



MAFEA



Making Future Education Accessible

February 21, 2024 • 14:00



Emmaüs secundaire school
Sint-Gerolflaan 20 | 9880 Aalter



Event tailored for Europeans with a pedagogical background, providing an immersive experience to explore the future of education and new technologies that will be used.

(free entry on registration)



Register here
[Form to register](#)



Eugène Kuipers
CEO Fectar.com



Kris Vande Moortel
Education advisor
Microsoft Belgium



Carl Boel
CPO Dexr,
Senior Researcher XR



Joachim De Vos
CEO Living Tomorrow
Founder
TomorrowLab



Jeroen Baert
Nerdland comedian
AI & Metaverses

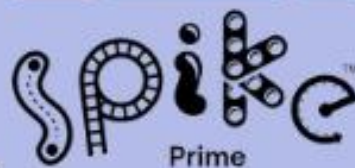
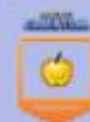
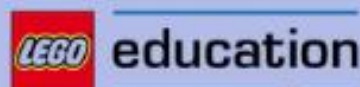
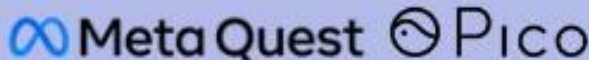


MaFEA - 11.00 - 14.00 - Workshops

Best practices will be demonstrated and discussed by **experienced teachers & experts** out of several (Flemish) schools.



Emmaüs Aalter
secundaire school OP WEG





MAFEA



Making Future Education Accessible

February 21, 2024 • 14:00

Event tailored for Europeans with a pedagogical background, providing an immersive experience to explore the future of education and new technologies that will be used.

Emmaüs secundaire school
Sint-Gerolfaan 20 | 9880 Aalter



Keynotes

14.00 - Welcome by Birger Quintyn

14.10 - MaFEA.eu

*The source of tutorials and lesson plans
to Make Future Education Accessible*

14.30 - Eugène Kuipers

Fectar and insights on future virtual learning

15.00 - Kris Van de Moortel

Microsoft, Ai, Copilot, HoloLens, MS tools for EDU

15.30 - Carl Boel

XR and future education.

Dexr as a dedicated XR-tool for EDU

16.00 - Coffee break

16.45 - Joachim De Vos

*Why Innovation Fails & 7 keys to success,
insight for education*

17.15 - Jeroen Baert

Critical thinking on Artificial Intelligence



Eugène Kuipers



Kris Van de Moortel



Carl Boel



Joachim De Vos



Jeroen Baert

MAFEA



MAKING FUTURE EDUCATION ACCESSIBLE

Peter De Deyn



Overview

- about the MaFEA-project
- some background
- some Xistory
- hurdles
- studied tools
- the MaFEA-website
- proof of work!
- **advices**



MaFEA PROJECT PARTNERS



ERASMUS+



<https://mafea.eu/>



VOCO

Estonia
Tartu



OMNIA

Finland
Espoo



ECL

Portugal
Lisboa



ROC A12

Holland
Arnhem



EMMAUS

Belgium
Aalter

PROFILES WE FOCUSED ON WITHIN THE **MAFEA** PROJECT



ERASMUS+



<https://mafea.eu/>

Car Mechanics

Mechatronics

Electrics

Metal workers

Business & Retail

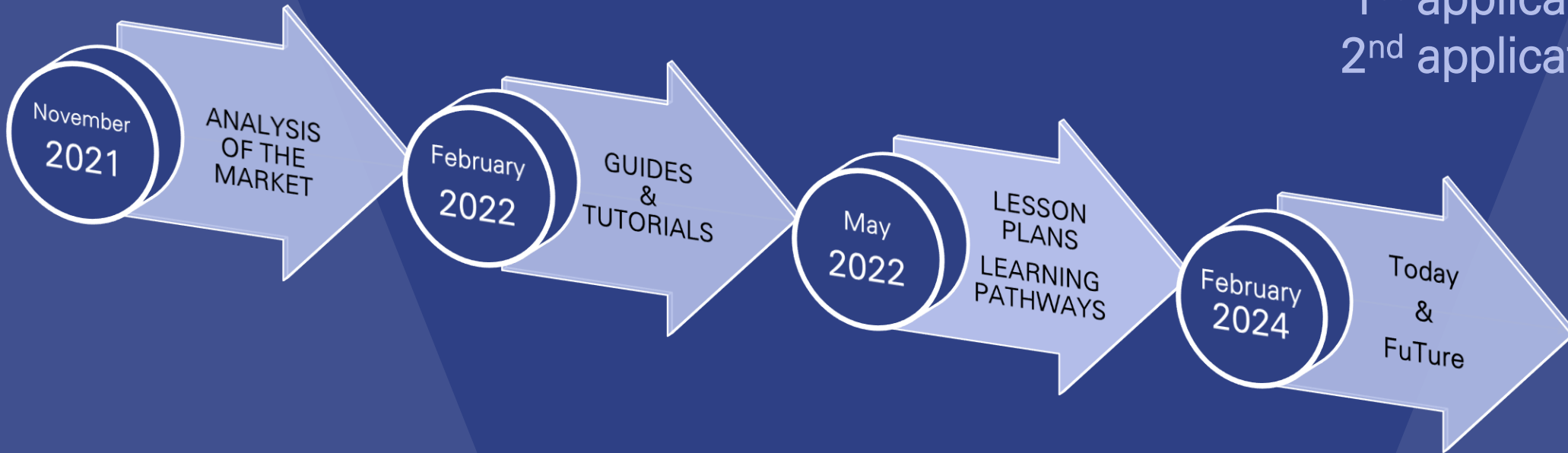
Health department

...



ERASMUS+

MaFEA PROJECT TIMELINE



idea → 2019
 1st application → 2020
 2nd application → 2021



<https://mafea.eu/>

FOR NEW EDUCATIONAL TECHNOLOGIES

WHAT IS INSTALLED AT THE END OF THIS PROJECT



ERASMUS+

<https://mafea.eu/>



The MaFEA partnership (2021-2024) answered for the **EU needs of modernisation and digitalisation in VET.**

- MaFEA encouraged teachers and students to test and implement future technologies in their lessons and workshops.
- MaFEA installed a public website with 3 combined and open repositories.
- MaFEA **ensured a network** between several VET institutions and relevant labour market.

THE MaFEA WEBSITE



ERASMUS+



<https://mafea.eu/>

The MaFEA website

offers pedagogical opportunities, showcasing examples and best practices for the application of new technologies in education.



MAFEA



Making Future Education Accessible



XR – AR – VR – MR

New technologies for education (2021)

Ai – IoT – Robotics

Holograms – ...

XR - AR - VR - MR

INNOVATION
SOLUTION
BRANDING
IDEAS
MARKETING
SUCCESS
MANAGEMENT
ANALYSIS

XR IS THE NEXT MOBILE COMPUTER PLATFORM

However, many technological
breakthroughs are still
required.



MAFEA



Making Future Education Accessible



Background



Glasses – Goggles – Headset – HMD – Head Mounted Device – Device
Sticks – Paddles – Controllers – ...

ROBOT

A robot is a programmable “machine” that sometimes processes information, sometimes performs physical tasks and sometimes those are combined.



VR - VIRTUAL REALITY

is a simulated experience that can be similar or completely different from the real world.

Often it is a new reality.



[VR - Wikipedia](#)



AR - AUGMENTED REALITY

Also defined as **added reality**,

seeing the 'real' world
with an extra layer of information
with true glasses.

No interaction between real world and digital layer.

