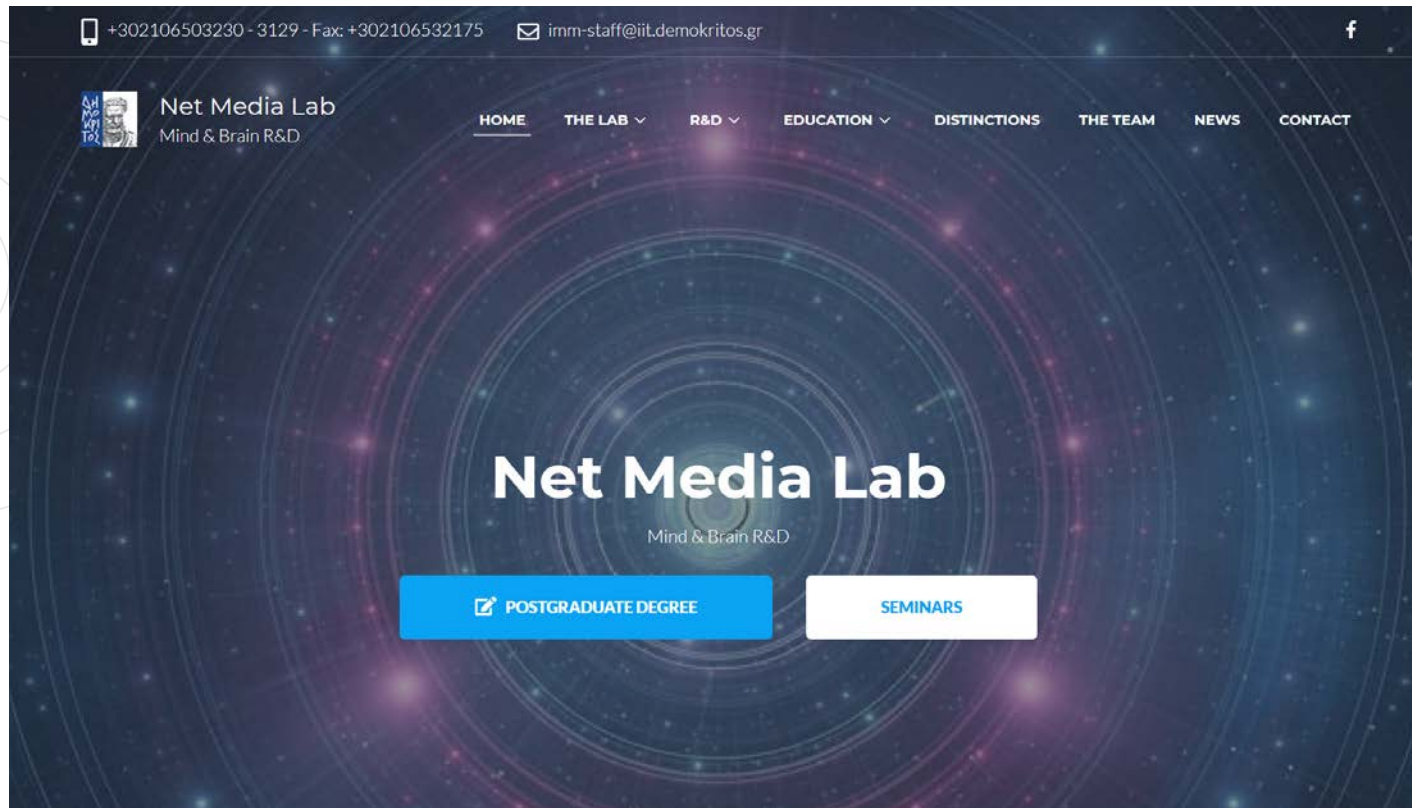


Διαδικτυακή Ημερίδα
“THE SCHOOL OF THE FUTURE”

Dr. Athanasios Drigas
RESEARCH DIRECTOR
Engineer & Psychologist
Net Media Lab - Mind & Brain R&D
I.I.T. -N C S R “Demokritos”

