Ινστιτούτο Πληροφορικής και Τηλεπικοινωνιών
Net Media Lab - Mind & Brain R&D

ΤΟ ΣΧΟΛΕΙΟ ΤΟΥ ΜΕΛΛΟΝΤΟΣ

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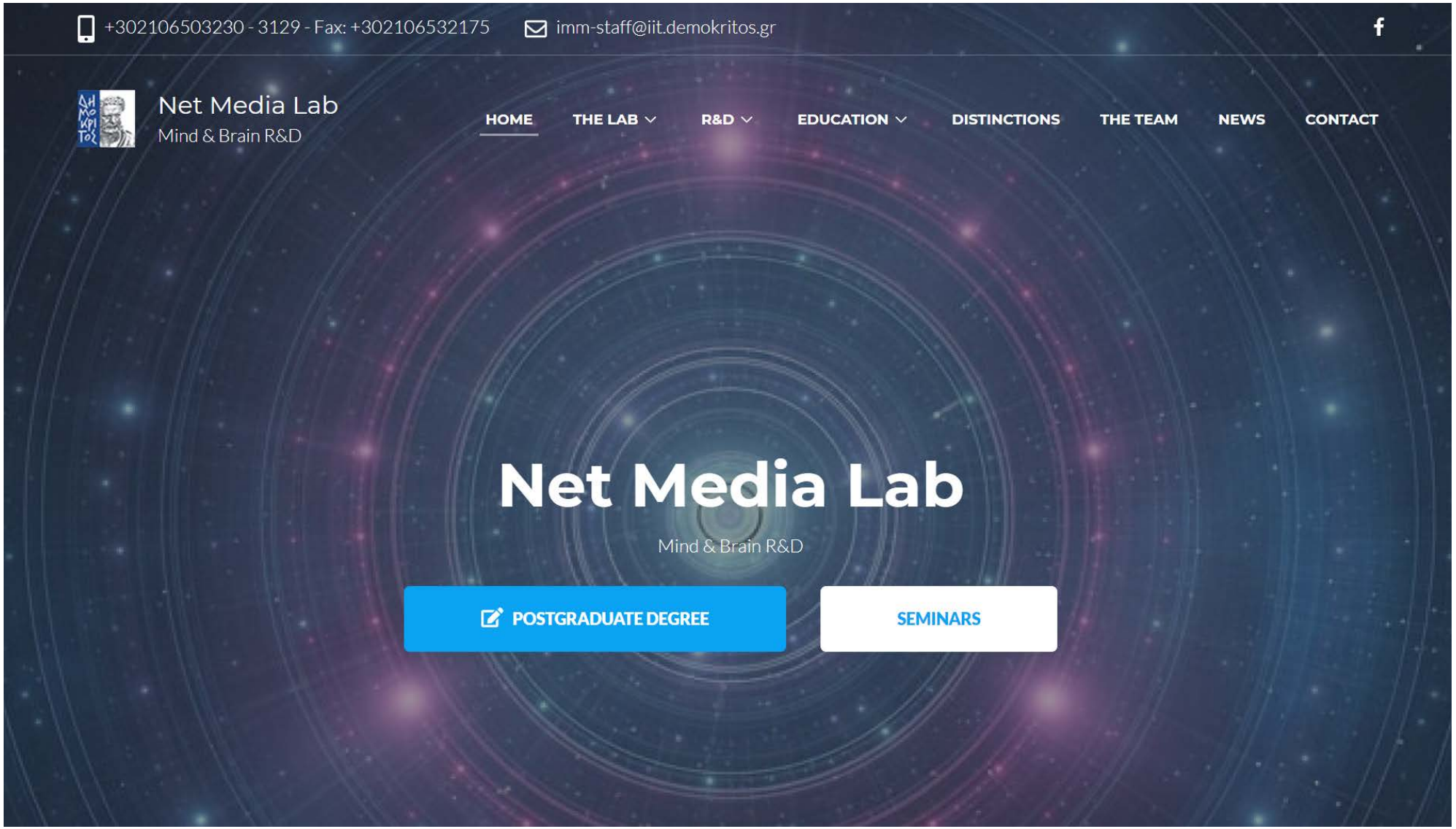
I.I.T. – N. C. S. R. "Demokritos"

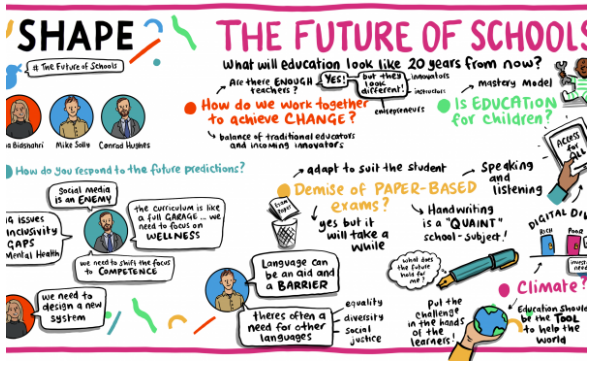
http://imm.iit.demokritos.gr/
http://imm.iit.demokritos.gr/wp-content/uploads/2021/02/drgr.pdf

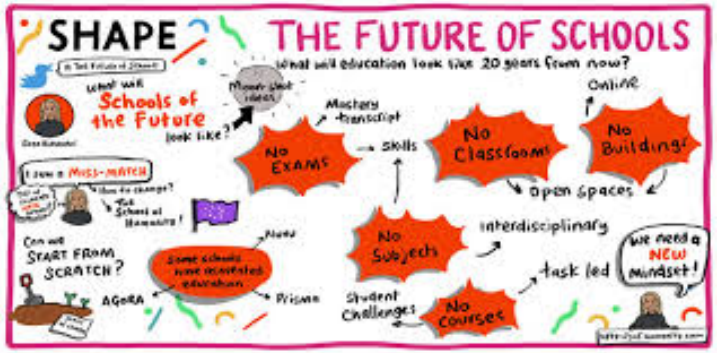
11 Ιουλίου 2023



Net Media Lab, Mind & Brain, R&D (http://imm.iit.demokritos.gr/)

ΤΟ ΣΧΟΛΕΙΟ ΤΟΥ ΜΕΛΛΟΝΤΟΣ
ΤΕΧΝΟΛΟΓΙΕΣ, ΠΕΡΙΕΧΟΜΕΝΟ, ΔΙΑΔΙΚΑΣΙΕΣ, ΠΡΟΤΕΡΑΙΟΤΗΤΕΣ





The Seven Gears of the Future Ready Framework:

- Curriculum, Instruction, and Assessment
- Personalized Professional Learning
- Technology and Infrastructure
- Data and Privacy
- Community Partnerships
- Budget and Resources
- Use of Space and Time

BOARD

TOP TRENDING TECHNOLOGIES

01 Artificial Intelligence (AI)

AI refers to a computer system designed to mimic human intelligence and perform tasks like image recognition, speech recognition, pattern recognition, and even higher cognitive processes.

02 Machine Learning (ML)

Machine learning is a kind of data analysis that automates the creation of analytical models.It is a field of AI based on the premise that computers can learn from data, recognize patterns, and make judgments with little or no human input

03 Robotic Process Automation

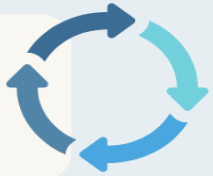
This technology enables anyone to build computer software, or a robot to mimic and incorporate human activities while interacting with digital systems in order to create business processes.

04 Data Science

Data Science is the automation that aids in the simplification of complex data

05 DevOps

DevOps is a methodology that brings together software development and IT operations.



06 Blockchain

Blockchain is the most advanced and cutting-edge technology when addressing electronic records in the year 2021. In simpler terms, a Blockchain is an electronic record that may be shared among several users.

07 Edge Computing

At the end of the week, the teacher has to send the study materials to the students for them to study at home also for project reference.

08 Virtual Reality

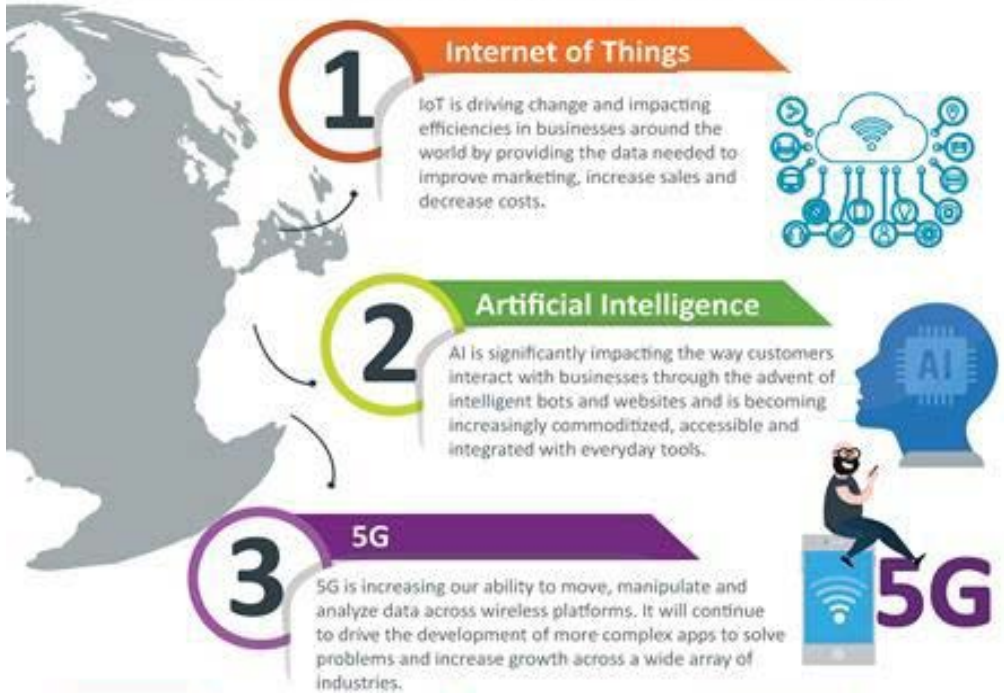
This cutting-edge technology creates sounds, lifelike visuals, and other emotions that transport you to a fantastical realm. Virtual reality is a technology that allows one to immerse in an environment that appears to be incredibly real.

https://www.boardinfinity.com/blog/top-10-trending-technologies/

CompTIA Emerging Technology COMMUNITY

TOP 10
EMERGING TECHNOLOGIES

CompTIA's Emerging Technology Community selected the top 10 technologies that have near-term business and financial opportunity for the IT channel and those working in the business of technology.



1 Internet of Things

IoT is driving change and impacting efficiencies in businesses around the world by providing the data needed to improve marketing, increase sales and decrease costs.