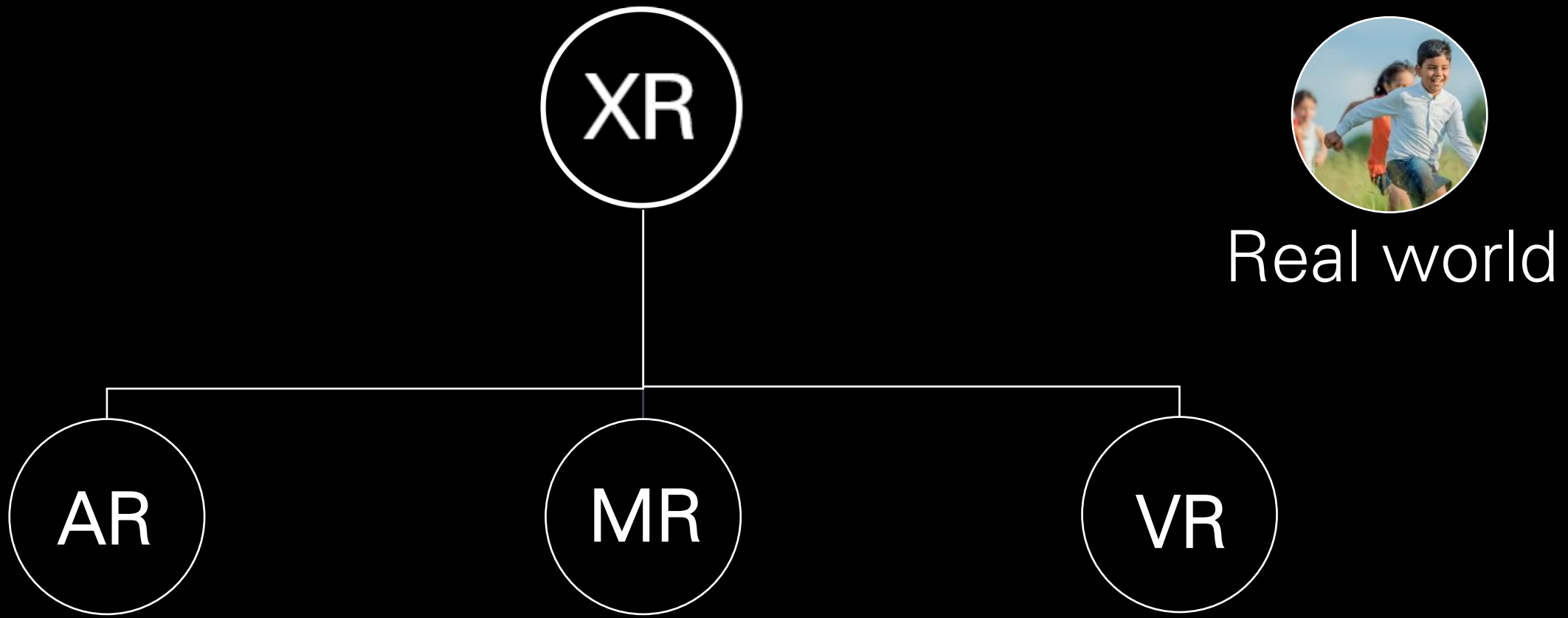
MR - MIXED REALITY

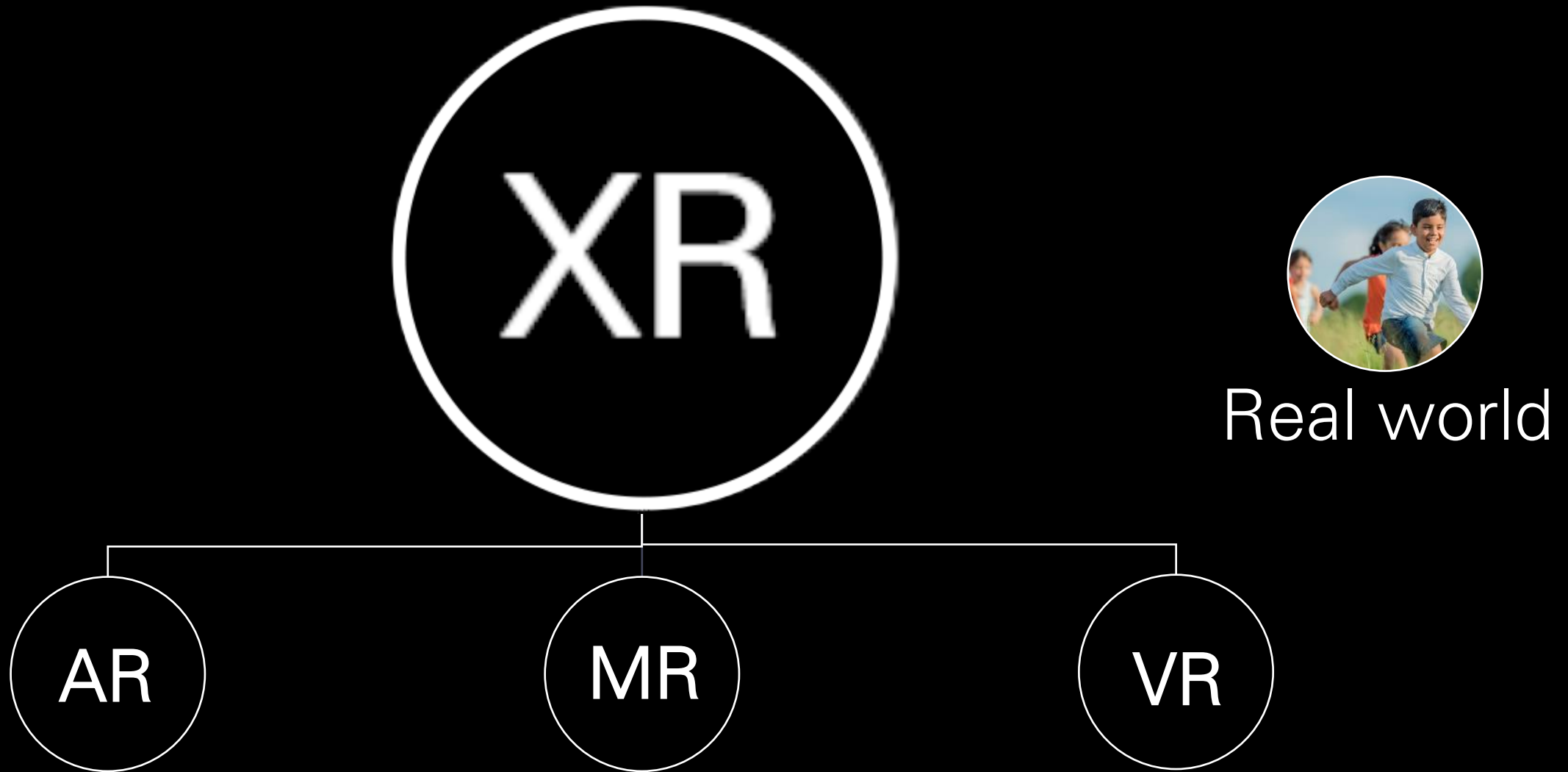
Mixed, as in a combination of AR and VR.

Again, you see the 'real' world enriched with digital information.

But now it can **interact** with that 'real' world.







AR - MR

VR

- devices are **see-through** glasses.



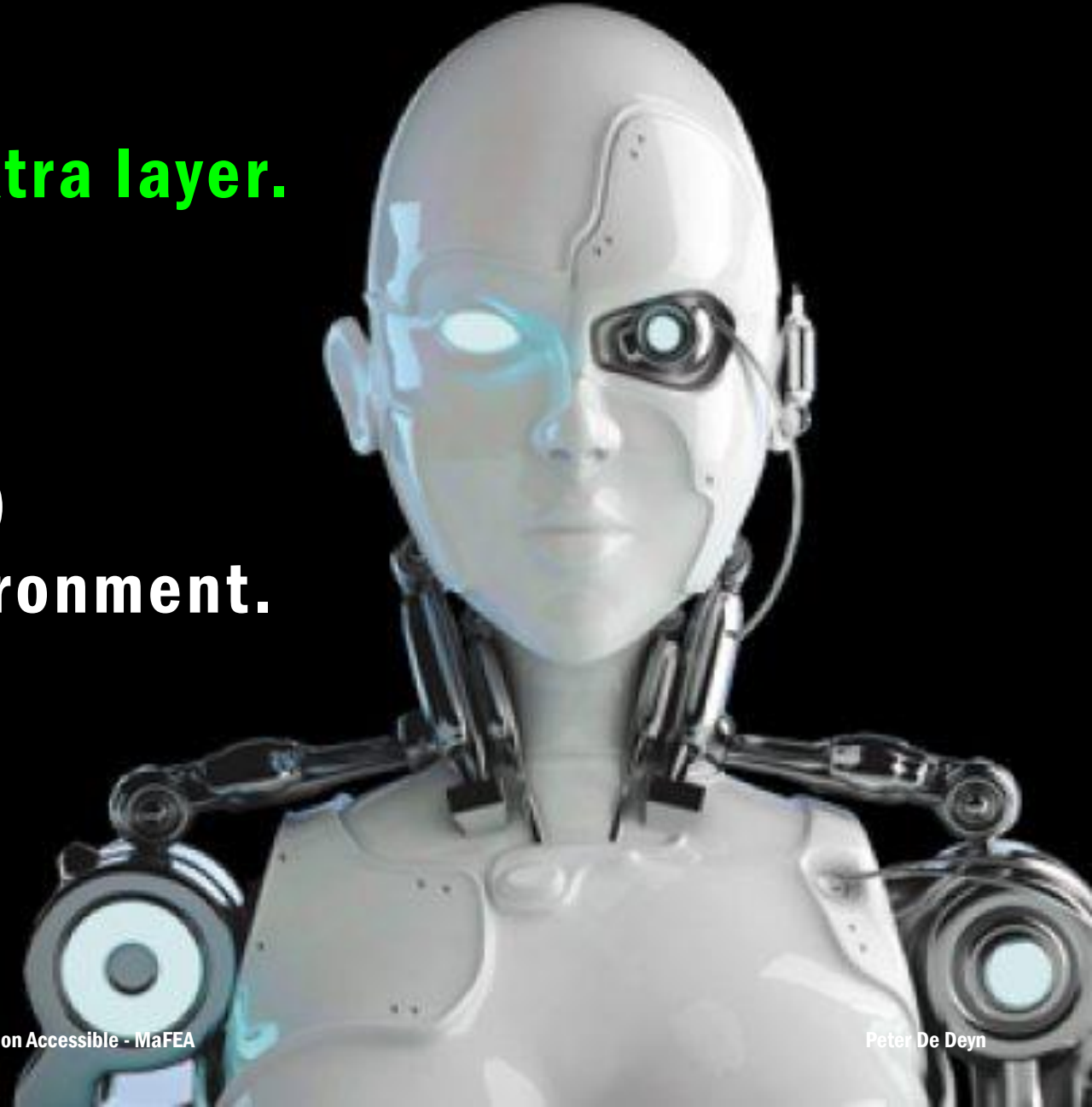
- devices are **covered** screens.