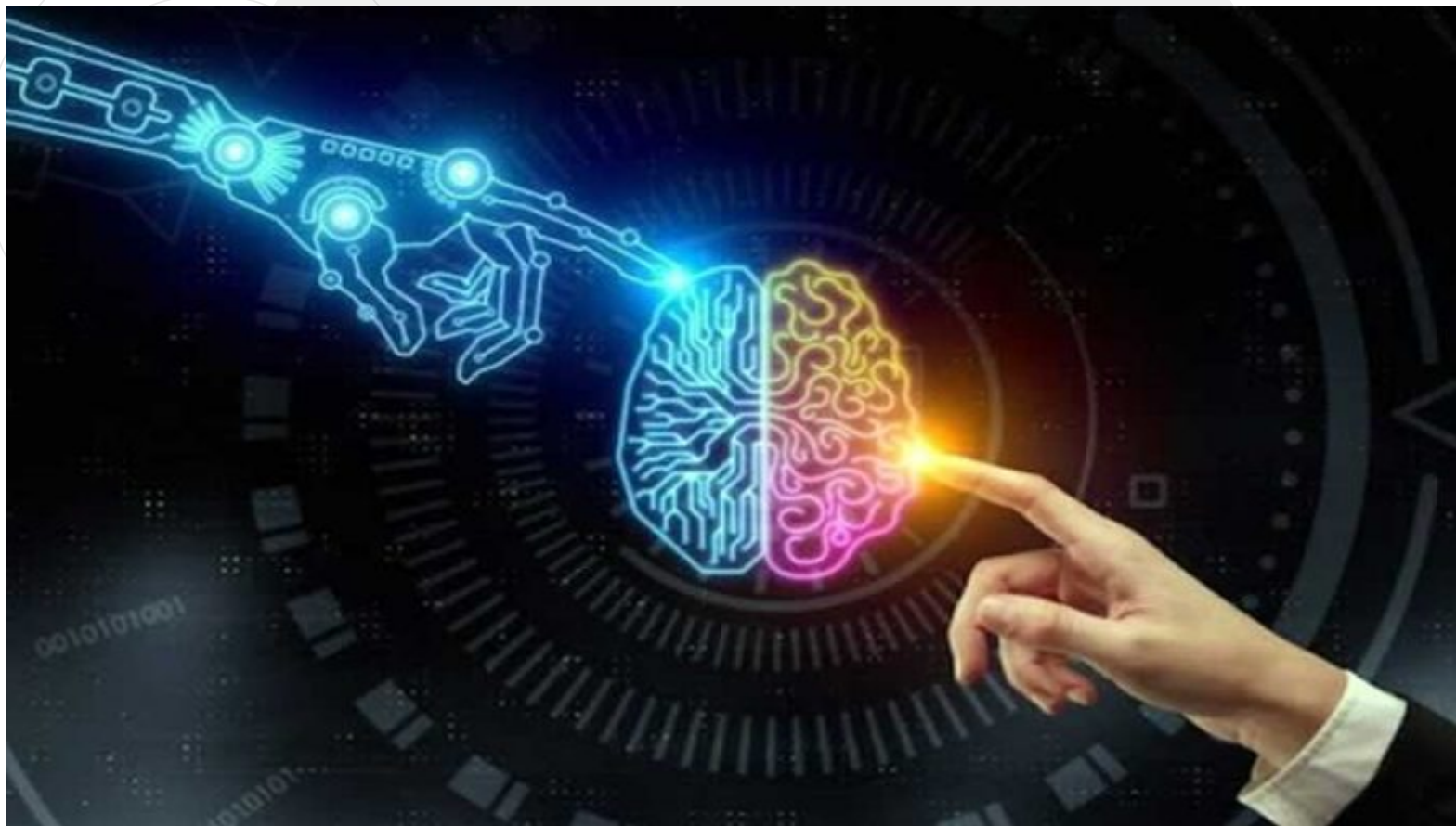
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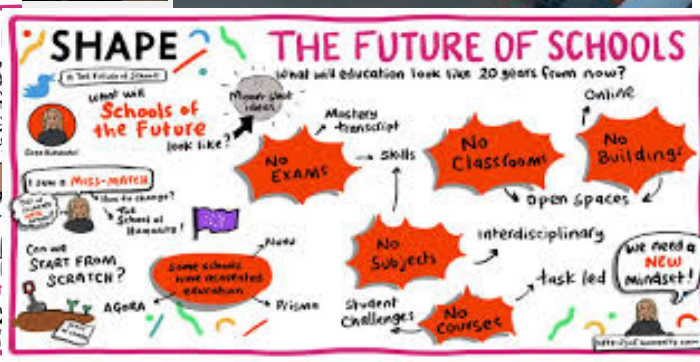
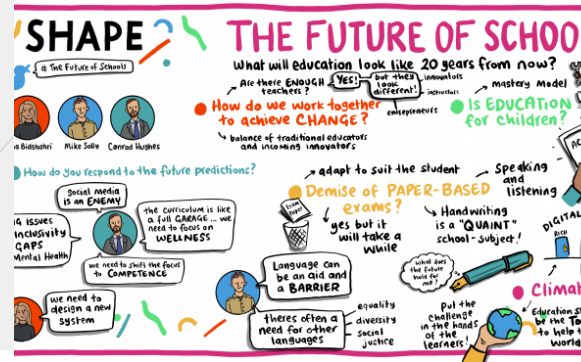
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- Net Media Lab, Mind & Brain, R&D (<http://imm.iit.demokritos.gr/>)

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



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'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.



Learn more at [CompTIA.org/EMTechCommunity](https://www.comptia.org/EMTechCommunity).

21st-century worker

Leadership

Take a cross-disciplinary approach to project teamwork. Participate in leading and following in order to prepare for your career.

Many businesses are adopting a participative management style, which involves employees in decision making.

George DeMetropolis
University of Phoenix faculty member
and leadership consultant

Collaboration

Choose courses that are collaborative and measure success by team results.

