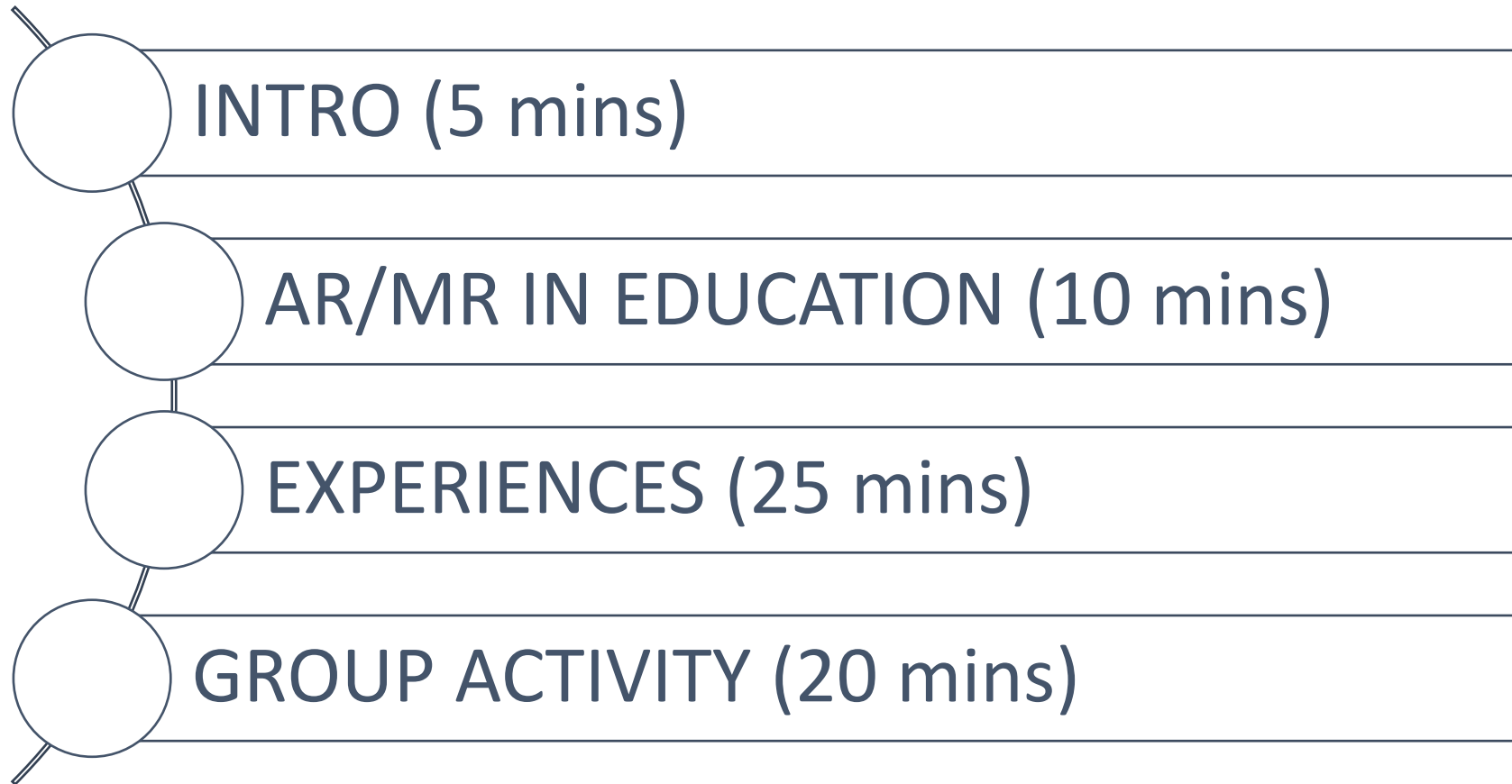


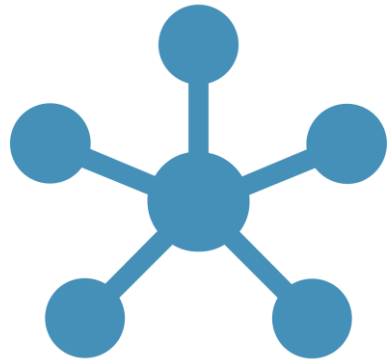


AUGMENTED REALITY, STEM AND REMOTE LEARNING

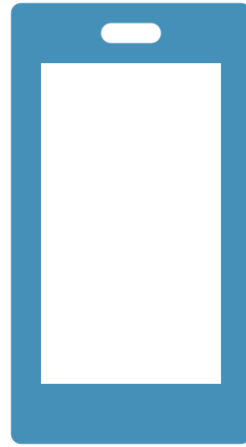
Danai Korre, PDRA in Augmented Reality
Andrew Sherlock, Professor of Data-Driven Manufacturing
Justin Savage, Research Assistant