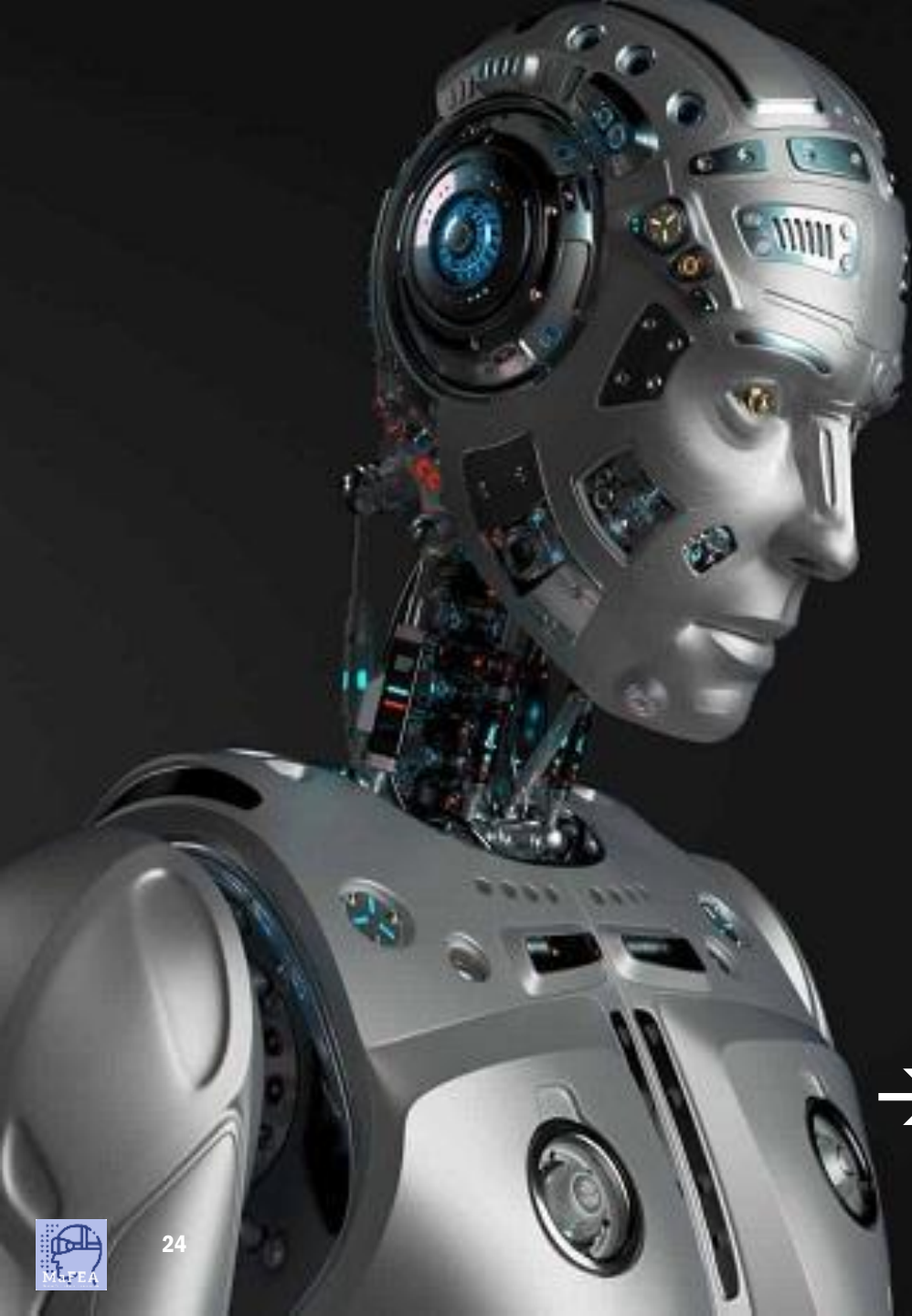
AR - MR

is providing information in an **extra layer.**

VR

is helping to build experience(s)
in a **NEW** safe and risk-free environment.





AR - MR

is often used
as an **on-the-job** training tool.
→ is teaching you **WHEN you need it**

VR

is frequently used
as a training tool **before** practice.
→ is teaching you a **METHOD for later use**