2 Artificial Intelligence

AI is significantly impacting the way customers interact with businesses through the advent of intelligent bots and websites and is becoming increasingly commoditized, accessible and integrated with everyday tools.

3 5G

5G is increasing our ability to move, manipulate and analyze data across wireless platforms. It will continue to drive the development of more complex apps to solve problems and increase growth across a wide array of industries.

4 Serverless Computing

Serverless computing is enabling organizations to create a NoOps IT environment that is automated and abstracted from underlying infrastructure, reducing operational costs and allowing businesses to invest in the development of new, impactful, value-add capabilities.

5 Blockchain

Blockchain is solving the increased need to secure and manage an increasing number of transactions across the Internet as it provides an alternative to centrally managed record keeping.

6 Robotics

Robotics is automating routine processes by leveraging machines in all shapes and sizes to make businesses faster, cheaper and more efficient. This is driving conversations and opportunities due to its incredibly fast ROI and Significant opportunity for cost savings and growth.

7 Biometrics

Leveraging biometric technology from facial recognition to retina and fingerprint scans will become the mainstream methodology for confirming your identity. These solutions, both stand alone and integrated, will form the secure foundation for solutions that we deliver moving forward.

8 3D Printing

3D printing is providing an effective solution for low volume manufacturing of complex parts and quick and local production of obscure products. The opportunity for the industry is expected to become bigger as more affordable products become available and will help to expand the market.

9 VR/AR

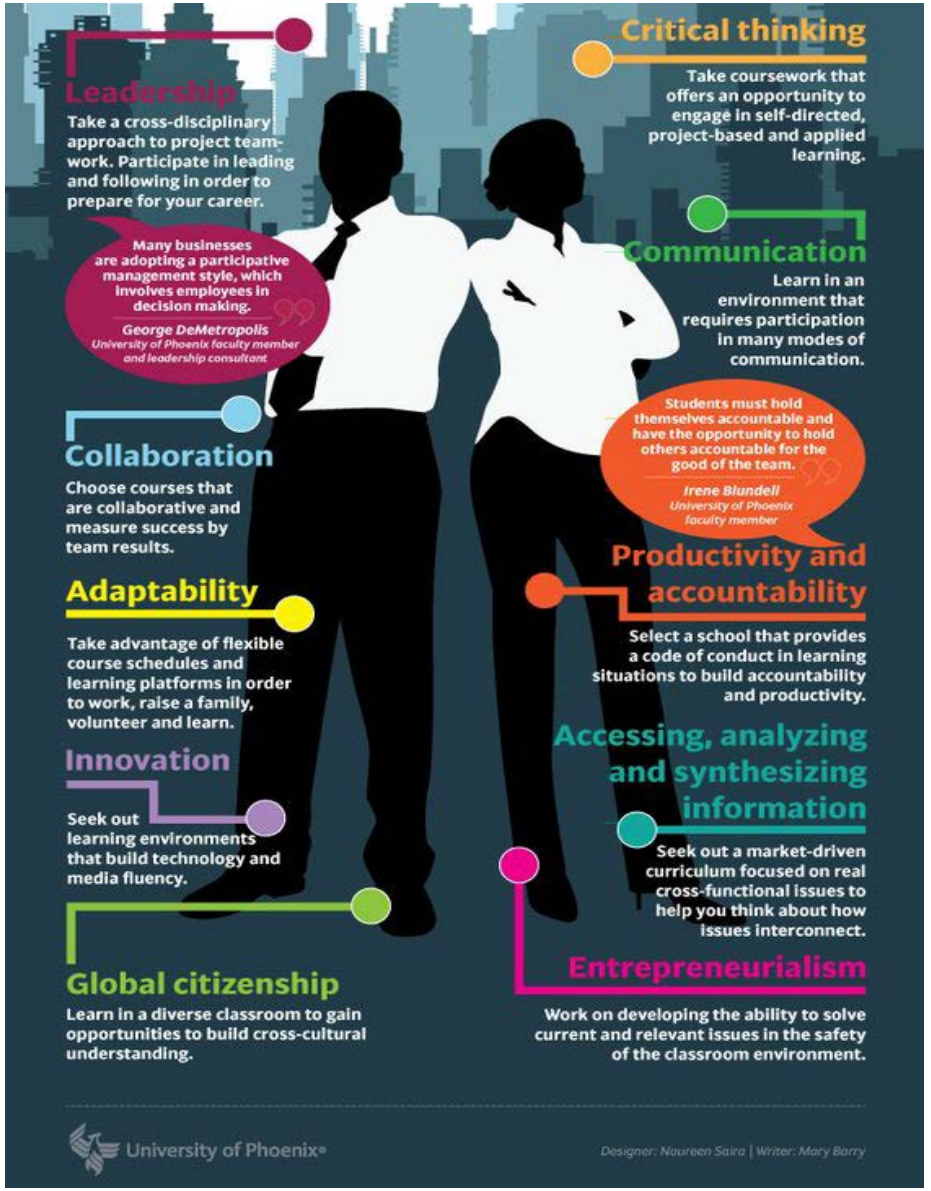
VR/AR is transforming the way we engage with machines, data and each other. Organizations are exploring opportunities to use VR, AR, mixed reality, AI and sensor technologies to enhance operational efficiency and individual productivity.

10 Drones

Drones are enabling robotic automation without geographic restriction and the opportunities for technological development and integration are high for the market.

Learn more at CompTIA.org/EMTechCommunity.

Top 10 skills for the successful 21st-century worker

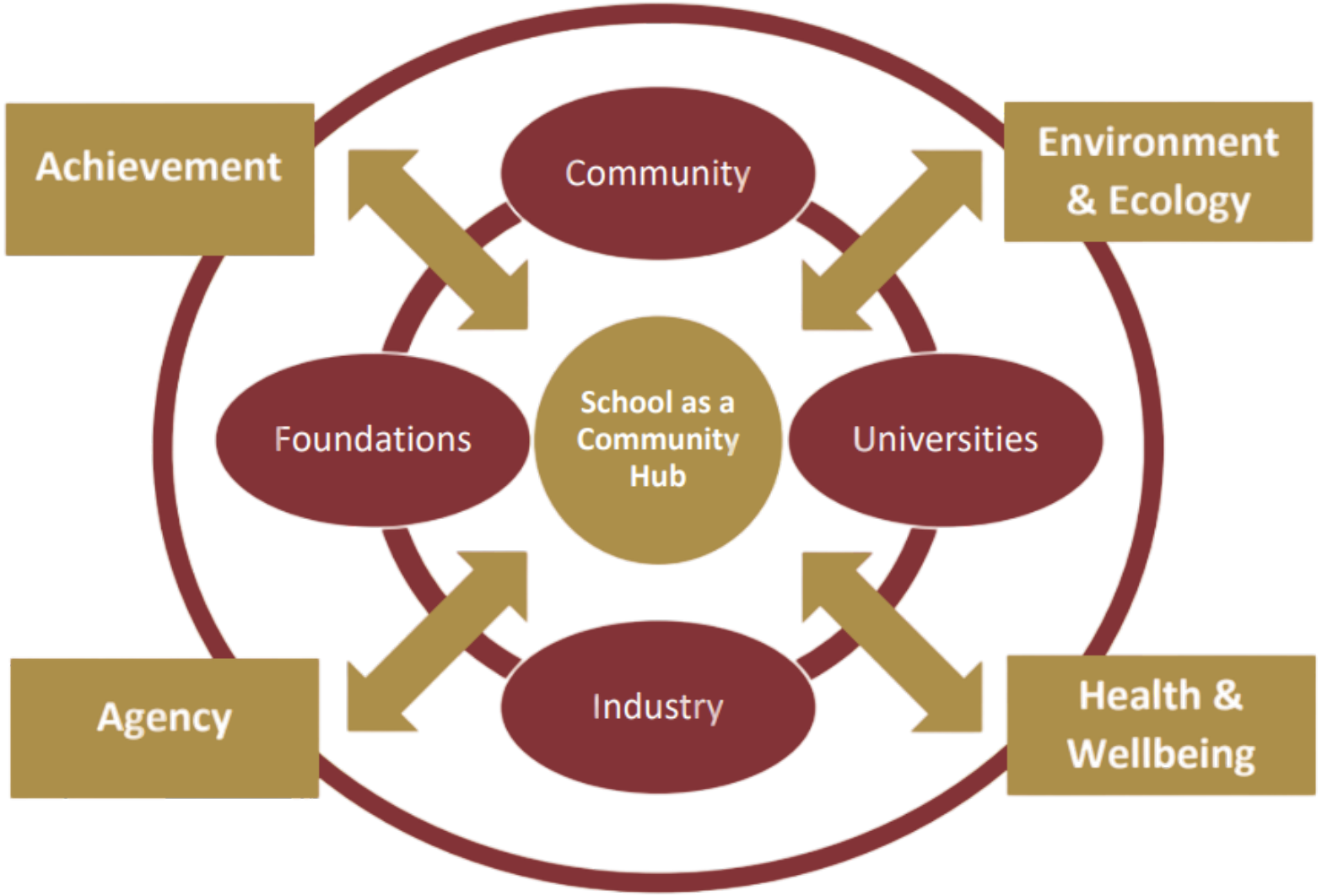


Claudine Habak, Mohamed L. Seghier, Mohamed A. Fahim, Scott Parkman

Emirates College for Advanced Education

https://rcepunesco.ae/ar/KnowledgeCorner/WorkingPapers/WorkingPapers/Schools%20of%20the%20Future_%20Sample%202.pdf

https://rcepunesco.ae/ar/KnowledgeCorner/WorkingPapers/WorkingPapers/Schools%20of%20the%20Future_%20Sample%202.pdf