Adaptability

Take advantage of flexible course schedules and learning platforms in order to work, raise a family, volunteer and learn.

Innovation

Seek out learning environments that build technology and media fluency.

Global citizenship

Learn in a diverse classroom to gain opportunities to build cross-cultural understanding.

Critical thinking

Take coursework that offers an opportunity to engage in self-directed, project-based and applied learning.

Communication

Learn in an environment that requires participation in many modes of communication.

Students must hold themselves accountable and have the opportunity to hold others accountable for the good of the team.

Irene Blundell
University of Phoenix
faculty member

Productivity and accountability

Select a school that provides a code of conduct in learning situations to build accountability and productivity.

Accessing, analyzing and synthesizing information

Seek out a market-driven curriculum focused on real cross-functional issues to help you think about how issues interconnect.

Entrepreneurialism

Work on developing the ability to solve current and relevant issues in the safety of the classroom environment.





Claudine Habak, Mohamed L. Seghier, Mohamed A. Fahim, Scott
Parkman
Emirates College for Advanced Education

Schools of the Future_Sample 2

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Schools o... 29 / 51 | 80%

Leaders as community coordinators

Teachers as facilitators

Individualized customized learning experiences within communities

Customized Teacher development and training

Policy: flexibility system-wide stakeholder input

Community opportunities for sustainable flexibility

Parental involvement and parent training

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Schools of th... 8 / 51 | 80%

a sustainable society.

Education

Schools of the future

Lifelong Learning

Critical Evaluation

Societal Equity

Future Needs

Social-Emotional Skills

Technology Skills

Figure 1. 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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School
Community Hub
Holistic Transformation

Physical Destination
Facilities, Green Spaces, Research,
Community

Intellectual Environment
Curricula, Subjects, Flexibility, Open
Education Resources

Social-Emotional Wellbeing
Emotional Learning, Physical Activity,
Health Education

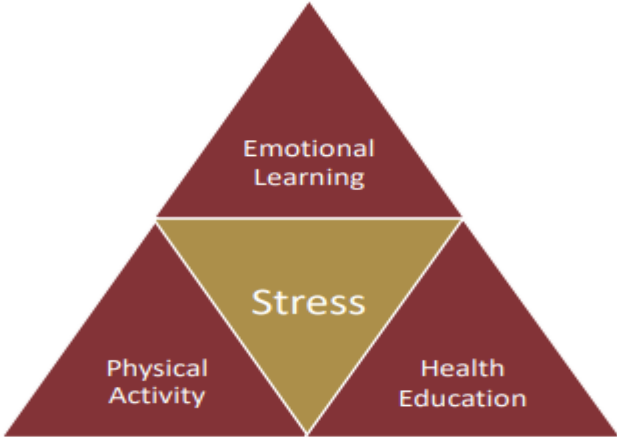
Figure 2. The school of the future as an integrated community hub. This involves transformation across three main areas: Physical, Intellectual, and Social-Emotional.

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Emotional Learning

Stress

Physical Activity

Health Education

Figure 5. Factors that can counter stress and support wellbeing. Youth and adults experience various sources of stress, but schools can integrate activities that not only