MAFEA

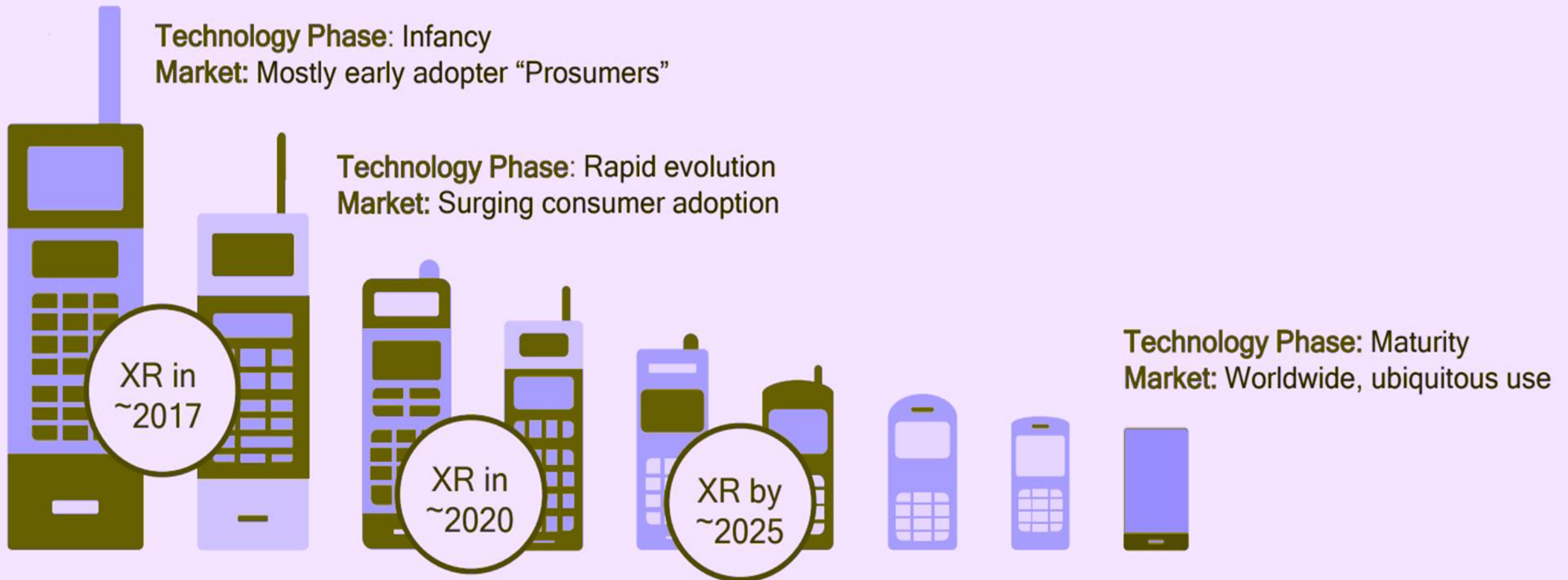


Making Future Education Accessible



Some Xstory

XR IS HERE TODAY, BUT IT IS STILL IN ITS INFANCY



62 YEARS AGO

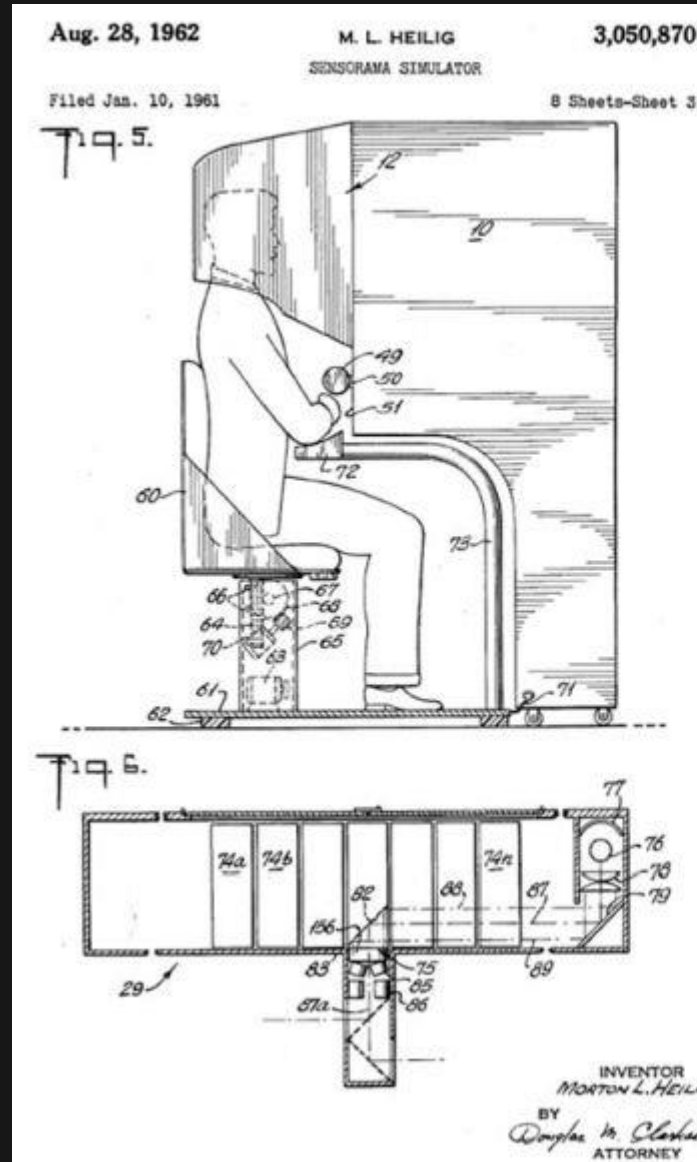
1962

(idea → 1955)

SENSORAMA

3D
Motion
Wide Vision
Aromas
Wind
Vibrations

...



Introducing . . .

sensorama

The Revolutionary Motion Picture System
that takes you into another world
with

- 3-D
- WIDE VISION
- MOTION
- COLOR
- STEREO-SOUND
- AROMAS
- WIND
- VIBRATIONS



SENSORAMA, INC., 855 GALLOWAY ST., PACIFIC PALISADES, CALIF. 90272
TEL. (213) 459-2162

14 YEARS AGO

2010-2011

MS HOLOLENS



11 YEARS AGO

2013

IKEA - CATALOGUE



8 YEARS AGO

2016

POKÉMON GO !



±2024

MOJO LENS AR

Smart contact lens startup Mojo Vision partners with Adidas and other sports brands.





MAFEA



Making Future Education Accessible



Hurdles



SIMULATOR SICKNESS

is a form of motion sickness linked to interaction with a simulated environment.

gaming is not education!

**to be blindfolded with glasses
→ Trust**

More hurdles

**technology
is not my cup of tea**

NEOPHOBIA

Neophobia is the fear of anything new.





MAFEA



Making Future Education Accessible



Some wisdom

ARISTOTLE (?)

Learning by listening,
Learning by seeing,
Learning by doing.

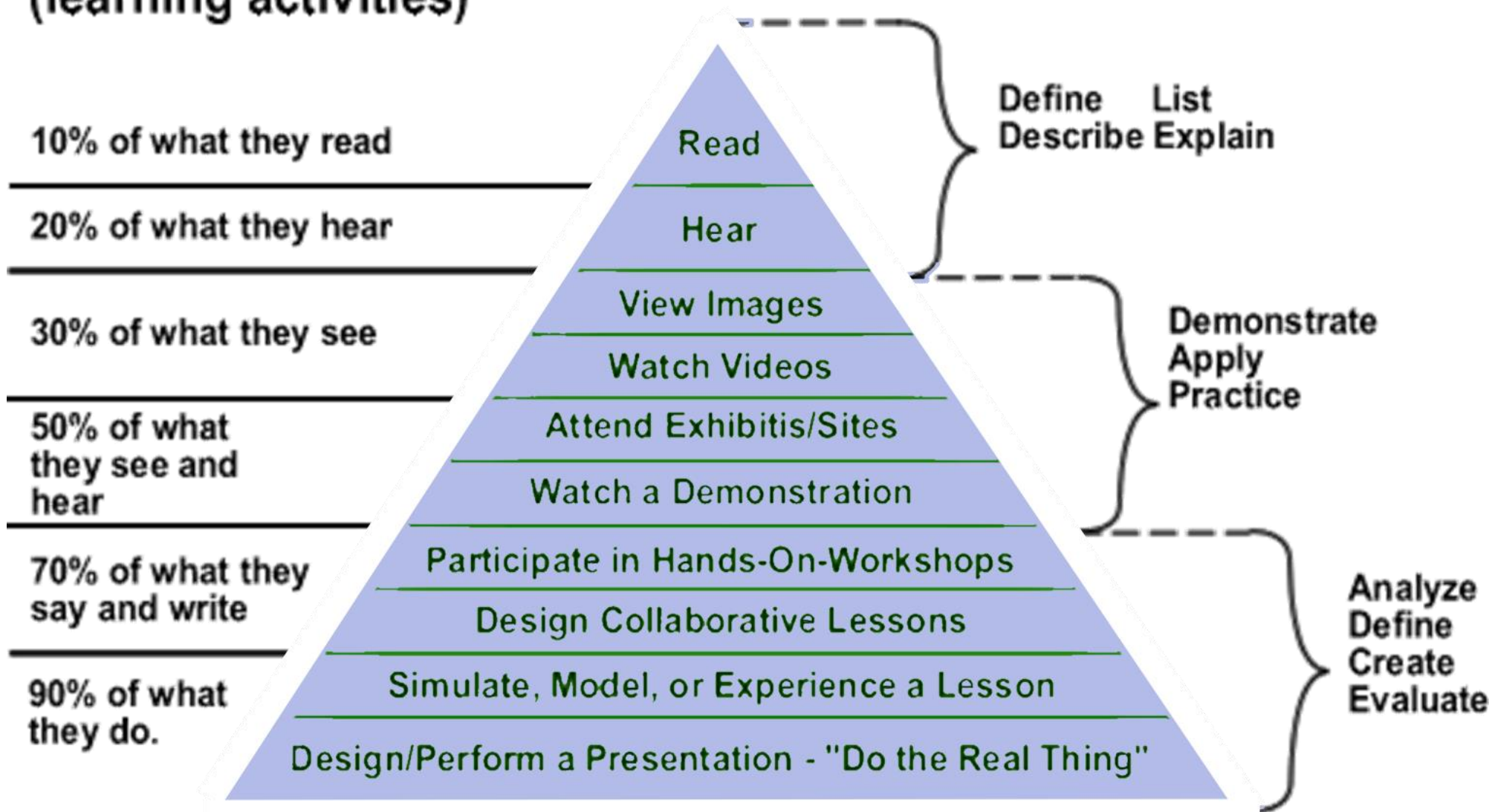


PEDRO DE BRUYCKERE (?)

Learning by listening,
Learning by seeing,
Learning by doing.