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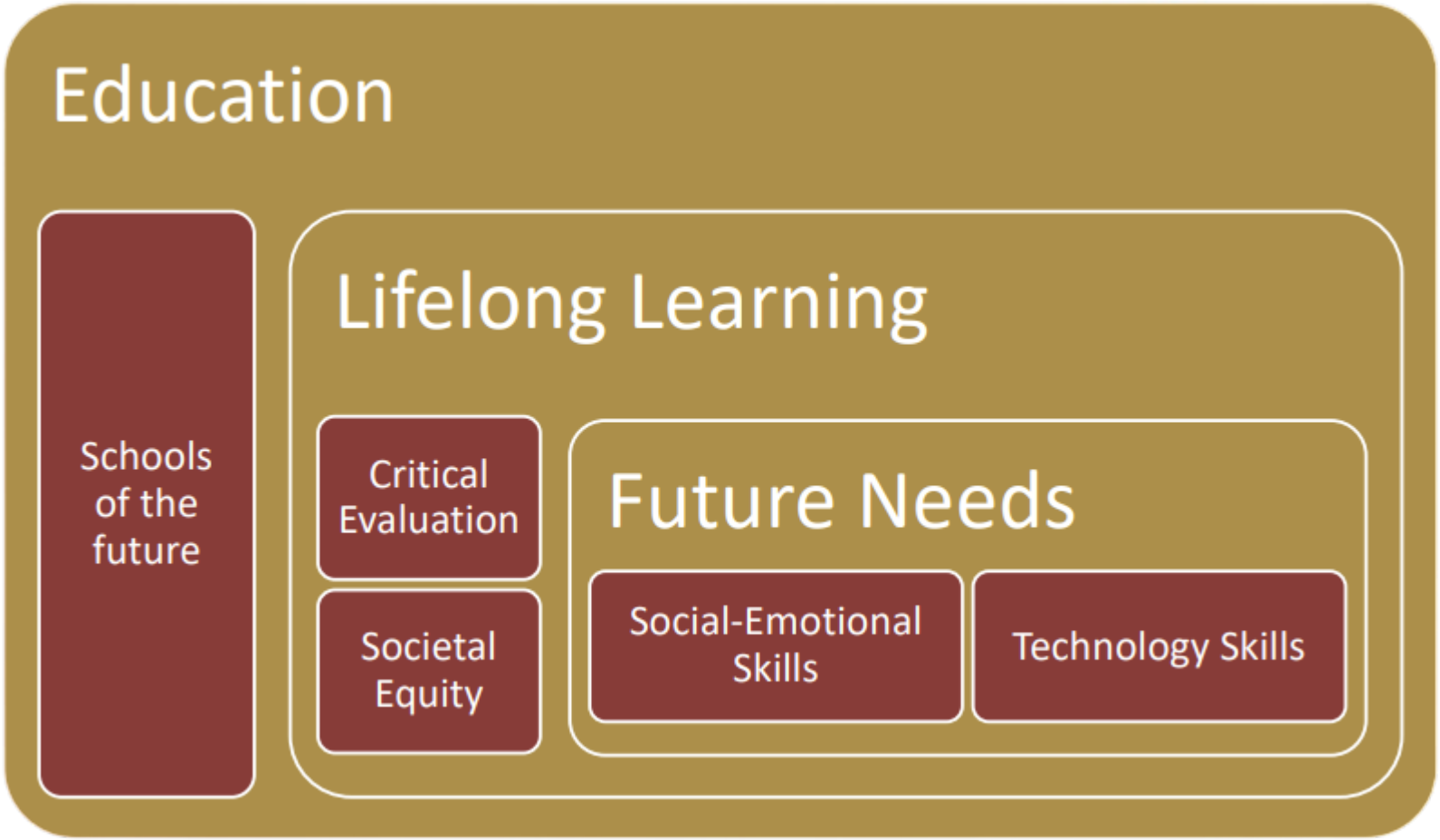

The role of education in promoting lifelong learning by developing critical evaluation, which can support societal cohesion. Combining this with social-emotional skills and technology skills creates adaptability to be able to respond to the needs of the future.

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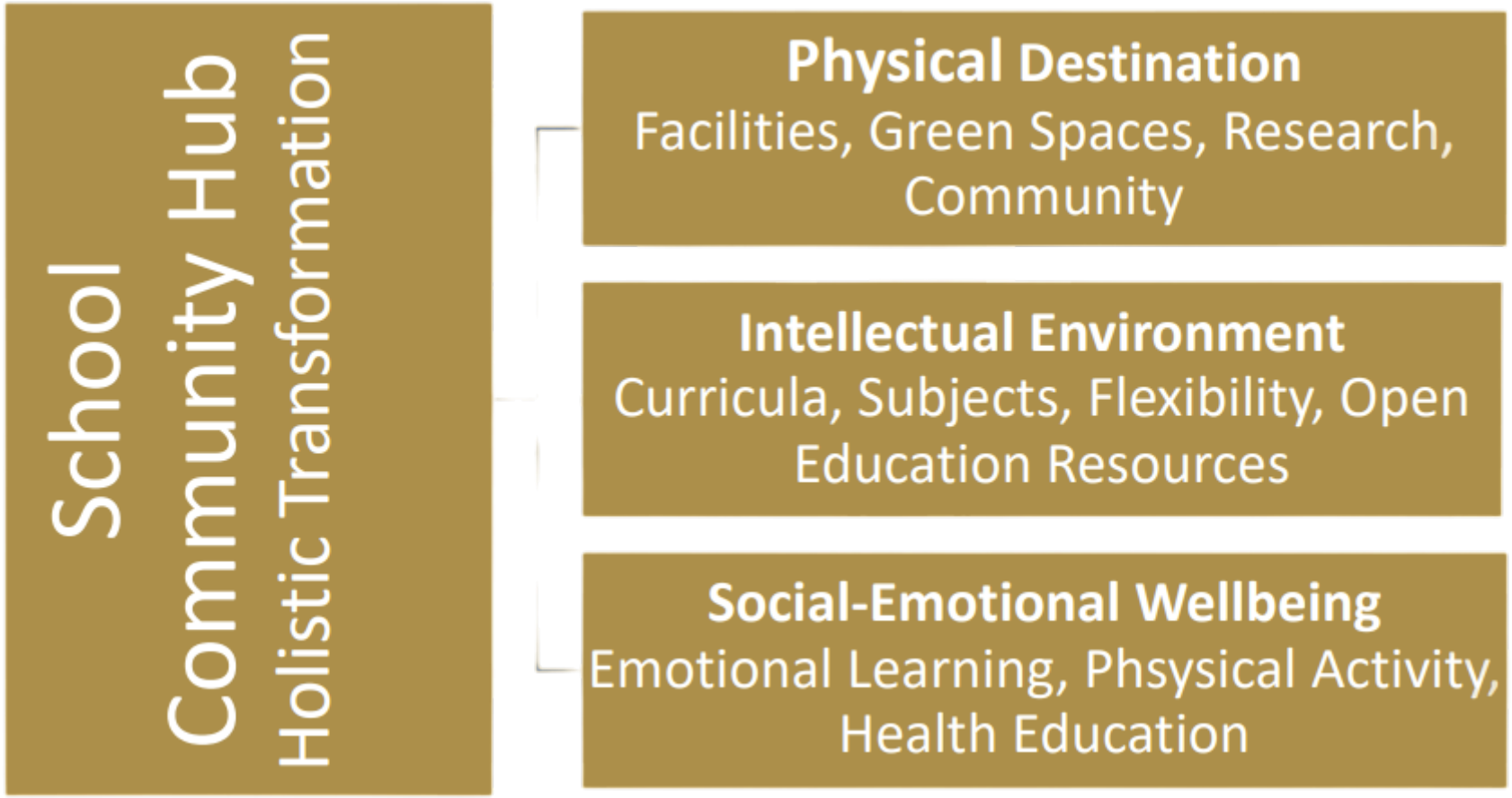

The school of the future as an integrated community hub. This involves transformation across three main areas: Physical, Intellectual, and Social-Emotional. Transformation in each area involves numerous concepts and activities.

https://rcepunesco.ae/ar/KnowledgeCorner/WorkingPapers/WorkingPapers/Schools%20of%20the%20Future_%20Sample%202.pdf

Factors that can counter stress and support wellbeing. Youth and adults experience various sources of stress, but schools can integrate activities that not only protect against the effects of stress, but also support positive development of wellbeing.

https://rcepunesco.ae/ar/KnowledgeCorner/WorkingPapers/WorkingPapers/Schools%20of%20the%20Future_%20Sample%202.pdf

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AI as an assessment tool	• Grade papers, so teachers can spend more time with students • Evaluate students at the learning outcome or standards level, as more and more assessments are conducted using technology
AI-based real-time feedback for students	• Make trial-and-error learning less intimidating: offer students a way to learn in a relatively judgment-free environment • Diagnose strengths or gaps in student knowledge and provide automated and timely feedback
Learning anytime and anywhere for more inclusion	• Customize experiences by supporting learning outside the classroom: students can learn from anywhere in the world at any time • Serve the flexibility of learning structures that schools of the future have to grow: move toward personalized scheduling
AI-based support for students with learning difficulties	• Create a better professional environment for teachers to work more on students with learning difficulties • Help students with learning difficulties navigate through content paths, personalized courses of action, and modes of delivery.
AI-powered virtual guides and facilitators	• Create virtual human facilitators for use in a variety of educational environments: shift the role of the teacher to that of facilitator • Engage and guide students in authentic virtual reality and game-based learning environments
Effective system-level AI-based decisions	• Predict academic achievement at the school/system, by profiling students and modelling learning behaviors • Offer opportunities for improving a state's capacity to manage large-scale educational systems by increasing data from schools. • Help to manage resources, support decision making and institutional policy, and assist with managing student study flow

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Drigas, A., & Leliopoulos, P. (2014). The Use of Big Data in Education. *International Journal of Computer Science Issues*, 11(5), 58-63.

Drigas, A. S., & Papoutsi, C. (2018). A new layered model on emotional intelligence. *Behavioral Sciences, 8*(5), 45. https://doi.org/10.3390/bs8050045

https://rcepunesco.ae/ar/KnowledgeCorner/WorkingPapers/WorkingPapers/Schools%20of%20the%20Future_%20Sample%202.pdf

ΟΙ ΤΕΧΝΟΛΟΓΙΕΣ ΤΟΥ ΜΕΛΛΟΝΤΟΣ ΜΕΣΑ ΣΤΟ ΣΧΟΛΕΙΟ

ARTIFICIAL INTELLIGENCE- MACHINE LEARNING-BIG DATA
CLOUD COMPUTING
FIBER NETWORKS, GIGABIT
5G/6G- ΑΣΥΡΜΑΤΕΣ ΤΕΧΝΟΛΟΓΙΕΣ
INTERNET OF THINGS
ROBOTICS EVERYWHERE IN EDUCATION
AVATARS AND DIGITAL ASSISTANCE/COUNSELORS
VIRTUAL LABS & VIRTUAL EXPERIMENTS
EXTENDED VIRTUAL AUGMENTED MIXED REALITY
VIRTUAL CLASSES & VIRTUAL PRESENCE
FUTURE DEVICES – NEW TECHNOLOGIES -SMARTPHONES –HOLOGRAMS
HUMAN MACHINE INTERFACES NEW ERA
BRAIN COMPUTER INTERFACES-BODY ANTENNAS-WEARABLES
NEW SKILLS FOR INDUSTRY REVOLUTION 4.0- 5.0 & BEYOND
COMPONENTS (ROBOTICS, DRONES,3D PRINTING)
GAMES -GAMIFICATION

3D2ACT:

Fostering Industry 4.0 and 3D Technologies through Social Entrepreneurship: An Innovative Programme for a Sustainable Future

AIMS

- Support VET trainers and educators in an attempt to strengthen their profiles with the acquisition of new skills, the development of targeted material, the collection of tools and resources
- Create opportunities for linking VET schools with the labour market building on synergies and partnerships with established organizations using industry 4.0 and automation or 3D printing and Robotics

CONSORTIUM

P1: N.C.S.R. "Demokritos" – **Greece**

P2: European Digital Learning Network – **Italy**

P3: Politeknika Ikastegia Txorierri – **Spain**

P4: Emphasys Centre – **Cyprus**

P5: Incubator Leeuwarden – **Netherlands**

P6: Regional Directorate of Primary and Secondary Education of Crete – **Greece**

P7: University of Crete – **Greece**

https://3d2act.eu/

3D2ACT

Strategic Partnerships for Vocational Education and Training
2020-1-EL01-KA202-078957

30 months
(1/12/2020 - 31/05/2023)

Erasmus+

DRONES@STEAM:

Fostering Digital Transformation in VET Schools and Creating New Job Prospects in the Labour Market

AIMS

- Promote high digital skills which appear to be missing from VET curricula and are currently needed to enter the labour market and be included in VET job profiles.
- Promote targeted 'wide and deep' digital competences and the use of technologies leading to the 4.0 industry.
- Promote job specific VET related skills for various fields and sectors which are not offered as work-based learning opportunities or include danger or hazards for the workers.