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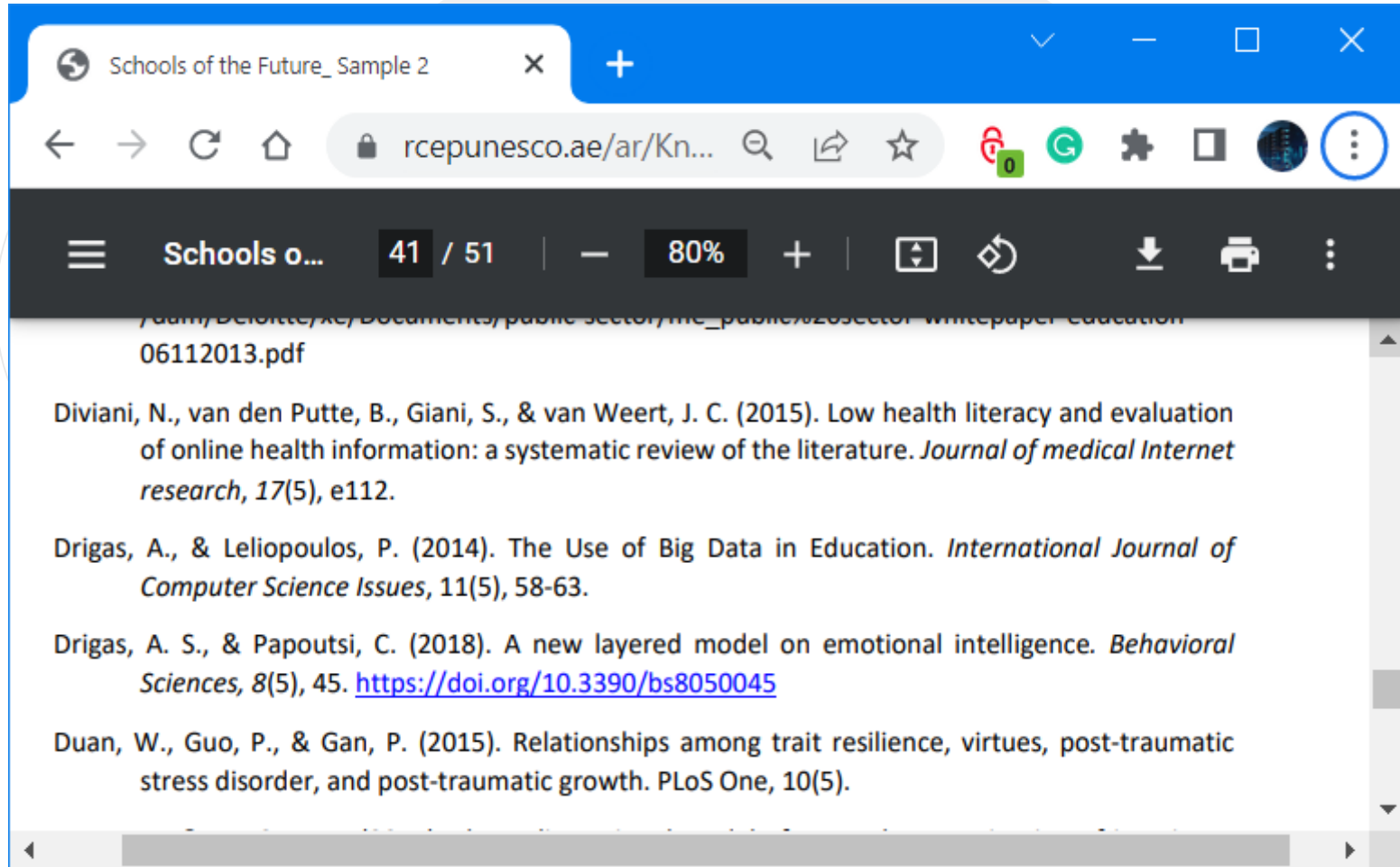
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ΟΙ ΤΕΧΝΟΛΟΓΙΕΣ ΤΟΥ ΜΕΛΛΟΝΤΟΣ ΜΕΣΑ ΣΤΟ ΣΧΟΛΕΙΟ

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

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



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



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



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



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



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

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

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

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



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



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.

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



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



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

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



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



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 the 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 products 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 flexible 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 Infinite 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 control in manufacturing can overlay information from head mounted displays (HMD) 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 specialists in the field through hands-free MR devices.



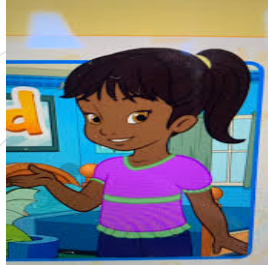
MR is changing how people work, learn and live, and it has the potential to expand further to improve and enhance enterprise and organisations.



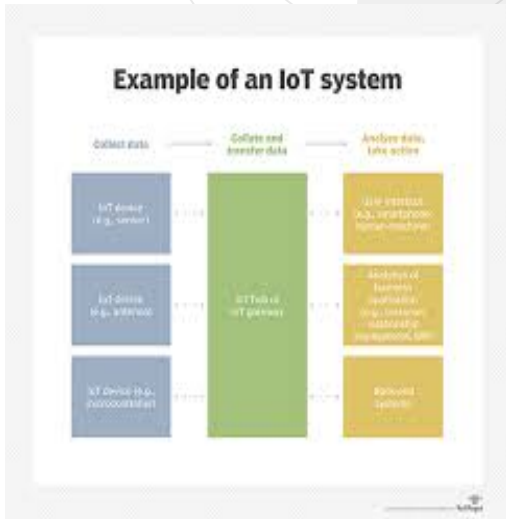
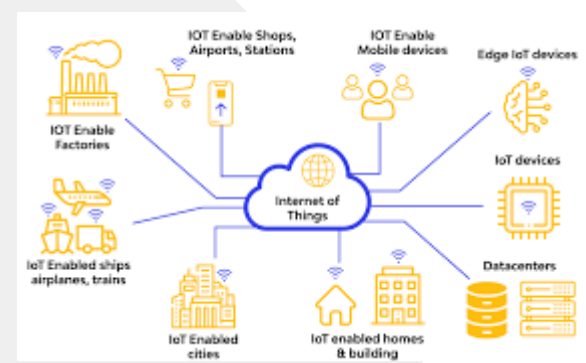
Mixed Reality opens up new opportunities for collaboration by bringing together multiple MR devices in shared spaces. Here, teams can network in a virtual world overlaid onto the physical environment.