**People generally remember...
(learning activities)**

**People are able to...
(learning outcomes)**





MAFEA



Making Future Education Accessible



Selected Future TOOLS



MAFEA



Making Future Education Accessible



Criteria MaFEA used for selection

- ✓ usable for most teachers (≠ geeks)
- ✓ usable within different subjects
- ✓ giving extra pedagogical advantages
- ✓ GDPR compliant
- ✓ easy to buy
- ✓ popular, ensuring a large number of experiences
- ✓ affordable for schools
- ✓ remain usable despite aging rapidly
- ✓ USB-c is present is a bonus



MAFEA

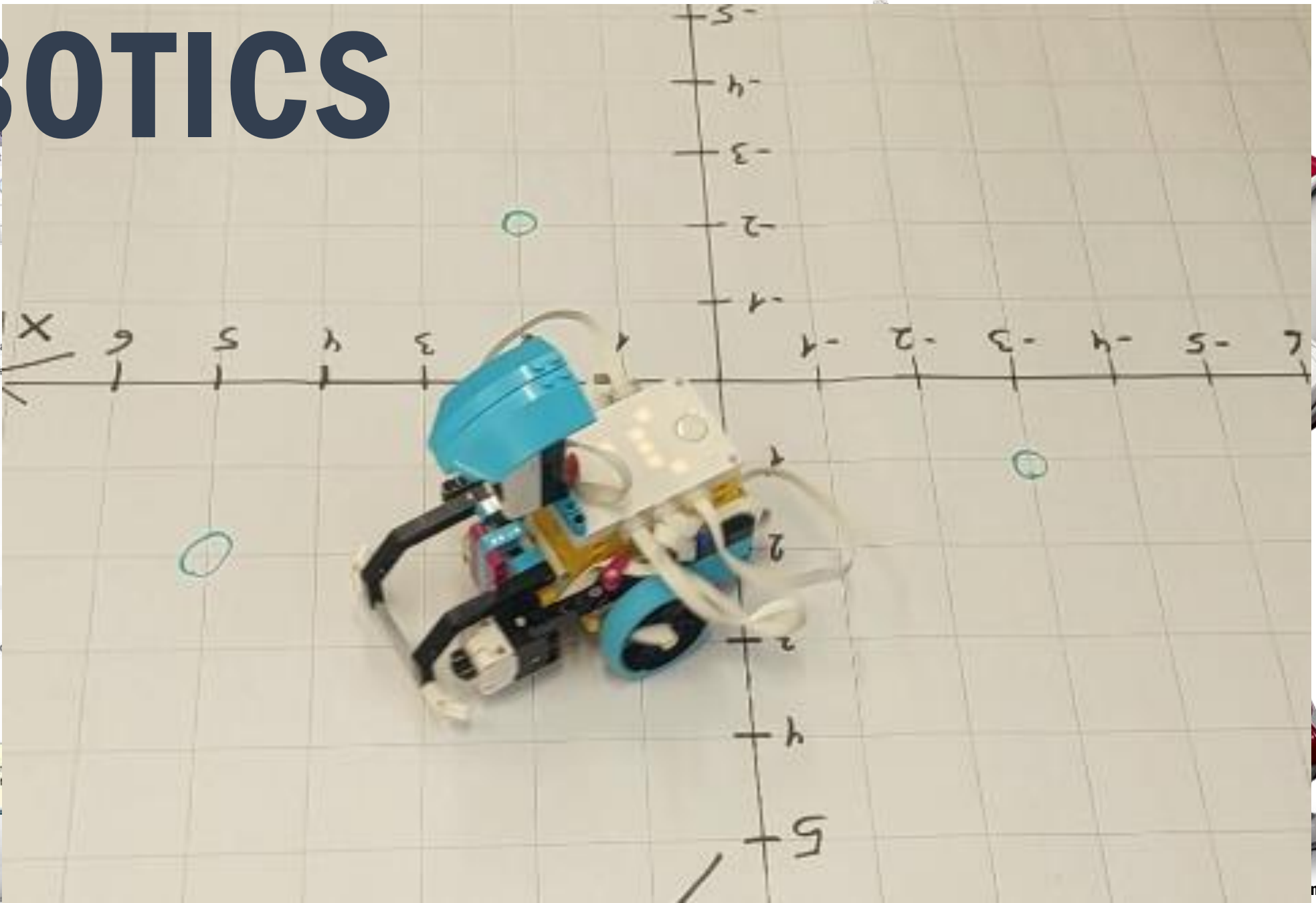
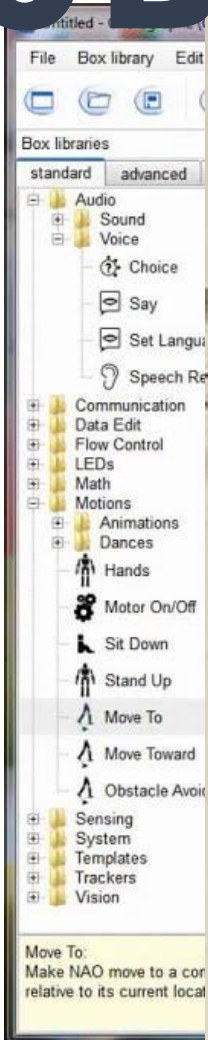


Making Future Education Accessible

ROBOTICS



ROBOTICS



ROBOTICS

±360€ INCL.

LEGO® Education SPIKE Prime™



Robotics - Lego Spike Prime box

was selected to investigate if robots are an extra value for education.

This Lego Spike Prime was the best and most affordable tool to learn about robots.

Learning goals that could be addressed

- learn to program
- learn to cooperate in teams
- engineering
- design thinking

Robotics - Lego Spike Prime box.

Conclusions on robotics for educational purpose (02/2024)

- ✓ Schools don't need a robot to play a quiz or to simulate emotions!
- ✓ WOW factor on schools open door?
- ✓ Humanized robots are expensive.
- ✓ Robots “to be constructed” (Lego) give more flexibility and activate more skills.
- ✓ Cheaper robots are “equally fine” to learn to program



MAFEA



Making Future Education Accessible

MR

MR-GLASSES

±4.200€ INCL.

MS HoloLens 2



MR - Microsoft Hololens 2

was selected as a reference to experiment with MR, with the intention of developing lesson plans enabling more immersive learning to interact with educational content.

Learning goals that could be addressed

- **interact** with and study virtual **3D-objects**
- exercise specific **handlings**
- **finding solutions** for specific problems
- learn to cooperate in **teams**
- **remote** collaboration with peers or teachers

MR - Microsoft HoloLens 2

Conclusions on MR for educational purpose (02/2024)

1. probably too expensive for schools
2. schools can build stepstones for their own machines or specific handlings
3. time consuming to build content
4. The HoloLens is part of the Microsoft tenant
5. Educational apps aren't widely available (yet)
6. No clear vision on a successor for HoloLens 2



MAFEA



Making Future Education Accessible

VR

VR-GLASSES

±400€ INCL.

Oculus Quest2,
META Quest2



VR-GLASSES

±740€ INCL.

Pico Neo 3



VR-GLASSES

± 1100€ INCL.

Pico 4 Enterprise



VR-GLASSES

META Quest Pro

±1800€ INCL.



META Quest2 - META Quest Pro - Pico Neo 3 - Pico 4 Enterprise

Conclusions on VR for educational purpose (02/2024)

1. Hardware is not the most determining factor,

compatible apps are!

2. Hardware is aging rapidly.

3. Business gear is too expensive.

Consumer versions are fine.

4. GDPR issues are (should be) solved?

5. Creating content is hard and time consuming.

META Quest2 - META Quest Pro - Pico Neo 3 - Pico 4 Enterprise

Advantages on VR for educational purpose (02/2024)

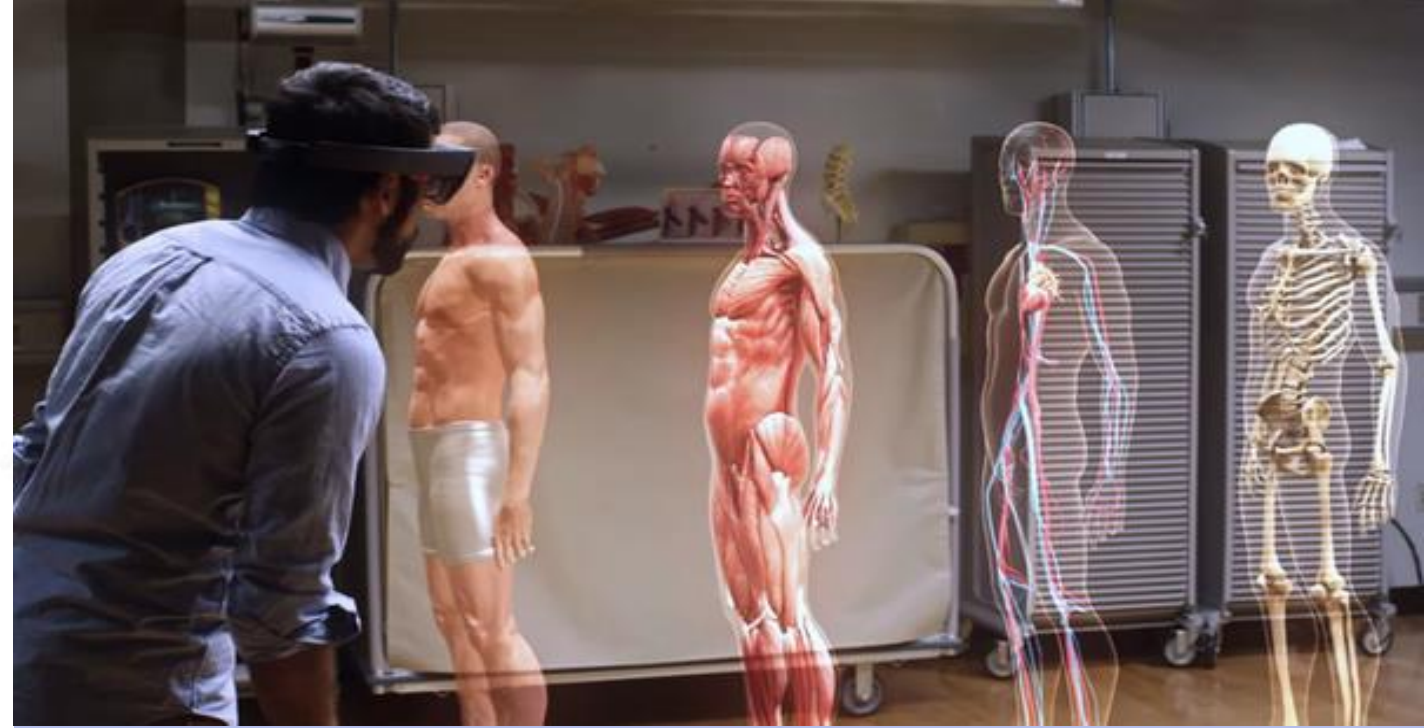
VR TRAINING

**LEARN
FOCUS
RETENTION** **4X FASTER
4X MORE
4X BIGGER**

Time to complete training



Source: PwC VR Soft Skills Training Efficacy Study, 2020



VR - LEARNING FEATURES

Visualise

- Show the inside with ease.
- Making abstract views visible.

