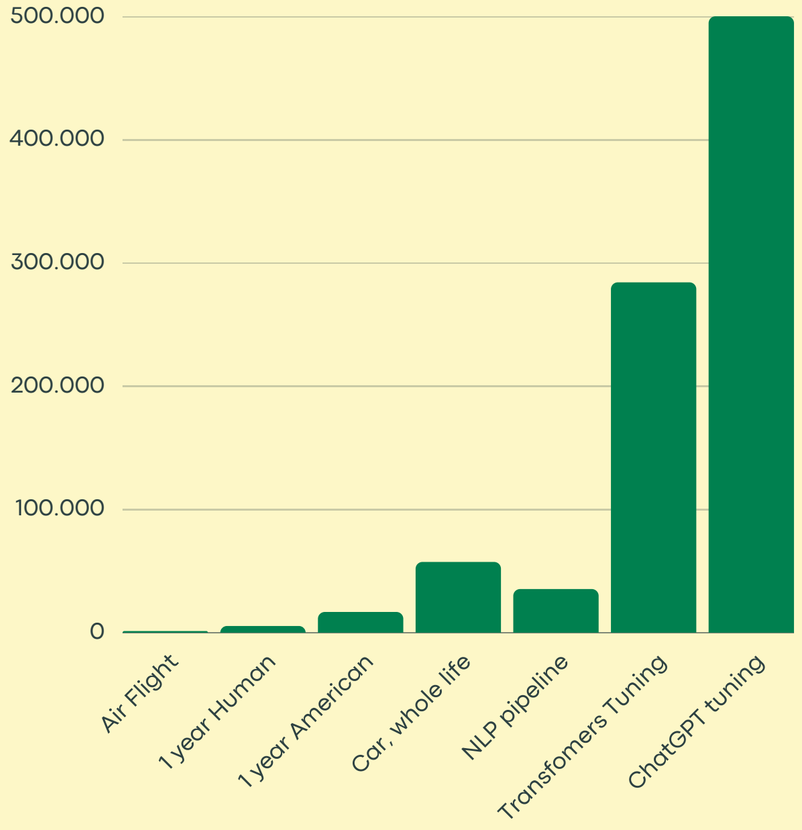


Water source by year for Digital Realty



ARTIFICIAL INTELLIGENCE

CO2 emission generated by human activities



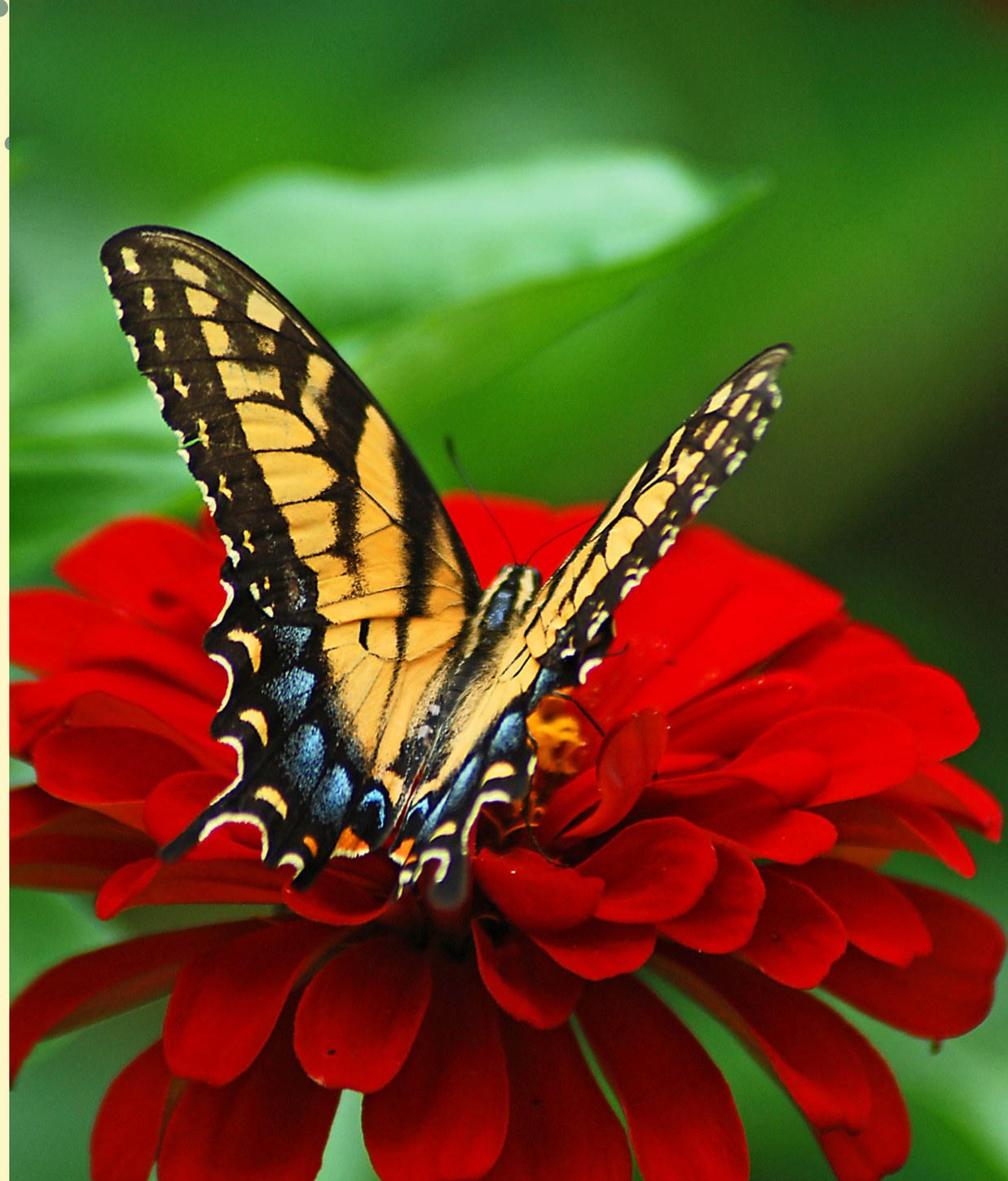
The metaverse has been recognized as being the ***next generation of social connection****... In the metaverse space, people can engage in social activities such as discussing an issue, collaborating on a project, playing games, and learning from experiencing or solving some problems.*

But are we sure that all these benefits are not already realized with **the current Internet**?

CONCLUSIONS

Despite the enthusiasm and clear benefits of using metaverse, we must always maintain a global perspective and consider all the issues associated with the use of technology (e.g. data use, training ethics and environmental impact).

COMPANIES AND TRAINING INSTITUTIONS NEED TO UNDERSTAND THE GLOBAL IMPACT OF THEIR METHODOLOGICAL AND TECHNOLOGICAL CHOICES IN THE VIRTUAL WORLD HAVE ON THE REAL WORLD.



THANK YOU !

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