ROBOTS AND AVATARS IN SCHOOL



INTERNET OF THINGS – 'ΟΛΑ ΔΙΑΔΙΚΤΥΩΜΕΝΑ



IOT ANALYTICS Your Global IoT Market Research Partner

10 IoT technology trends to watch in 2022

- 1 IoT is developing into a crucial technology for sustainability
- 2 The platform hype is moving from cloud to the edge
- 3 IIoT initiatives are transforming manufacturing
- 4 Cloud-Native applications are on the rise
- 5 Hyperautomation is transforming operations
- 6 AI is increasingly found at the (Thin) Edge
- 7 "Invisible AI" adoption is happening right under our noses
- 8 Immersive realities (VR/AR) are entering the enterprise environment
- 9 5G is becoming "IoT ready"
- 10 Secure remote access of assets is growing in importance

Source: IOT Analytics Report Q2, 2022. For more information on these trends visit www.iot-analytics.com



Schools of the Future_Sample 2

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Schools o... 25 / 51 | 80%

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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

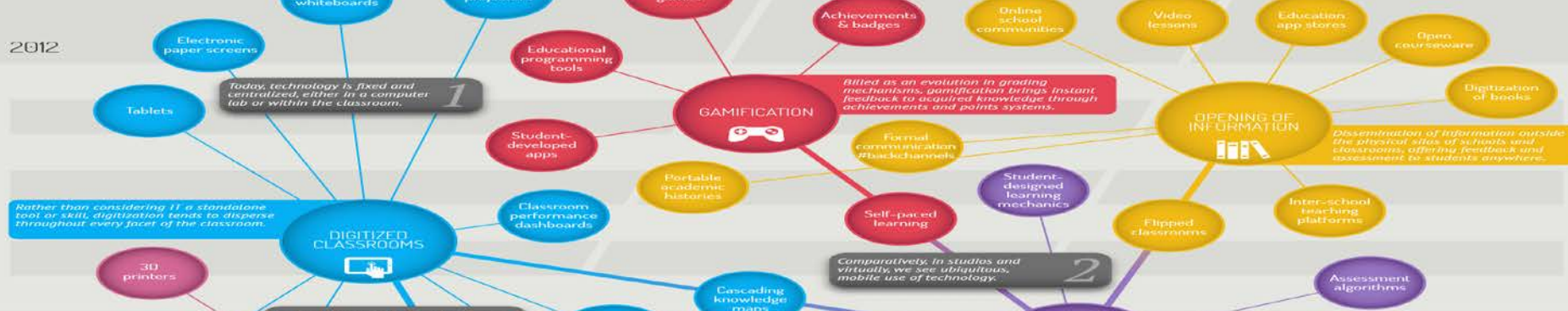
teachthought
WE GROW TEACHERS

Educational platforms based on Artificial Intelligence technology

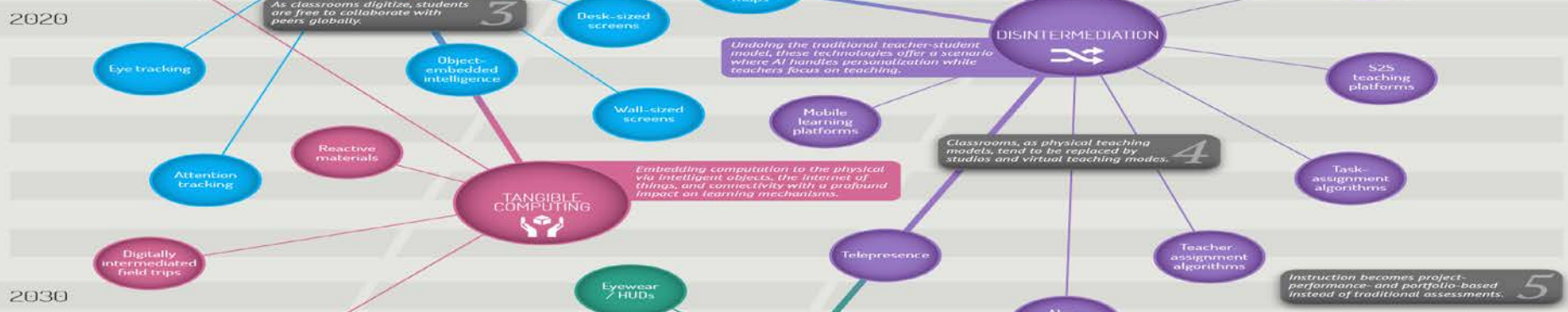
- ◆ Third Space Learning
- ◆ Little Dragon
- ◆ Brainy
- ◆ CTI
- ◆ Carnegie Learning
- ◆ ThinkerMath



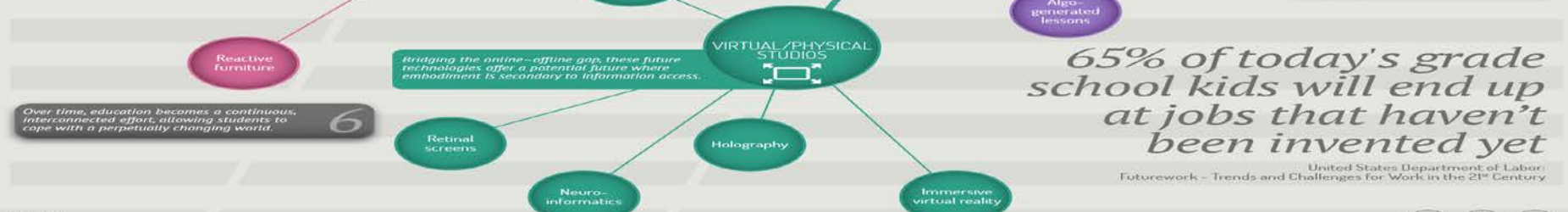
2012



2020



2030



2040

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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Angeliki Sideraki Ethalia Maradou Dina-Papageorgiou L.I Athanasios Drigas