CONSORTIUM

P1: University of Crete – **Greece**

P2: ECAM-EPMI – **France**

P3: Cyprus Computer Society – **Cyprus**

P4: Politeknika Ikastegia Txorierri – **Spain**

P5: N.C.S.R. "Demokritos" – **Greece**

P6: Emphasys Centre – **Cyprus**

P7: Regional Directorate of Primary and Secondary Education of Attica – **Greece**

https://dronesteam.eu/

DRONES STEAM

Cooperation Partnerships for Vocational Education and Training
2021-1-EL01-KA220-VET-000034686

28 months
(28/2/2022 - 27/6/2024)

Erasmus+

JOBS4ALL:

Strengthening the Employability and Key Competences of Young People with Disabilities Through the Digital Transformation and Modernisation of Youth Work

AIMS

- Strengthen Young People with Disabilities (YPwDs) employability skills by improving existing training programmes integrating technology-based tools to enable young people into adulthood & effectively support their integration into the labour market.
- Advance training opportunities offered for a vulnerable group of the population through the advancement of YOUTH programmes on EMPLOYABILITY SKILLS.

CONSORTIUM

P1: N.C.S.R. "Demokritos" – **Greece**

P2: Associação Portuguesa para as Perturbações do Desenvolvimento e Autismo de Coimbra – **Portugal**

P3: Learning Center for Youth – **Cyprus**

P4: Metropolisnet-European Metropolis Employment Network EWIV – **Germany**

P5: Emphasys Centre – **Cyprus**

P6: 2 EPAL Agias Paraskevis – **Greece**

P7: Zespol Szkol Specjalnych im. Janiny Porazinskiej w Ignacowie – **Poland**

https://jobs4all-project.eu/

Cooperation Partnerships for Youth Education
2021-2-EL02-KA220-YOU-000049207

30 months
(2/5/2022 - 1/11/2024)

Erasmus+

XR EXTENDED REALITY

Extended reality (XR) is an umbrella term referring to all real-and-virtual combined environments and interactions generated by computer technology. It includes Augmented Reality (AR), Mixed Reality (MR) and Virtual Reality (VR). "XR isn't about the future – it's already here", says Thomas Walter, Section Manager, Strategic Product Marketing at NEC Display Solutions Europe.

WHAT ARE THE ADVANTAGES OF XR?

Extended reality (XR) technology is playing more of a prominent role in different industries and sectors, providing clear benefits in many aspects of work and business, including training, collaborative working and marketing.

In education and training, XR bridge the gap between educators and trainees, enabling closer collaboration even when people attend course remotely.

XR can accelerate learning, helping companies save money on training.

It provides safe learning environments where trainees can learn from mistakes without any risks.

For presentation and collaboration, XR enables shared, large-scale visualisation and vivid, walk-through representations of designs and structures.

Providing immersive experiences is enabling brands to improve how they market products, bringing customers closer into their world.

Extended reality also helps learners stay focused, and offers high engagement and knowledge retention.

Consumers can experience and visualise goods before making a physical purchase.

XR offers detailed analytics, connected to performance and interaction, which support rigorous assessment, testing and refinement of marketing messages.

AR AUGMENTED REALITY

Augmented reality (AR), on the contrary, does not give a complete immersion. AR adds digital elements to a live view often done by using the camera on a smartphone or tablet. Augmented reality experiences and games include for example apps like Pokemon Go or devices like the Snapchat lenses.

WHAT ARE THE ADVANTAGES OF AR?

Augmented reality (AR) offer a broad range of applications for enterprises and organisations.

Augmented reality (AR) provides a richer user experience while providing a cost-effective alternative to other media platforms.

It is especially well-suited to the massively expanding smartphone market, integrating its technology into highly personal and mobile experiences.

AR has a range of important practical applications across different industries.

In the automotive sector, it is used with in-car dashboards to provide drivers with useful and essential travel and technical information.

It also provides virtual instructions for everyday tasks, such as tyre pressure checks and oil changes.

As with other XR technologies, AR also includes detailed analytics, which are extremely useful for providing customer feedback, marketing data and individual performance assessments.

In both education and tourism, AR can add extra layers of information to historical and cultural sites for users, experienced in real time on location.

For customers in the financial and banking sector, there are AR-activated bank cards and geo-targeting apps for locating nearby banking facilities.

Retailers can use AR to provide additional, dynamic brand content, provide product demonstrations and allow consumers to experience product benefits before purchase.

VR VIRTUAL REALITY

Virtual Reality might be the one you are most familiar with.VR is the term used to describe a three-dimensional, computer generated environment which can be explored and interacted with by a person. That person is immersed within this virtual environment and in most cases is able to manipulate objects or perform a series of actions. Many people know VR through the use of Head-Mounted Devices (HMD) like the Oculus Rift, HTC Vive, or Google Cardboard.

WHAT ARE THE ADVANTAGES OF VR?

In research and development, design and review and education and training, virtual reality (VR) offer a broad range of applications for enterprises and organisations.

In engineering, for example, VR gives firms a means of demonstrating proucts and services, and visualising outcomes to clients.

Manufacturers can experience products before they commit to producing them.

Virtual prototyping enables them to fine-tune designs and troubleshoot earlier in the development process.

In training, VR is having a marked impact across a large number of sectors, including medical, aerospace, military and sport.

It offers opportunities for iterative learning and repeated exercises in highly realistic, challenging environments.

Commercial applications of VR include the property market, where estate agents can give potential buyers virtual tours of developments, even if they are still at the design or construction stage.

VR also provides highly accurate, walk-through visualisations of architectural projects and renovations.

Virtual reality can also become a useful recruitment tool, giving job applicants a vivid snapshot of what it is actually like to work in a specific role or environment.

MR MIXED REALITY

Mixed Reality blends elements of both AR and VR, where physical and digital objects co-exist and interact in real-time. It allows the user to interact with combined virtual and real objects. Examples of MR include games like Halo Recruit or apps such as HoloTour.

WHAT ARE THE ADVANTAGES OF MR?

MR's combination physical and digital is making significant changes to the mainstream in various industries, including manufacturing, design and construction, medical, education and research.

Call-out engineers can use Mixed Reality for accessing up-to-date information and support from remote experts while remaining hands-free to apply this knowledge practically on-site.

Quality controllers in manufacturing can overlay information from head mounted displays (HMDs) and hand held devices, speeding up quality assurance processes and reducing errors.

MR enables intensive on-the-job training, combining practical instruction with digital information.

It can also speed up the training process, helping businesses bridge the skills gap.

Remote experts offer over-the-shoulder coaching to employees and operatives in the field through hands-free MR devices.

MR is changing how people work, learn and live, and it has the potential to expand further to improve and enhance enterprises and organisations.

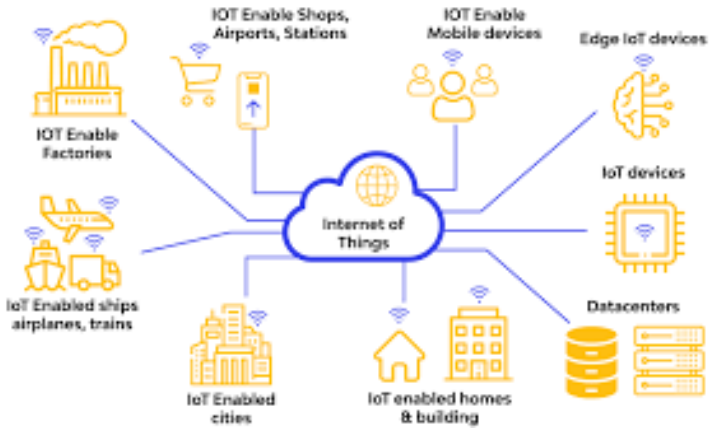
Mixed Reality opens up new opportunities for collaboration by bringing together multiple MR devices in shared spaces. Here, teams can network in a virtual world overlaid onto the physical environment.