Travel to

- Unreachable or far away places
- To the past

VR - LEARNING ADVANTAGES



Computer-aided

- instant feedback
- visual feedback
- haptic feedback
- virtual assistant
- data from/true learning analytics

Studying with XR-tools

- greater (study) **motivation**
- more **fun** during study
- greater learning **efficiency**
- greater learning **perfection**

Exhausting

- Training with face goggles makes you **focus at 110%**, which drains your energy level.

VR - LEARNING CAPABILITIES

Learning-by-doing

- Unlimited practice opportunities
- Each trainee can train 100% of the exercise
- Practice a learning path at own pace
 - Practice can be *paused*.
 - Practice can be *accelerated*.
 - Practice can be done *more slowly*.
- Students can plan their own learning trajectory!
 - 24/7 / Online / Offline
- Objective and equal
 - All trainings and exercises are identical, so it's for all trainees the same every time again!



VR - LEARNING ASPECTS

Expensive machines and devices

- For education, it's the only way to keep up with the newest machinery.
 - Newest machines can be trained before arriving to the factory.
 - Production machines can keep producing.
-
- SAFE
 - no **danger** for learners or machines
 - Durable
 - no **waste** of physical material
 - no **transportations** like in the real world



META Quest2 - META Quest Pro - Pico Neo 3 - Pico 4 Enterprise

Conclusions on VR for educational purpose (02/2024)

- ✓ With the correct app any VR goggle is an educational winner
- ✓ Meta Quest 2 is probably the best buy (for now) to start with
- ✓ Although Meta Quest 3 is a bit more expensive probably it's worth it



MAFEA



Making Future Education Accessible

Content Creation

Content Creation

With VR glasses it's the only way to create custom tailored content without outsourcing and hiring expensive companies.

MaFEA tested

- Zappar
- Thinglink
- Fectar
- MS Digital Guides
- Scanners
 - Insta360 X3
 - Iphone pro (Lidar)
 - Polycam
 - ...

Content Creation

Learning goals that could be addressed

- to create interactive visual content that allows students to explore and analyze complex issues
- to create direct relevant material to address learning goals that are not found anywhere
- to create collaborative projects
- to create interactive learning trajectories that allow students to learn at their own pace
- 3D models used in interactive lessons

CONTENT CREATION

ThingLink



±1.100€/ YEAR INCL.

ThingLink

offers an easy way to create interactive audio-visual learning materials.

The ThingLink platform was selected because:

- easy to use for both students and teachers
- usable on any device: tablets/phones/computer
- creating interactive projects virtually outside the classroom
- many ways to create digital content
(360 tours, learning scenarios, 3D models etc).
- many ways to share content with students
(link, VR, QR-code, embed, learning scenarios,,)
- analytic tools

CONTENT CREATION ±350€/YEAR INCL.

Fectar



Fectar

Fectar offers various solutions that enhance the learning process and engage students in a different way (interactive 3D models, animations, simulations, visualization).

The Fectar platform was selected because:

- easy to use by all teachers and students
- usable on any device: tablets/phones/computer
- creating interactive projects outside the classroom
- create easy VR projects and even more complex VR projects

CONTENT CREATION

±600€ INCL.

Insta360 X3



Making Future Education Accessible - MaFEA

Insta360 X3 camera

The Insta360 X3 is a camera with two lenses that take photographs/videos simultaneously. These images or videos can be added to tools that allow a person or item to become immersed

The Insta360 X3 camera was selected because of:

- interest from the teachers in the partner schools
- the popularity and quality of the Insta360 brand cameras
- existing positive experiences from partner schools
- positive price / value ratio
- compatible with Zappar, ThingLink and Fectar and more

Insta360 X3 camera

Learning goals that could be addressed with the Insta360 X3 camera

- offer learning processes with clear step-by-step guidance
- potential to be safer than real life experiences
- create sustainable travel to new locations
- boost excitement and engagement in the classroom



MAFEA



Making Future Education Accessible



Website

Outcomes and results

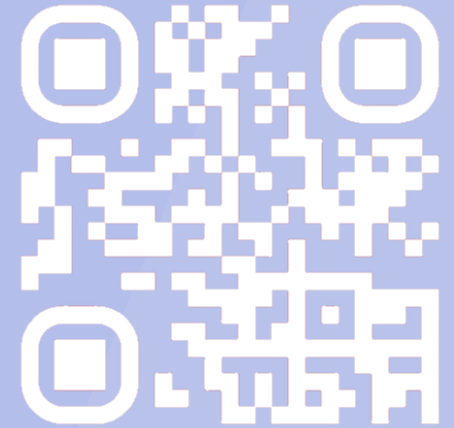


<https://mafea.eu/>

THE MaFEA WEBSITE



ERASMUS+



<https://mafea.eu/>

5 Repositories to find:

1. **tutorials, guidelines and studying pathways**
2. **lesson plans** with best practices for Futuristic education
3. Specifications list
4. an **inspiration list** for “XR-apps”
5. a **guide to find relevant “XR-app-stores”**





Overviews ▾ Tutorials ▾ Lesson plans ▾ Specs ▾ Apps ▾ Contribute Search ▾ About ▾

Welcome to the MaFEA project website. In our goal towards **M**aking **F**uture **E**ducation **A**ccessible, you can find tutorials, lesson plans, overviews and specifications for all the tools used in the project.

This content can be found either via the search bar, the site menu, [a filterable content search](#), or our 1-2-3. process, below.
If you are more interested in apps and other XR experiences for VR googles, please browse our [inspiration list](#) or detailed [app store compatibility](#) page.

1

Select a language.

2

Select a tool.

3

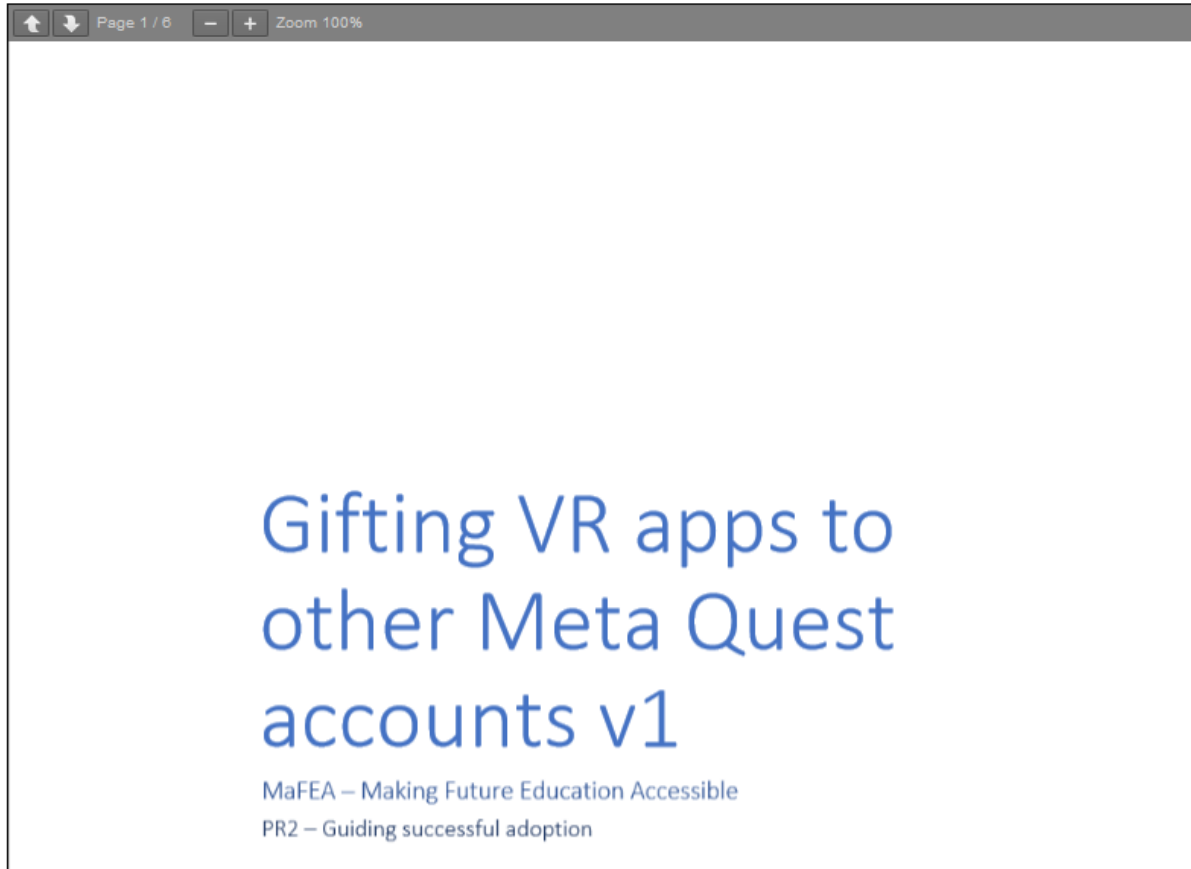
Read the overview, specification, tutorials or lesson plans for that tool.