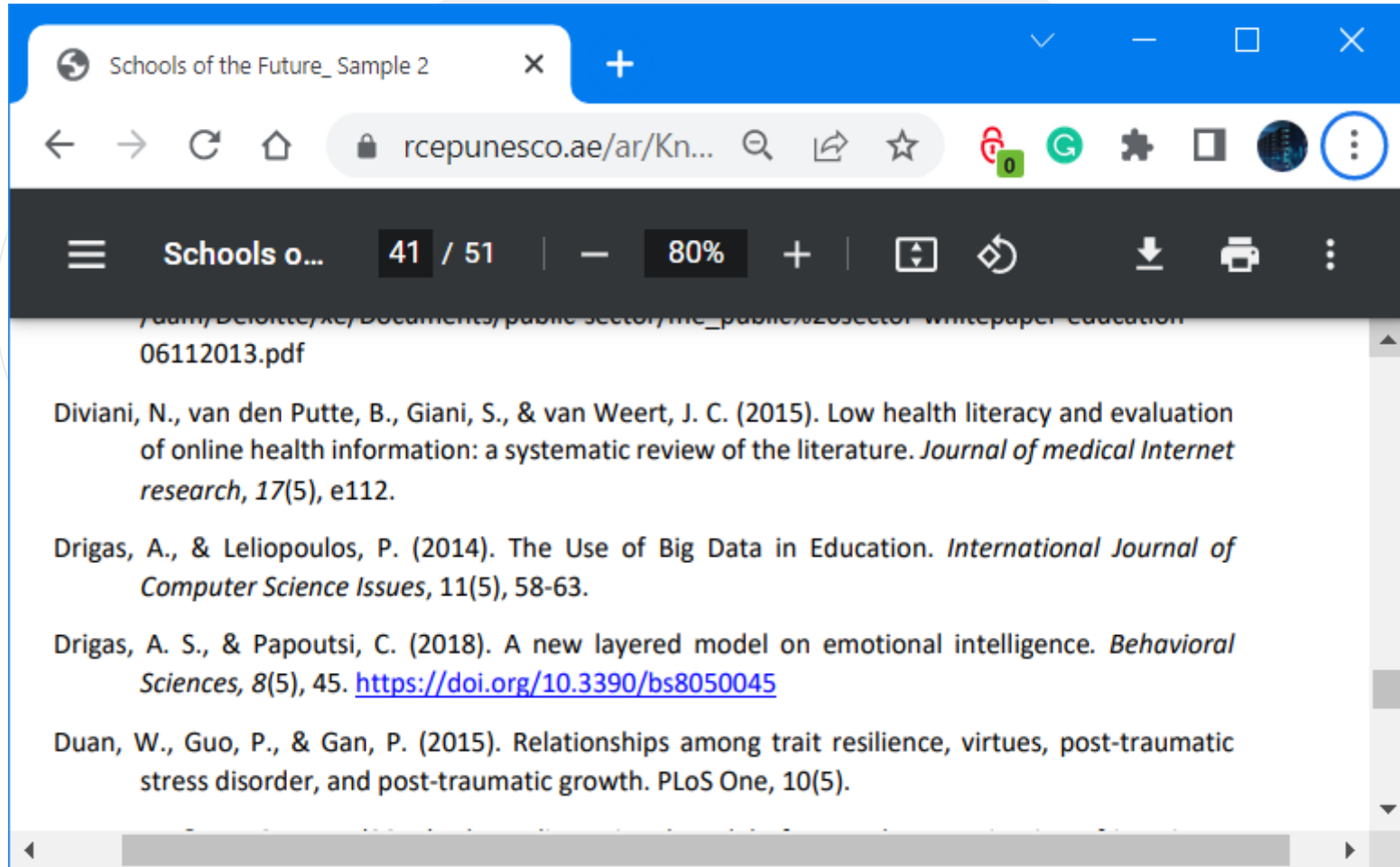
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Emotional Intelligence in Autism
[Article](#) | [Full-text available](#) | December 2021
Athanasios Drigas Angeliki Sideraki