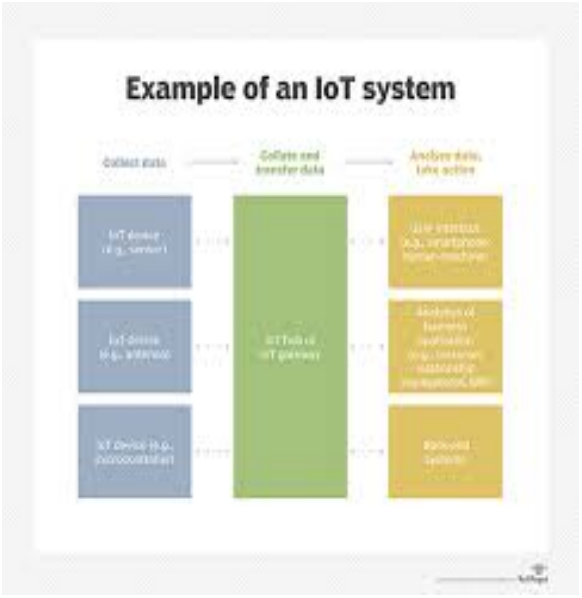
ST Engineering

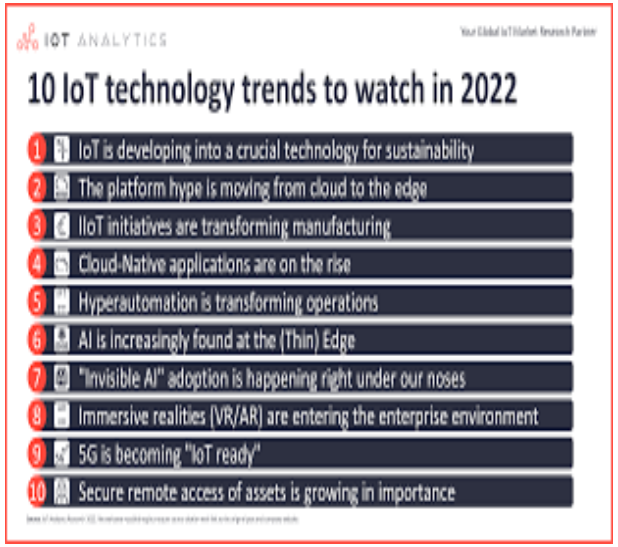

XR
EXTENDED REALITIES
AR
VR
MR

ROBOTS AND AVATARS IN SCHOOL

INTERNET OF THINGS – ΟΛΑ ΔΙΑΔΙΚΤΥΩΜΕΝΑ







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https://rcepunesco.ae/ar/KnowledgeCorner/WorkingPapers/WorkingPapers/Schools%20of%20the%20Future_%20Sample%202.pdf

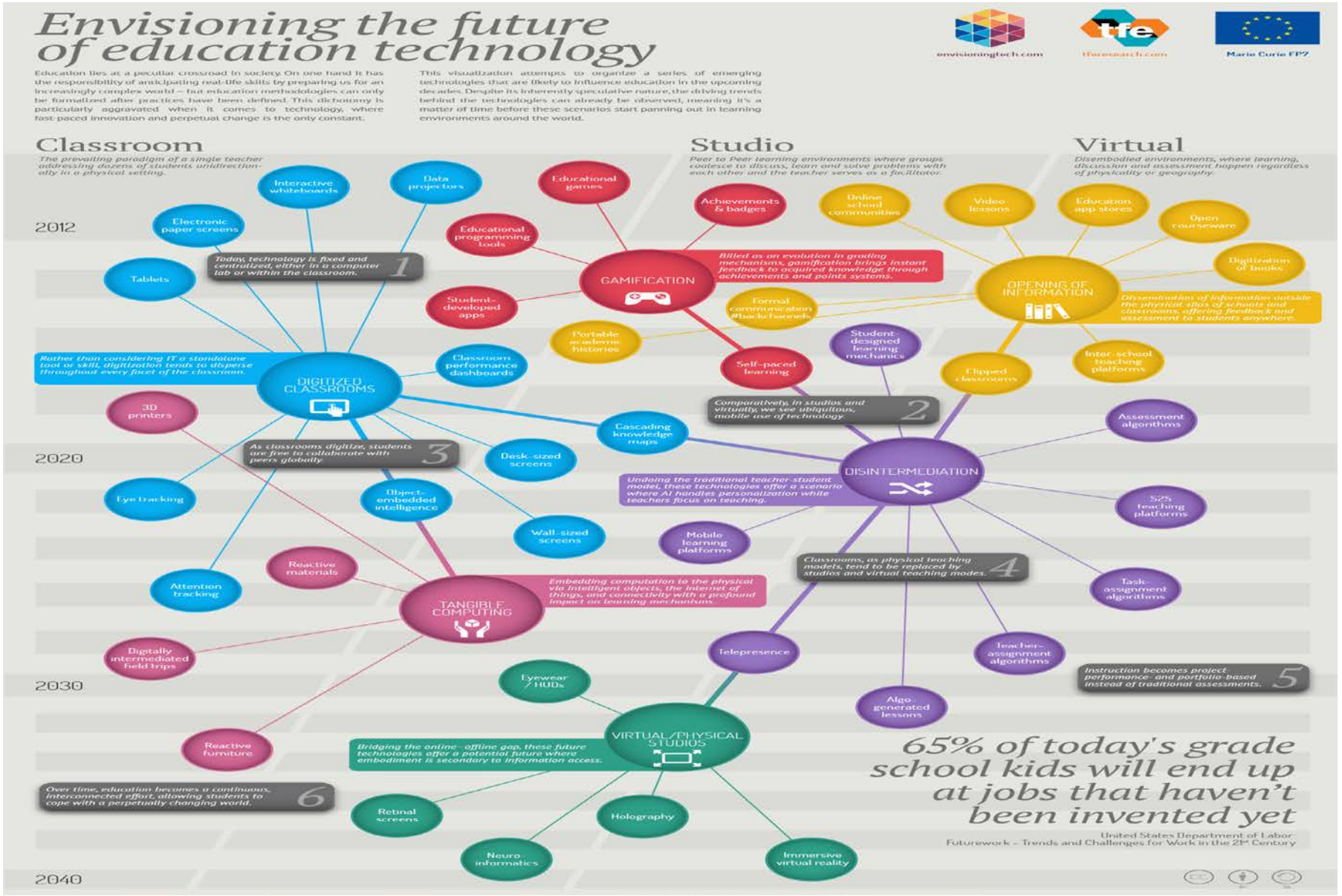
10 ROLES FOR ARTIFICIAL INTELLIGENCE IN EDUCATION

1. Activity automation
2. Adaptive software
3. Targeted improvement
4. Tutorial support
5. Helpful feedback
6. Information interaction
7. Changing teacher roles
8. Trial-and error learning
9. Actionable data
10. Changing learning nature

teachthought
WE GROW TEACHERS

Educational platforms based on Artificial Intelligence technology

- Third Space Learning
- Little Dragon
- Brainy
- CTI
- Carnegie Learning
- ThinkerMath


Envisioning the future of education technology
Education lies at a peculiar crossroad in society. On one hand it has the responsibility of anticipating real-life skills by preparing us for an increasingly complex world – but education methodologies can only be formalized after practices have been defined. This dichotomy is particularly aggravated when it comes to technology, where fast-paced innovation and perpetual change is the only constant.
This visualization attempts to organize a series of emerging technologies that are likely to influence education in the upcoming decades. Despite its inherently speculative nature, the driving trends behind the technologies can already be observed, meaning it's a matter of time before these scenarios start panning out in learning environments around the world.
envisioningtech.com
tfaresearch.com
Marie Curie FP7
Classroom
The prevailing paradigm of a single teacher addressing dozens of students unidirectionally in a physical setting.
Studio
Peer to Peer learning environments where groups coalesce to discuss, learn and solve problems with each other and the teacher serves as a facilitator.
Virtual
Disembodied environments, where learning, discussion and assessment happen regardless of physicality or geography.
2012
2020
2030
2040
Interactive whiteboards
Data projectors
Electronic paper screens
Tablets
Today, technology is fixed and centralized, either in a computer lab or within the classroom. 1
Educational games
Educational programming tools
Student-developed apps
GAMIFICATION
Billed as an evolution in grading mechanisms, gamification brings instant feedback to acquired knowledge through achievements and points systems.
Achievements & badges
Online school communities
Video lessons
Education app stores
Open courseware
Digitization of books
OPENING OF INFORMATION
Dissemination of information outside the physical silos of schools and classrooms, offering feedback and assessment to students anywhere.
Formal communication channels
Portable academic histories
Student-designed learning mechanics
Self-paced learning
Flipped classrooms
Inter-school teaching platforms
Rather than considering IT a standalone tool or skill, digitization tends to disperse throughout every facet of the classroom.
DIGITIZED CLASSROOMS
Classroom performance dashboards
3D printers
Cascading knowledge maps
Comparatively, in studios and virtually, we see ubiquitous, mobile use of technology. 2
Assessment algorithms
As classrooms digitize, students are free to collaborate with peers globally. 3
Desk-sized screens
DISINTERMEDIATION
Undoing the traditional teacher-student model, these technologies offer a scenario where AI handles personalization while teachers focus on teaching.
Eye tracking
Object-embedded intelligence
Wall-sized screens
Mobile learning platforms
S2S teaching platforms
Reactive materials
Classrooms, as physical teaching models, tend to be replaced by studios and virtual teaching modes. 4
Attention tracking
TANGIBLE COMPUTING
Embedding computation to the physical via intelligent objects, the Internet of things, and connectivity with a profound impact on learning mechanisms.
Task-assignment algorithms
Digitally intermediated field trips
Telepresence
Teacher-assignment algorithms
Instruction becomes project, performance- and portfolio-based instead of traditional assessments. 5
Eyewear / HUDs
Algo-generated lessons
Reactive furniture
VIRTUAL/PHYSICAL STUDIOS
Bridging the online–offline gap, these future technologies offer a potential future where embodiment is secondary to information access.
Over time, education becomes a continuous, interconnected effort, allowing students to cope with a perpetually changing world. 6
Retinal screens
Holography
Neuro-informatics
Immersive virtual reality
65% of today's grade school kids will end up at jobs that haven't been invented yet
United States Department of Labor
Futurework – Trends and Challenges for Work in the 21st Century