Let's start with step 1: Pick a language


Gifting VR apps to other Meta Quest accounts

[English](#), [Meta Quest 2](#), [Meta Quest Pro](#), [Tutorial](#)


Read the PDF below, or download the files here: [Word](#) – [PDF](#)



Read the PDF below, or download the files here: [Word](#) – [PDF](#)



Page 2 / 8 Zoom 100%



mafea.eu

MaFEA – Making Future Education Accessible

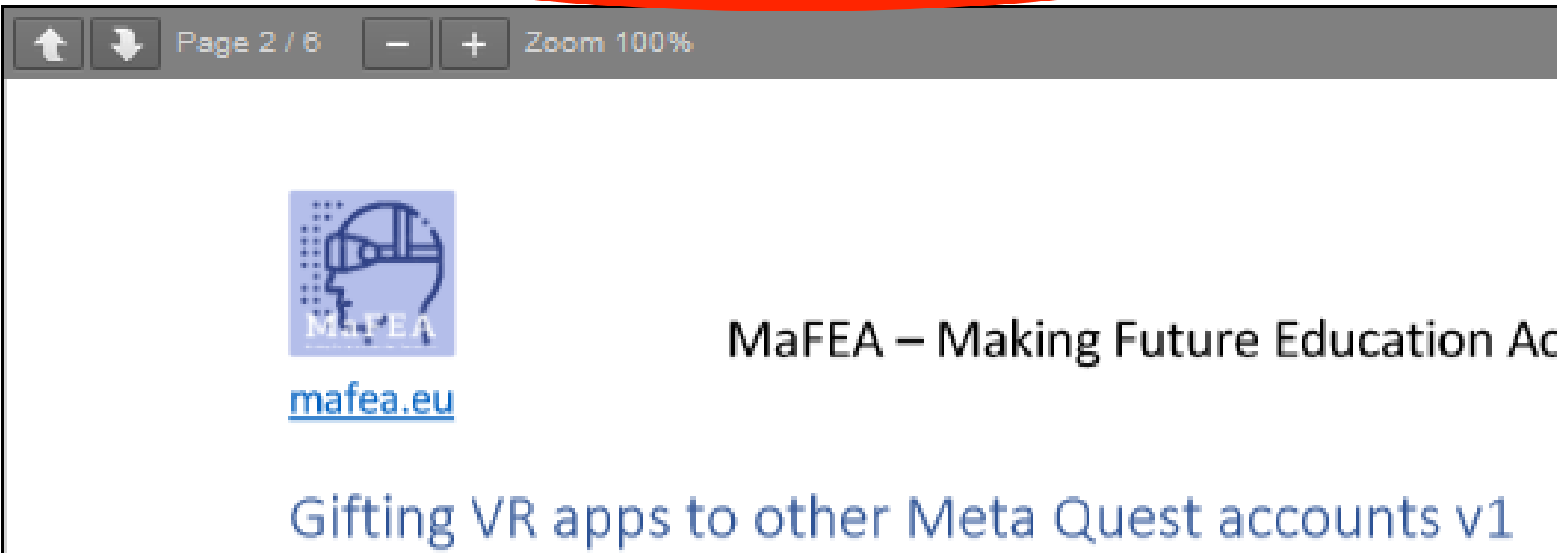
Gifting VR apps to other Meta Quest accounts v1

Once your organisation starts to use many Meta Quest devices, it can become tricky to know how best to purchase paid apps for each of the Meta accounts that are used on each of your Meta Quest devices. Adding a credit card or a PayPal account to each of the Meta accounts that is used is time consuming and purchases cannot be easily controlled.

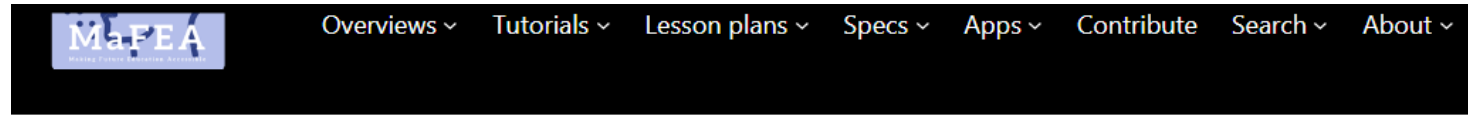
This guide will show how Meta’s “gifting” process works in the Oculus Store. Gifting is when one Meta account buys an app for another Meta account.

[English](#), [Meta Quest 2](#), [Meta Quest Pro](#), [Tutorial](#)

Read the PDF below or download the files here: [Word](#) – [PDF](#)



THE MaFEA WEBSITE



Inspiration list of many XR experiences

Our project team has curated several hundreds of XR experiences, XR design tools (should you wish to create XR experiences) and XR experience developers, should you want to outsource the development of your XR ideas.

	A	B	C	D
1	Category	Title	Cost	Is the experience available from a appstore?
324	STEM - Biology - Anatomy	EducationXR	Free	Steam
325	STEM - Chemistry	Molecule Builder	15 EUR	SideQuest
326	STEM - Chemistry	HoloLAB Champions – Schell Games	8.20 EUR	Steam
327	STEM - Chemistry	AR/VR/MR Mobile & Web Application Development Company	By offer	
328	STEM - Chemistry	MEL VR Science Simulations	By offer	
329	STEM - Chemistry	VR Apps (futuclass.com)	By offer	
330	STEM - Engineering & Production	VRKshop carpentry	17 EUR	Steam
331	STEM - Engineering & Production	Metalwork: Kolomboor: Drill Press training	4 EUR	Steam
332	STEM - Engineering & Production	Electricity: Vinci - wind turbine training	By offer	
333	STEM - Engineering & Production	Engineering - PNX Labs	By offer	
334	STEM - Engineering & Production	Nuclear: Tecknotrove Systems Nuclear plant Air driving mining defense	By offer	
335	STEM - Engineering & Production	Nuclear: Virtualware - nuclear plant training	By offer	
336	STEM - Engineering & Production	Ocuweld - StrataTech	By offer	
337	STEM - Engineering & Production	Welding: Lincoln Electric	By offer	
338	STEM - Engineering & Production	Digital Engineering and Magic - Electrical Power Stations	By offer	
339	STEM - Engineering & Production	Modest Tree Explorer	By offer	
340	STEM - Engineering & Production	Electronics programming: Feeder Protection Relay Training	Free	SideQuest
341	STEM - Engineering & Production	Engineering – Kitchen Assembly by FutuClass	Free	SideQuest
342	STEM - Engineering & Production	Industriële elektriciteit HV Electrical substation training	Free	SideQuest

THE MaFEA WEBSITE

STEM - Chemistry	HoloLAB Champions – Schell Games	8.20 EUR	Steam
STEM - Chemistry	AR/VR/MR Mobile & Web Application Development Company	By offer	
STEM - Chemistry	MEL VR Science Simulations	By offer	
STEM - Chemistry	VR Apps (futuclass.com)	By offer	
Engineering & Production	VRKshop carpentry	17 EUR	Steam
Engineering & Production	Metalwork: Kolomboor: Drill Press training	4 EUR	Steam
Engineering & Production	Electricity: Vinci - wind turbine training	By offer	
Engineering & Production	Engineering - PNX Labs	By offer	
	Nuclear Technology Systems Nuclear plant Air driving mining		

THE MAFEA WEBSITE - VISITORS



Funded by
the European Union

Total visits:

15,424

Total visitors:

5,121

[View total visitors by country.](#)



MAFEA



Making Future Education Accessible



Work

Proof of evidence?