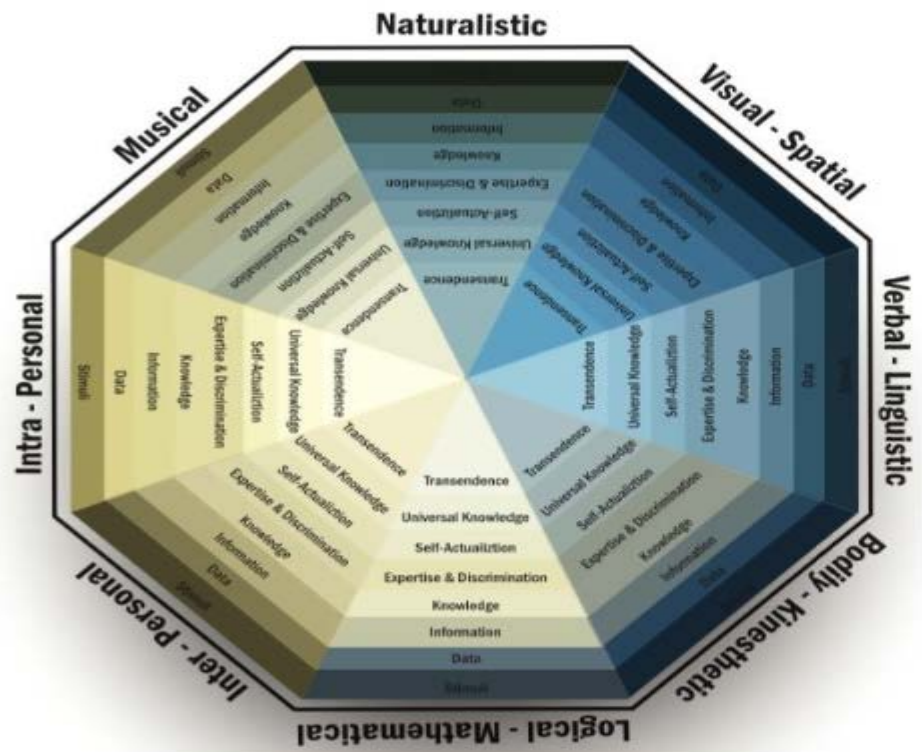
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3. The Pyramid of Emotional Intelligence: The Nine-Layer Model

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 [92,93].

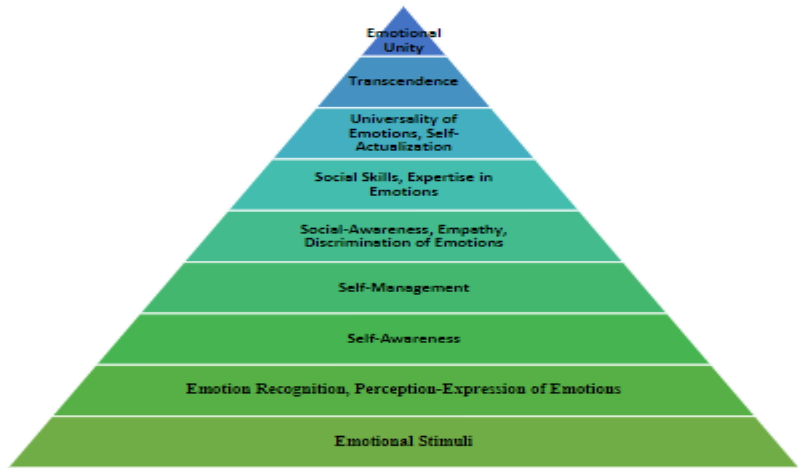


Figure 1. The emotional intelligence pyramid (9-layer model).

ResearchGate browser interface showing the article "Success: A 9 Layered-based Model of Giftedness".

Article Title: **Success: A 9 Layered-based Model of Giftedness**
Type: Article | Date: Dec 2017
Action: [Upload figures](#) | Recommendations: 16

The diagram is a pyramid with 9 horizontal layers, each with a different color and text. From top to bottom, the layers are:

- Duty Consciousness (light blue)
- Self-Transcendence (medium blue)
- Universal Knowledge Creation (teal)
- Gift/Talent/Excellence (green)
- Self-Regulation (light green)
- Intrapersonal Skills (yellow-green)
- Critical Creative Thinking (yellow)
- Higher Cognitive Skills (orange-yellow)
- Natural Abilities (orange)

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ResearchGate article page for "8 Pillars X 8 Layers Model of Metacognition Educational Strategies, Exercises & Trainings".

Article | Full-text available

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

August 2021 · *International Journal of Online and Biomedical Engineering (iJOE)*
 17(8):115-134 · [Follow journal](#)
 DOI: [10.3991/ijoe.v17i08.23563](https://doi.org/10.3991/ijoe.v17i08.23563)

Projects: [Intelligence](#), [Emotional Intelligence](#), [Consciousness](#), [Metacognition](#), [Giftedness](#), [Theories](#), [Models](#), [Technologies](#), [ICTS](#) and other interventions diet, vitamins etc for Special education, Autism, ADHD, Dyslexia · [STEM ROBOTICS AI MOBILES GAMES BCI & VR TO IMPROVE LEARNING ABILITIES](#)

Athanasios Drigas · Eleni Mitsea

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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 metacognition 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.