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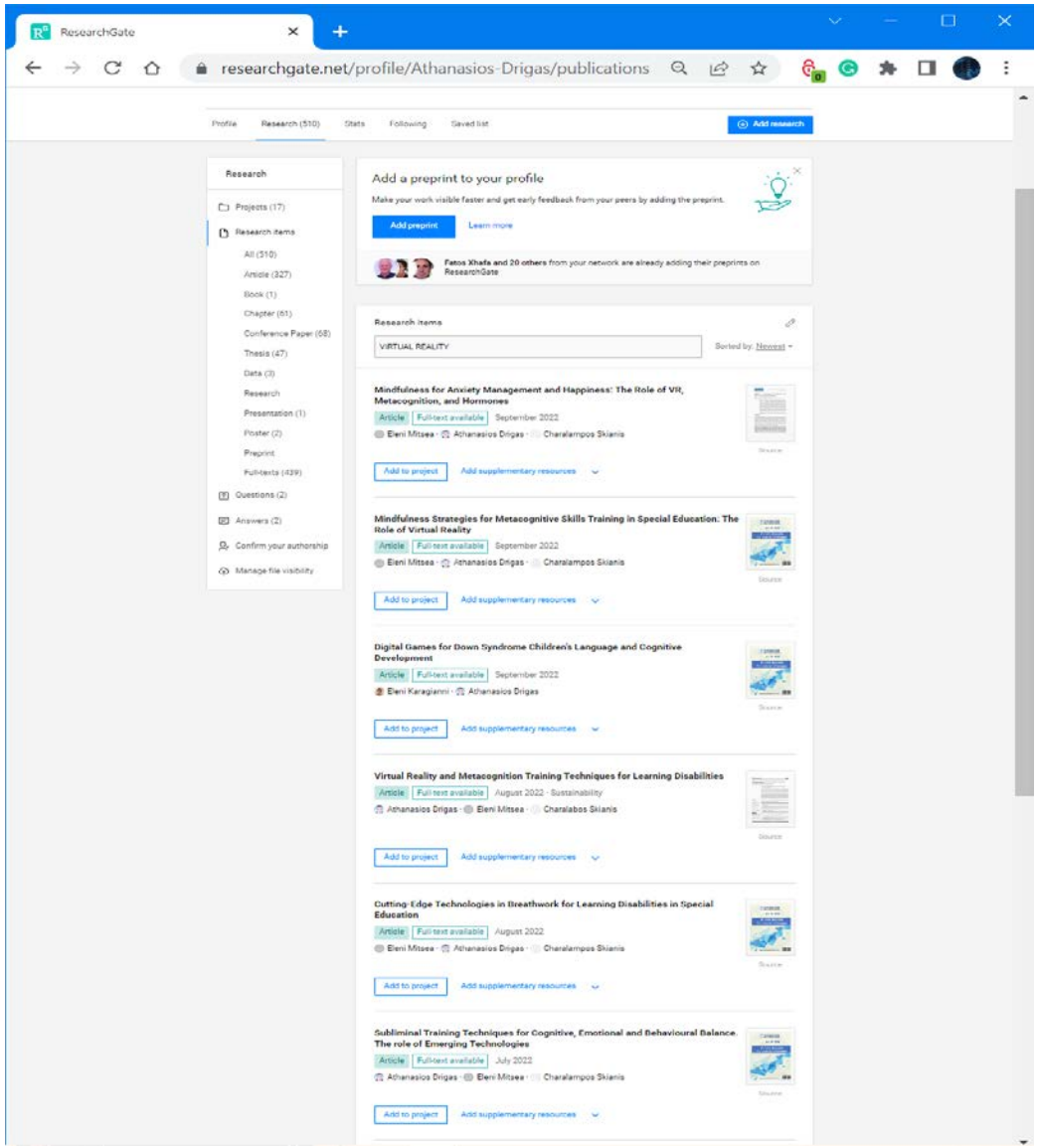
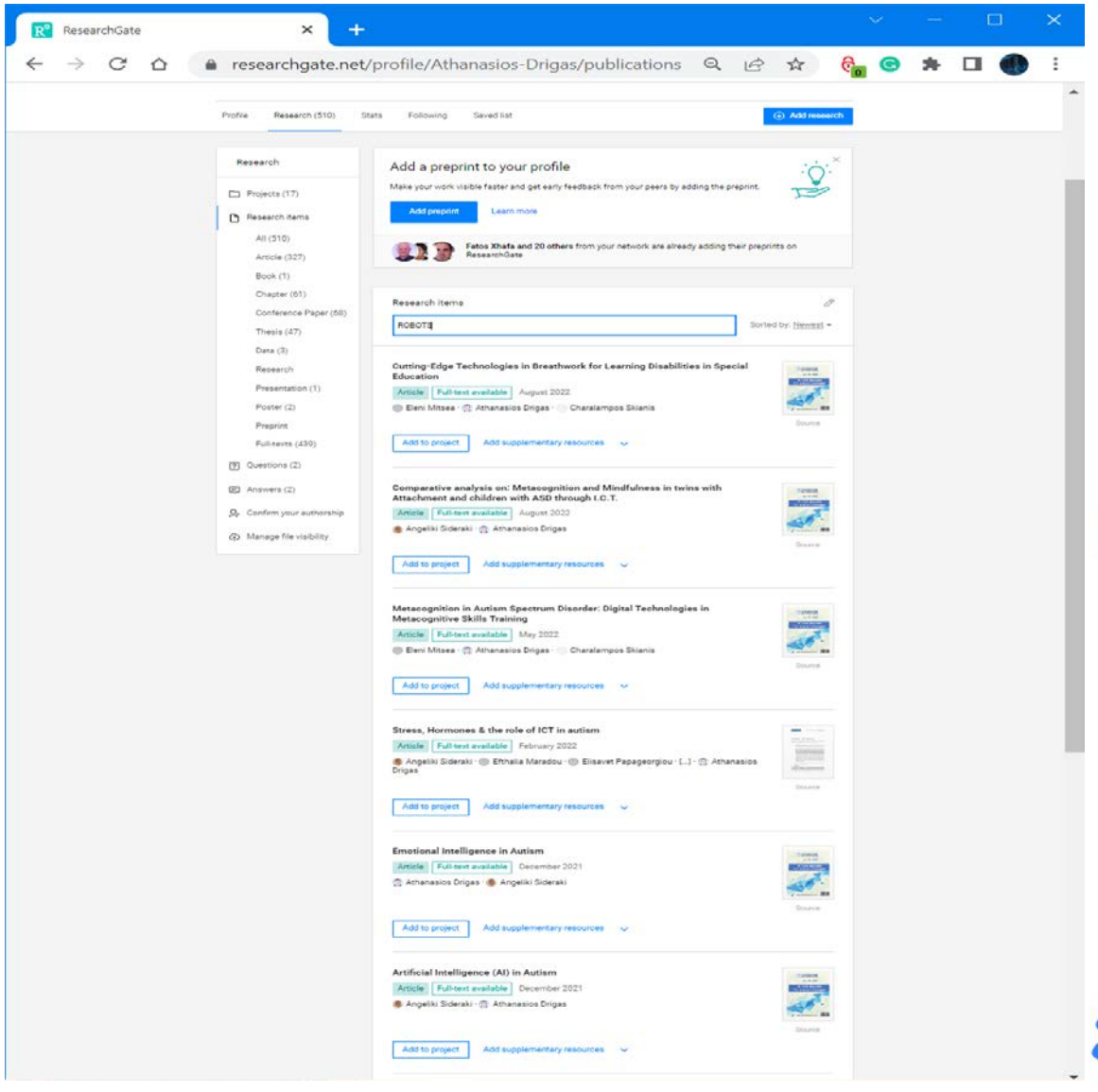
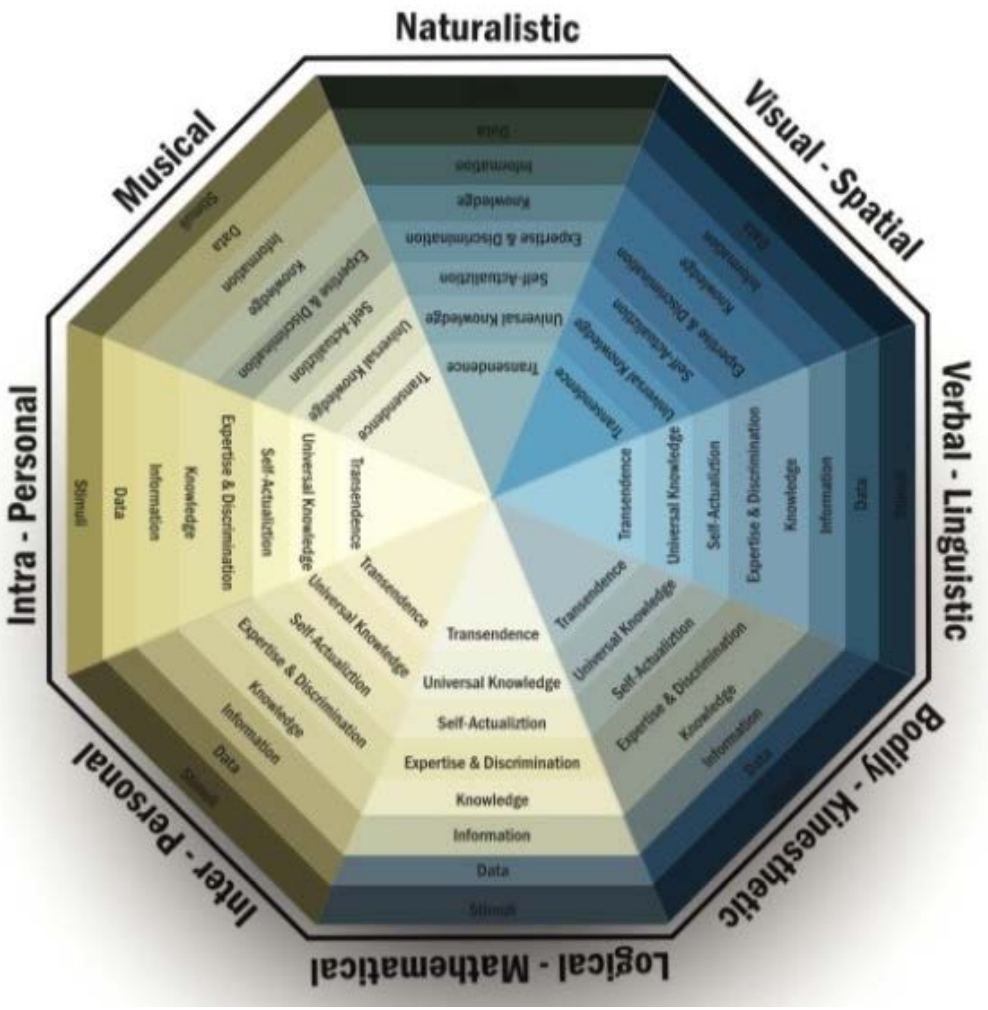




Drigas, A., & Leliopoulos, P. (2014). The Use of Big Data in Education. *International Journal of Computer Science Issues*, 11(5), 58-63.

Drigas, A. S., & Papoutsi, C. (2018). A new layered model on emotional intelligence. *Behavioral Sciences, 8*(5), 45. https://doi.org/10.3390/bs8050045

https://rcepunesco.ae/ar/KnowledgeCorner/WorkingPapers/WorkingPapers/Schools%20of%20the%20Future_%20Sample%202.pdf



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The Pyramid of Emotional Intelligence: The Nine-Layer Model

Taking into consideration all the theories of the past concerning pyramids and layer models dealing with EI, we analyze the levels of our pyramid step by step (Figure 1), their characteristics, and the course of their development so as to conquer the upper levels, transcendence and emotional unity, as well as pointing out the significance of EI. Our model includes features from both constructions (the Ability EI and the Trait EI model) in a more hierarchical structure. The ability level refers to awareness (self and social) and to management. The level of trait refers to the mood associated with emotions and the tendency to behave in a certain way in emotional states considering other important elements that this construction includes as well. The EI pyramid is also based on the concepts of intrapersonal and interpersonal intelligences of Gardner.