NUMBERS AT THE END OF MAFEA

- **65 teachers** a collaborative network of experts between VET institutions
- **420 pupils/students**
- **5 partner institutions**
- **10 future educative tools**
- **1 website** with 3 combined repositories
- **5 languages**
- **5x 45 different tutorials** or roadmaps or stepstones or
- **5x 38 lesson plans** or learning trajectories.
- **1 inspiration list with apps.**
- **1 app store compatibility list**



Co-funded by the
European Union

ERASMUS+



<https://mafea.eu/>

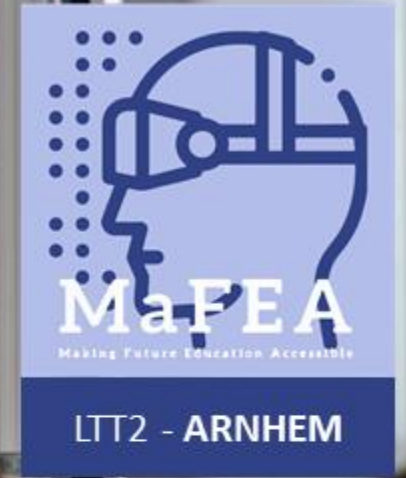


WORKING




MaFEA
Making Future Education Accessible

LTT2 - ARNHEM



TEACHING CLASSES

RECORDING



MaFEA
Making Future Education Accessible

LTT2 - ARNHEM
Peter De Deyn



TRAINING



TRAINING



TESTING



MaFEA
Making Future Education Accessible

LIT2 - ARNHEM
Peter De Deyn



TESTING

FUN & MOTIVATION





MAFEA



Making Future Education Accessible



Advices on robotics

ADVICES FOR SCHOOLS ON ROBOTS



ERASMUS+



<https://mafea.eu/>

ADVICES

- *humanized robots should only be considered for special purposes*
- *in general, a robot package to build yourselves has more advantages*
- *to learn programming cheaper robots have the same coding structure!*
- *LEGO prime was a good choice for secondary education*



MAFEA



Making Future Education Accessible



Advices on XR

ADVICES FOR SCHOOLS THAT WANT TO START WITH XR



ERASMUS+



<https://mafea.eu/>

ADVICES

1. Investigate what “Apps” are available. → www.MaFEA.eu
2. Buy affordable goggles that are compatible with your Future apps.
 - a) Meta quest 2 or **Meta Quest 3** are the best gear for money.
3. Be patient, install an expert and train your teachers.
 - a) Point your teachers to the European EDU library for FuTure tools → www.MaFEA.eu

ADVICES FOR SCHOOLS THAT WANT TO START WITH XR



ERASMUS+



<https://mafea.eu/>

INFRASTRUCTURAL

- *A stable WiFi(6) coverage is essential.*
- *A teacher/class can handle 3 goggles if the classroom has enough square meters.*
- *Mirroring each goggles' view is key to success, connecting to screens is handy.*
- **ThingLink and Fectar** are a good start to build own content.

ADVICES FOR SCHOOLS THAT WANT TO START WITH XR



ERASMUS+



<https://mafea.eu/>

TIPS

- *Avoid direct sunlight, it can damage the sensors, don't play outside.*
- *There are stationary apps (sitting down) and room scale apps (standing and moving around).*
- *Battery usage time is narrow, so invest in a couple of booster batteries.*
- *Consider buying one **Insta360 X3 camera** to scan usable 3D content.*



MAFEA



Making Future Education Accessible

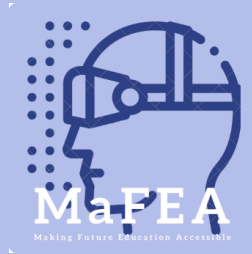


Advices on MR

ADVICES FOR SCHOOLS ON ROBOTS



ERASMUS+



<https://mafea.eu/>

ADVICES

- *MR as in HoloLens and Apple Vision Pro are probably too expensive*
- *devices as the Meta quest 3 (and Meta quest 4) have already MR functionalities build in for affordable money*
- *However, MR is a good coaching tool that gives a lot of possibilities*
- *Also apps are even more important than the gear*



MAFEA



Making Future Education Accessible



Advices Content creation





MAFEA



Making Future Education Accessible

February 21, 2024 • 14:00



Emmaüs secundaire school
Sint-Gerolflaan 20 | 9880 Aalter

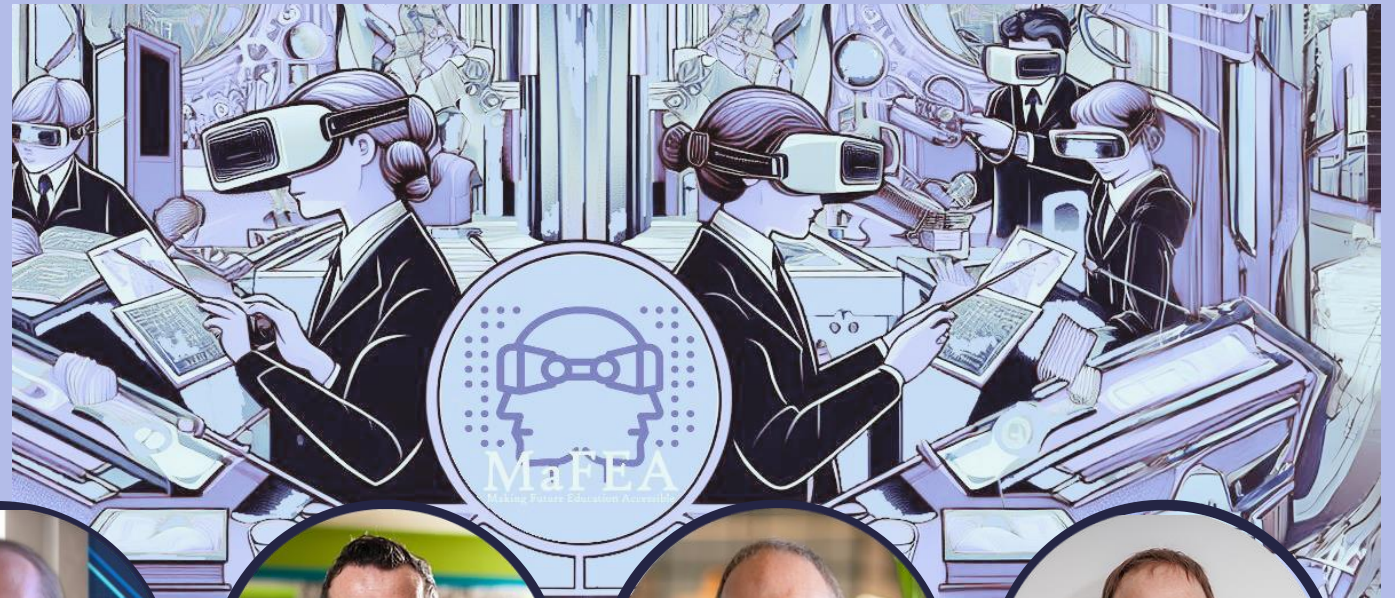


Event tailored for Europeans with a pedagogical background, providing an immersive experience to explore the future of education and new technologies that will be used.

(free entry by registration)



Register here
[Form to register](#)



Eugène Kuipers
CEO Fectar.com



Kris Vande Moortel
Education advisor
Microsoft Belgium



Carl Boel
CPO Dexr,
Senior Researcher XR



Joachim De Vos
CEO Living Tomorrow
Founder
TomorrowLab



Jeroen Baert
Nerland comedian
Ai & Metaverses



MAFEA



Making Future Education Accessible

February 21, 2024 • 14:00

Event tailored for Europeans with a pedagogical background, providing an immersive experience to explore the future of education and new technologies that will be used.

Emmaüs secundaire school
Sint-Gerolfaan 20 | 9880 Aalter



Keynotes

14.00 - Welcome by Birger Quintyn

14.10 - MaFEA.eu

*The source of tutorials and lesson plans
to Make Future Education Accessible*

14.30 - Eugène Kuipers

Fectar and insights on future virtual learning

15.00 - Kris Van de Moortel

Microsoft, Ai, Copilot, HoloLenses, MS tools for EDU

15.30 - Carl Boel

XR and future education.

Dexr as a dedicated XR-tool for EDU

16.00 - Coffee break

16.45 - Joachim De Vos

*Why Innovation Fails & 7 keys to success,
insight for education*

17.15 - Jeroen Baert

Critical thinking on Artificial Intelligence



Eugène Kuipers



Kris Van de Moortel



Carl Boel



Joachim De Vos



Jeroen Baert