FIGURE 1 (Left): Stacked bar chart showing components of metacognition across five levels: Attention, Adaptation, Recognition, Discrimination, and Integration. The components are: Metacognitive Knowledge, Metacognitive Experiences, Metacognitive Tasks or Goals, Metacognitive Strategies, and Metacognitive Knowledge.

FIGURE 2 (Right): Diagram titled "8 PILLARS" listing various cognitive and metacognitive processes:

- TRANS
- LING
- SPEE
- EXPR
- RNC
- INFO
- DAT
- STIM

Other terms listed include: MNEMONIC, DISCRIMINATION, RECOGNITION, ADAPTATION, SELF-REGULATION, SELF-OBSERVATION, APPLYING THEORY, LEARNING THEORY.

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

<https://doi.org/10.3991/ijes.v9i2.22497>

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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

1 Introduction

The problem of the nature and provenance of human knowledge is rather one of the fundamental problems of humanity. Perhaps it is one of those cardinal problems of



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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).


Design/methodology/approach – SGs indicate positive effects on students with special educational needs and promote a multi-sensory style of learning.

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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.

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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.

ResearchGate browser interface showing a literature review article titled "Brain computer interface based applications for training and rehabilitation of students with neurodevelopmental disorders. A literature review" by George Papanastasiou, Athanasios Drigas, Charalabos Skianis, and Miltiadis Lytras. The article is published in Heliyon 6 (2020) e04250. The page includes navigation tabs (Overview, Stats, Comments, Citations: 35 New), a Share button, and a More dropdown menu. The article title is prominently displayed, along with the authors' names and their affiliations. A 'Check for updates' icon is visible next to the title. The abstract section is partially visible, starting with 'The aim of this article is to explore a paradigm shift on Brain Computer Interface (BCI) research...'. The page also features logos for CellPress and Heliyon, and a ScienceDirect link for content lists.

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Envisioning the future of education technology

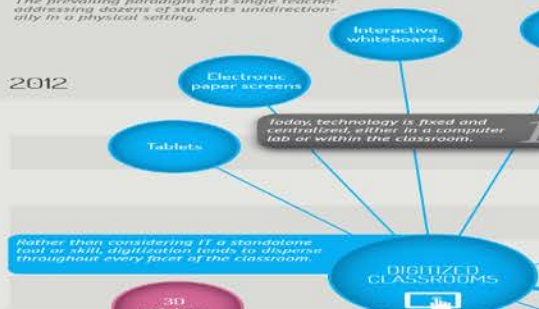
Education lies at a peculiar crossroad in society. On one hand it has the responsibility of anticipating real-life skills by preparing us for an increasingly complex world – but education methodologies can only be formalized after practices have been defined. This dichotomy is particularly aggravated 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.

Classroom

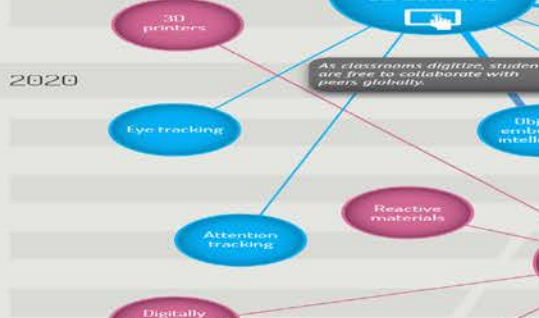
The prevailing paradigm of a single teacher addressing dozens of students unidirectionally in a physical setting.

2012



Rather than considering IT a standalone tool or skill, digitization tends to disperse throughout every facet of the classroom.

2020



2030



Over time, education becomes a continuous, interconnected effort, allowing students to cope with a perpetually changing world.

2040



Studio

Peer-to-peer learning environments where groups congregate to discuss, learn and solve problems with each other and the teacher serves as a facilitator.

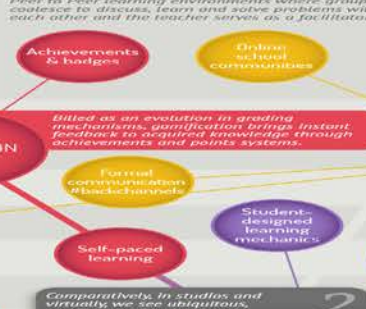
Billed as an evolution in grading mechanisms, gamification brings instant feedback to acquired knowledge through achievements and points systems.

Comparatively, in studios, and virtually we see ubiquitous, mobile use of technology.

Undoing the traditional teacher-student model, these technologies offer a scenario where AI handles personalization while teachers focus on teaching.

Classrooms, as physical teaching models, tend to be replaced by studios and virtual teaching modes.

Instruction becomes project, performance- and portfolio-based instead of traditional assessments.



Virtual

Disembodied environments, where learning, discussion and assessment happen regardless of physicality or geography.

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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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](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/>

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<https://www.weforum.org/reports/schools-of-the-future-defining-new-models-of-education-for-the-fourth-industrial-revolution/>

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Ευχαριστώ για την προσοχή σας

Any questions?

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