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8 Pillars X 8 Layers Model of Metacognition Educational Strategies, Exercises &Trainings

August 2021 · International Journal of Online and ... 17(8):115-134
DOI: 10.3991/ijoe.v17i08.23563

Athanasios Drigas · Eleni Mitsea

Abstract and figures

Metacognition is one of the foremost cardinal factors of achievement in the 21st century. Despite extensive research, there is still the need to build a unique model based on multidisciplinary research illuminating questions as regards the real nature of metacognition and the methods to develop metacognitive abilities. The current study presents a new layered model of metacognition based on well-established theories derived from cognitive science, psychology, physical and computer sciences, environmental and other sciences, even from philosophy. We describe in detail the cognitive and metacognitive processes involved at each layer, while particular emphasis is placed on the relation between the control processes as well as the special role of attention. According to our model, each layer of metacognition describes a higher-order control system which operates under the rule of a series of attention processes at an ever more refined, abstract and united level. The same applies to the cognitive processes and abilities such as attention , memory, perception, pattern recognition. At each higher level, they display more advanced attributes and functions responding to the necessity of creating more abstract mental representations and upper class motivations, thoughts and emotions. In addition, we recommend a number of strategies that support the metacognitive development at each level of the hierarchy. The multi-layered model of metacognition targets at enriching our understanding of how metacogni-tion evolves and it has the potential to guide the development of more effective strategies in educational system. 1 Introduction Many researchers have attempted to develop theories and models of metacognition. Flavell [1] recognized that metacognition consisted of both monitoring and regulating aspects. He proposed a model of metacognitive monitoring which includes the following components: metacognitive knowledge, metacognitive experiences, tasks or goals and strategies.

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The 8x8 Layer Model Consciousness-Intelligence-Knowledge Pyramid, and the Platonic Perspectives

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Abstract—The concept of knowledge is an issue that concerns a swarm of scientists. In now days a battery of researches are trying to detect appropriate strategies to improve cognitive and metacognitive skills. Since ancient times many questions have been raised about what knowledge is (what we mean when we say that someone knows something or what we attribute to a person who we say knows something) and how we can gain knowledge. Moreover how knowledge and information in general is influenced by its transmission is also an important and widely debated problem, which takes different forms depending on the ways (philosophy) or media (technologies) and the era of transmission. In this article we will try to review the pyramid of knowledge in the process of the years getting started from the era of antiquity by affiliating its data with the musings of the Greek philosophers to prove that all the philosophical prepossessions and theories of the past are timelessness and undisputed.

Keywords—Pyramid of knowledge, philosophy, Greek philosophers, Plato

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Serious games in K-12 education

Benefits and impacts on students with attention, memory and developmental disabilities

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Abstract

Purpose – The purpose of this paper is to explore the integration of serious games (SGs) in the area of special educational needs in the last ten years (2007-2017).

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Digital games & special education

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Abstract. Educators define three factors of interaction or as they refer to the 3 C's in education: Children (children), Community (communication), and Computer (computers) [1]. Information and Communication Technologies are an integral tool of the educational process for modern educational systems, helping the learning process to turn from passive to active, pushing each student to learn independence and autonomy. In recent years, the sciences of education have turned their attention and have already recognized the importance of games and even digital games as a learning tool, emphasizing the benefits for students with or without educational needs.

Keywords. ICT, Digital game, Special Education

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BCI-based games and ADHD

Jogos baseados na BCI e TDAH

Juegos basados en BCI y TDAH

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Abstract
Attention Deficit Hyperactivity Disorder (ADHD) is a neurological condition characterized by cognitive task difficulty, impulsivity, hyperactivity and loss of attention. It can persist into adulthood with negative academic and socio-professional outcomes. Neurofeedback treatments have been shown as effective for training the attention ability in children with ADHD. It has been found that interactive multi-player games are ideal from a therapeutic and long-term usage point of view due to their higher social motivation and cooperation among children with ADHD. In this study we conducted a semi-systematic review, with the goal of gathering findings from empirical and theoretical works in order to deepen our understanding about the use of Brain Computer Interface (BCI)-based for children and adults with ADHD, as a method to ameliorate the symptoms of their disorder.
Keywords: Brain-computer interface; BCI; Attention deficit hyperactivity disorder; ADHD; Serious games.

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Review article

Brain computer interface based applications for training and rehabilitation of students with neurodevelopmental disorders. A literature review

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BCI
EEG

ABSTRACT

The aim of this article is to explore a paradigm shift on Brain Computer Interface (BCI) research, as well as on intervention best practices for training and rehabilitation of students with neurodevelopmental disorders. Recent studies indicate that BCI devices have positive impact on students' attention skills and working memory as well as on other skills, such as visuospatial, social, imaginative and emotional abilities. BCI applications aim to emulate humans' brain and address the appropriate understanding for each student's neurodevelopmental disorders. Studies conducted to provide knowledge about BCI-based intervention applications regarding memory, attention, visuospatial, learning, collaboration, and communication, social, creative and emotional skills are highlighted. Only non-invasive BCI type of applications are being investigated based upon representative, non-exhaustive and state-of-the-art studies within the field. This article examines the progress of BCI research so far, while different BCI paradigms are investigated. BCI-based applications could successfully regulate students' cognitive abilities when used for their training and rehabilitation. Future directions to investigate BCI-based applications for training and rehabilitation of students with neurodevelopmental disorders concerning the different populations involved are discussed.

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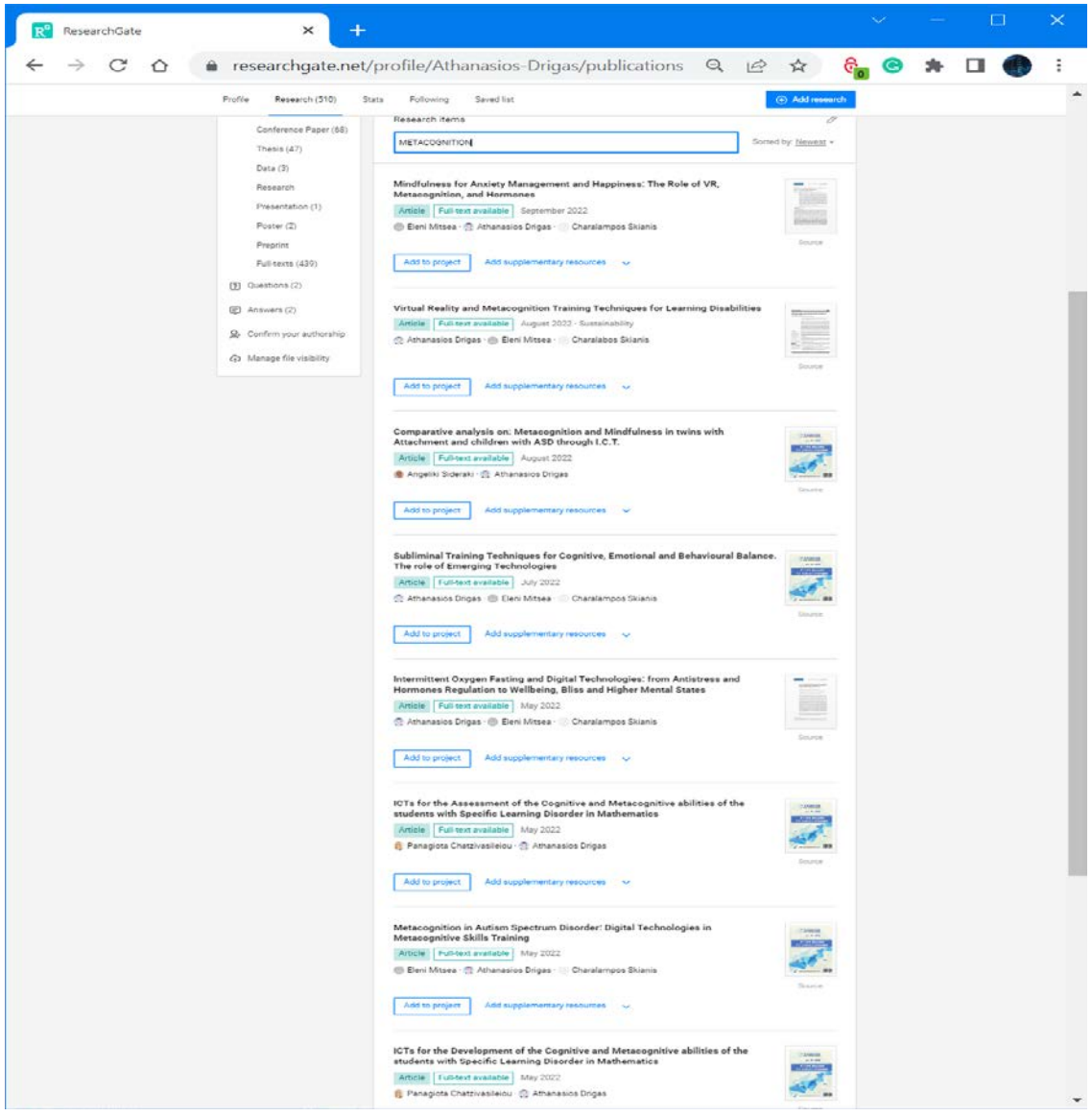

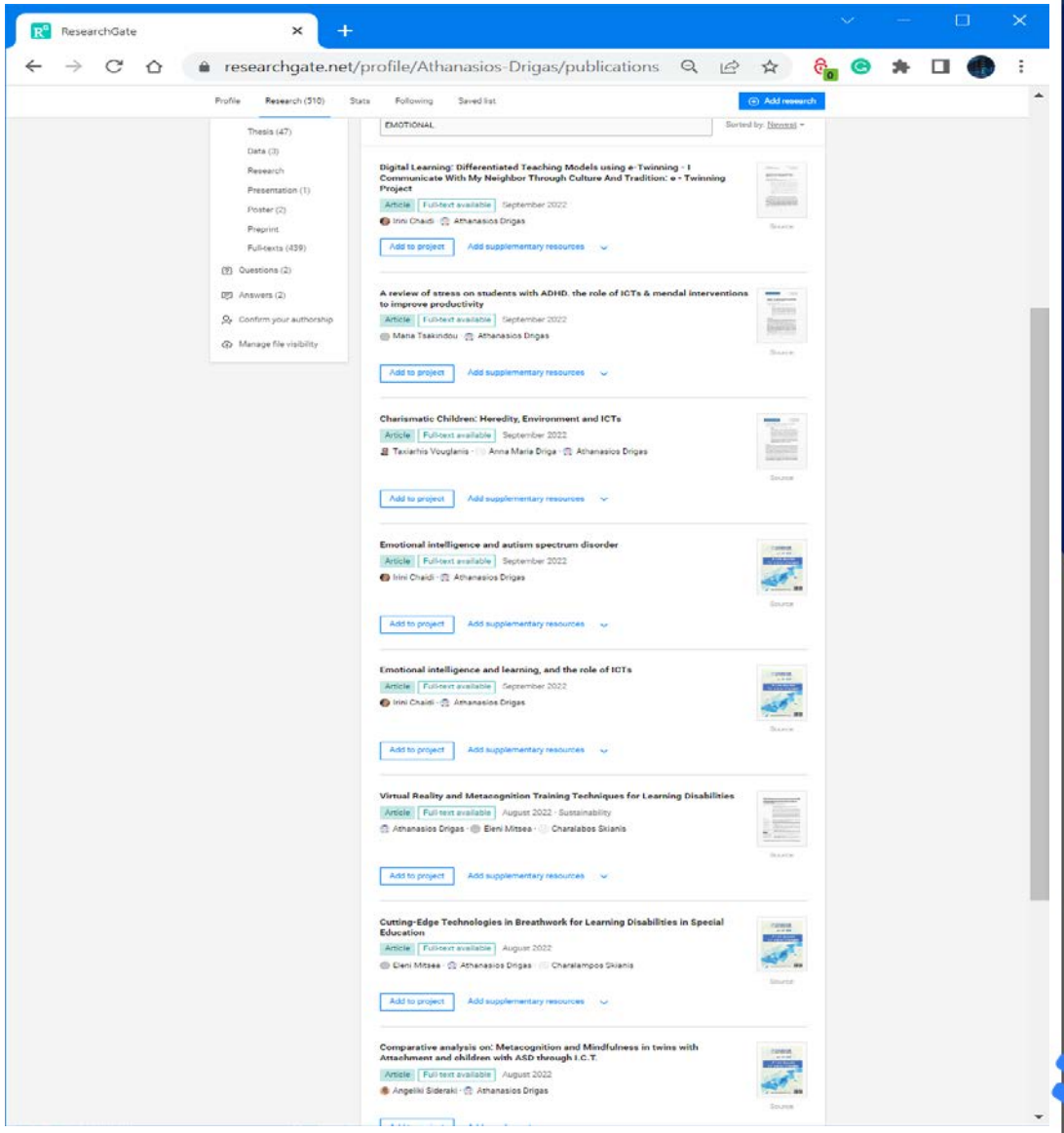

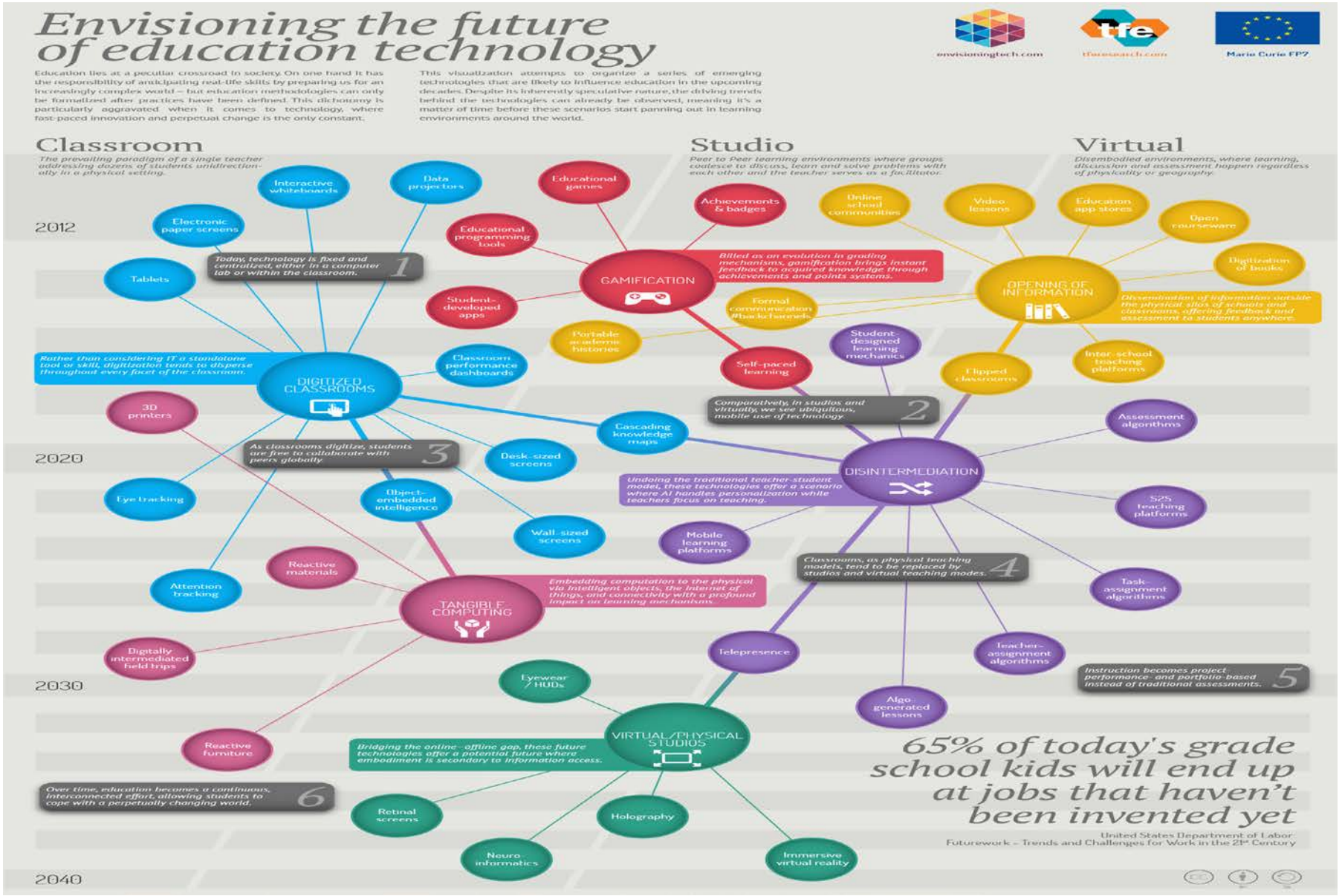
Envisioning the future of education technology
Education lies at a peculiar crossroad in society. On one hand it has the responsibility of anticipating real-life skills by preparing us for an increasingly complex world – but education methodologies can only be formalized after practices have been defined. This dichotomy is particularly aggravated when it comes to technology, where fast-paced innovation and perpetual change is the only constant.
This visualization attempts to organize a series of emerging technologies that are likely to influence education in the upcoming decades. Despite its inherently speculative nature, the driving trends behind the technologies can already be observed, meaning it's a matter of time before these scenarios start panning out in learning environments around the world.
envisioningtech.com
tfaresearch.com
Marie Curie FP7
Classroom
The prevailing paradigm of a single teacher addressing dozens of students unidirectionally in a physical setting.
Studio
Peer to Peer learning environments where groups coalesce to discuss, learn and solve problems with each other and the teacher serves as a facilitator.
Virtual
Disembodied environments, where learning, discussion and assessment happen regardless of physicality or geography.
2012
2020
2030
2040
Interactive whiteboards
Data projectors
Electronic paper screens
Tablets
Today, technology is fixed and centralized, either in a computer lab or within the classroom. 1
Educational games
Educational programming tools
Student-developed apps
GAMIFICATION
Billed as an evolution in grading mechanisms, gamification brings instant feedback to acquired knowledge through achievements and points systems.
Achievements & badges
Online school communities
Video lessons
Education app stores
Open courseware
Digitization of books
OPENING OF INFORMATION
Dissemination of information outside the physical silos of schools and classrooms, offering feedback and assessment to students anywhere.
Formal communication channels
Portable academic histories
Student-designed learning mechanics
Self-paced learning
Flipped classrooms
Inter-school teaching platforms
Rather than considering IT a standalone tool or skill, digitization tends to disperse throughout every facet of the classroom.
DIGITIZED CLASSROOMS
Classroom performance dashboards
3D printers
Cascading knowledge maps
Comparatively, in studios and virtually, we see ubiquitous, mobile use of technology. 2
Assessment algorithms
As classrooms digitize, students are free to collaborate with peers globally. 3
Desk-sized screens
DISINTERMEDIATION
Undoing the traditional teacher-student model, these technologies offer a scenario where AI handles personalization while teachers focus on teaching.
Eye tracking
Object-embedded intelligence
Wall-sized screens
Mobile learning platforms
S2S teaching platforms
Reactive materials
Classrooms, as physical teaching models, tend to be replaced by studios and virtual teaching modes. 4
Attention tracking
TANGIBLE COMPUTING
Embedding computation to the physical via intelligent objects, the Internet of things, and connectivity with a profound impact on learning mechanisms.
Task-assignment algorithms
Digitally intermediated field trips
Telepresence
Teacher-assignment algorithms
Instruction becomes project, performance- and portfolio-based instead of traditional assessments. 5
Eyewear / HUDs
Algo-generated lessons
Reactive furniture
VIRTUAL/PHYSICAL STUDIOS
Bridging the online–offline gap, these future technologies offer a potential future where embodiment is secondary to information access.
Over time, education becomes a continuous, interconnected effort, allowing students to cope with a perpetually changing world. 6
Retinal screens
Holography
Neuro-informatics
Immersive virtual reality
65% of today's grade school kids will end up at jobs that haven't been invented yet
United States Department of Labor
Futurework – Trends and Challenges for Work in the 21st Century

http://imm.iit.demokritos.gr/wp-content/uploads/2022/02/Distinctions_2005-2022.pdf

- ✓ Classrooms in 2051 | SpringerLink https://link.springer.com/chapter/10.1007/978-3-030-77610-7_4
- ✓ SCHOOLS OF THE FUTURE | https://rcepunesco.ae/ar/KnowledgeCorner/WorkingPapers/WorkingPapers/Schools%20of%20the%20Future_%20Sample%202.pdf
- ✓ Innovative Learning Environments (ILE) | https://www.oecd.org/education/ceri/DEU.THU.003.%20Finalwihcover.pdf
- ✓ The case for 21st-century learning | https://www.oecd.org/general/thecasefor21st-centurylearning.htm
- ✓ OECD Learning Framework 2030 | https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf
- ✓ Future of Education and Skills 2030 | https://www.oecd.org/education/2030-project/
- ✓ Schools of the Future: Defining New Models of Education for the Fourth Industrial Revolution | https://www.weforum.org/reports/schools-of-the-future-defining-new-models-of-education-for-the-fourth-industrial-revolution/
- ✓ How can we prepare students for the Fourth Industrial Revolution? 5 lessons from innovative schools around the world | https://www.weforum.org/agenda/2020/02/schools-of-the-future-report-2020-education-changing-world/?DAG=3&gclid=CjwKCAjwqJSaBhBUEiwAg5W9p9oCbL_Bo15PM-TOWuvmajvaLP4aoV3jniG5U20SVRf46k7rEfvijBoCrgsQAvD_BwE

👍 Ευχαριστώ για την προσοχή σας

Any questions?

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