AGENDA



Internet access

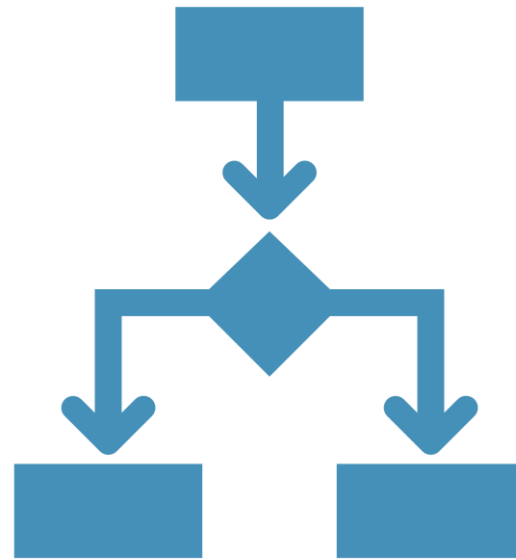


Smartphone or
tablet



Laptop or desktop

FOR THIS SESSION YOU WILL NEED

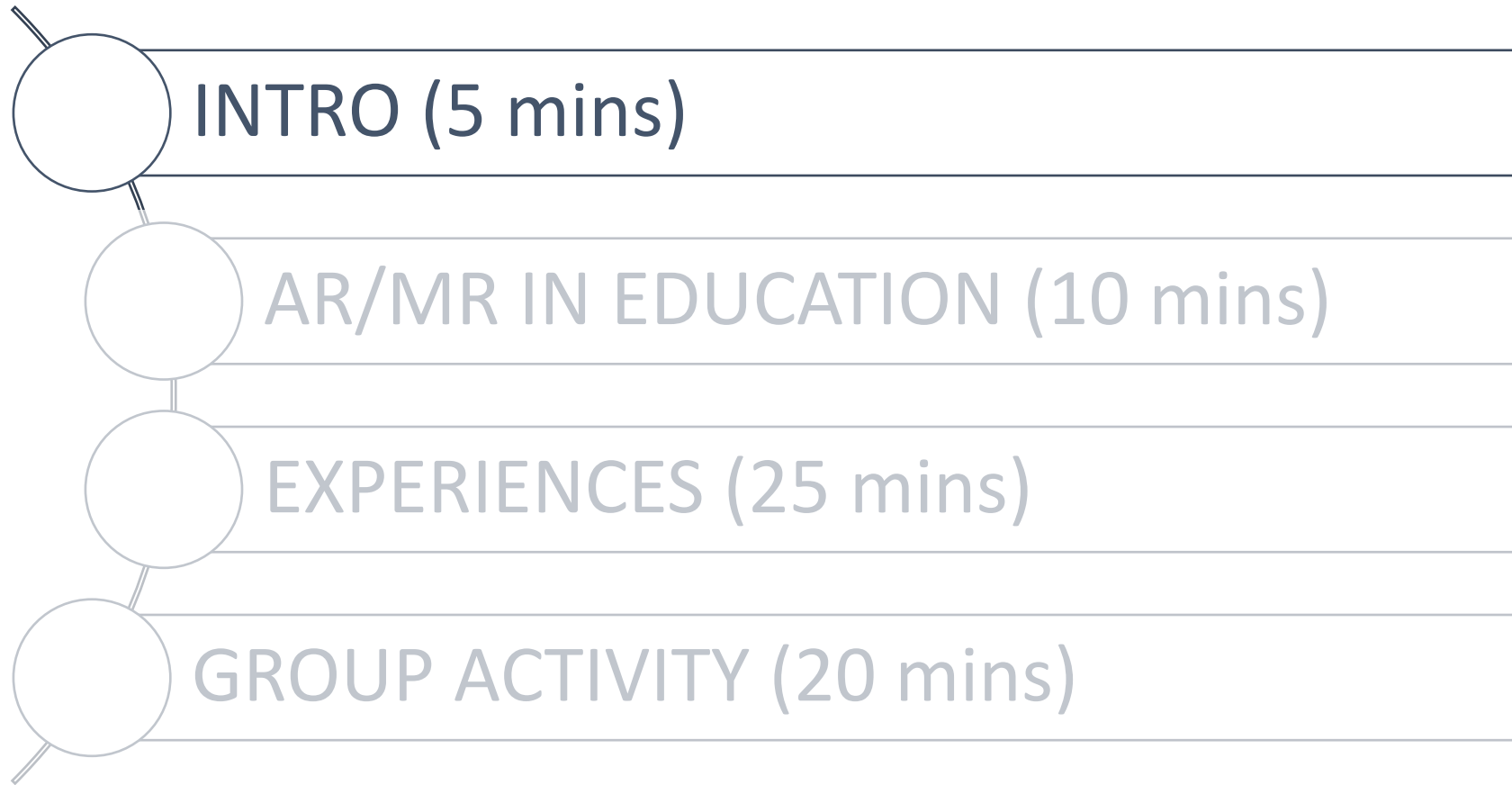


Dichotomous key

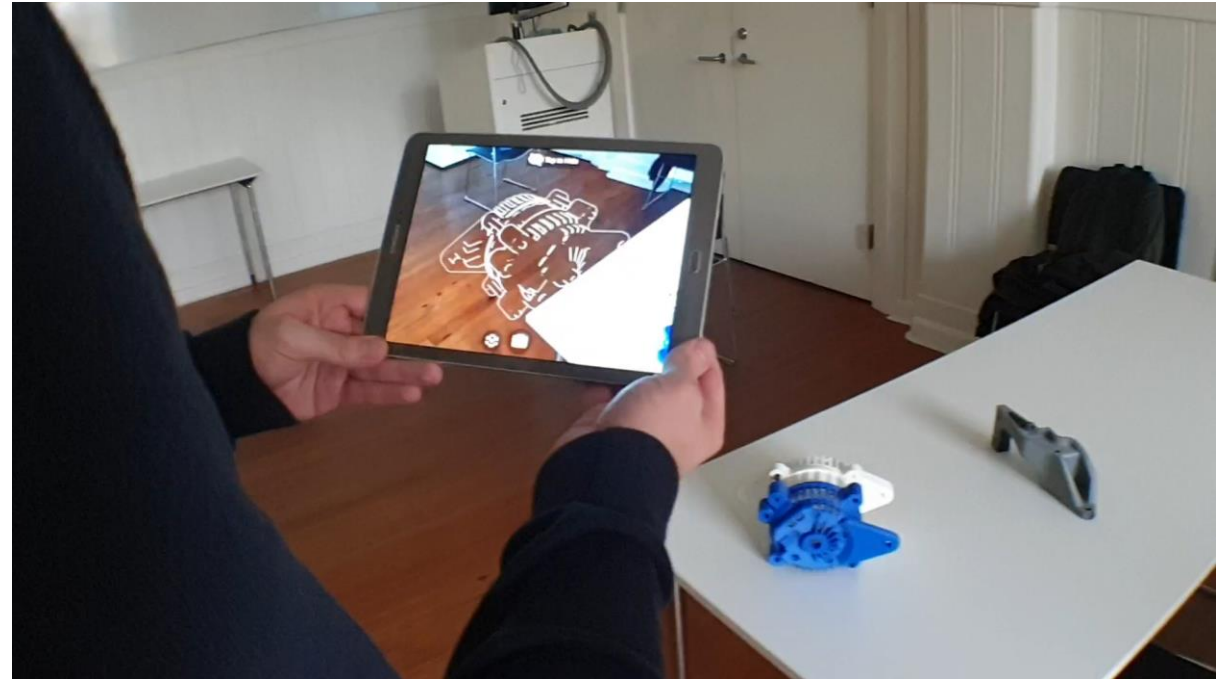
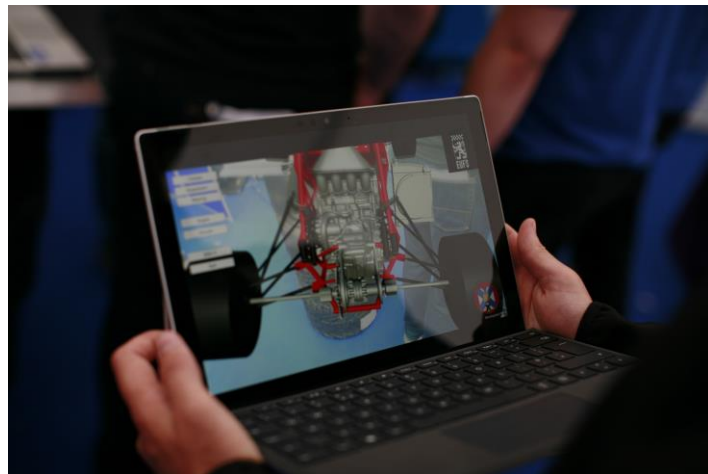
FOR THIS SESSION YOU WILL NEED

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https://edar.online/?page_id=606



AGENDA



PTAS PROJECT ACADEMIC YEAR 2018/2019

Purpose: Formation of start-up in AR for engineering education. Development of initial products via collaboration with industrial and Uni partners

Consortium: University of Edinburgh
Babcock (Marine Rosyth)
Theorem Solutions
DTx Colab (Bosch)
University of Minho

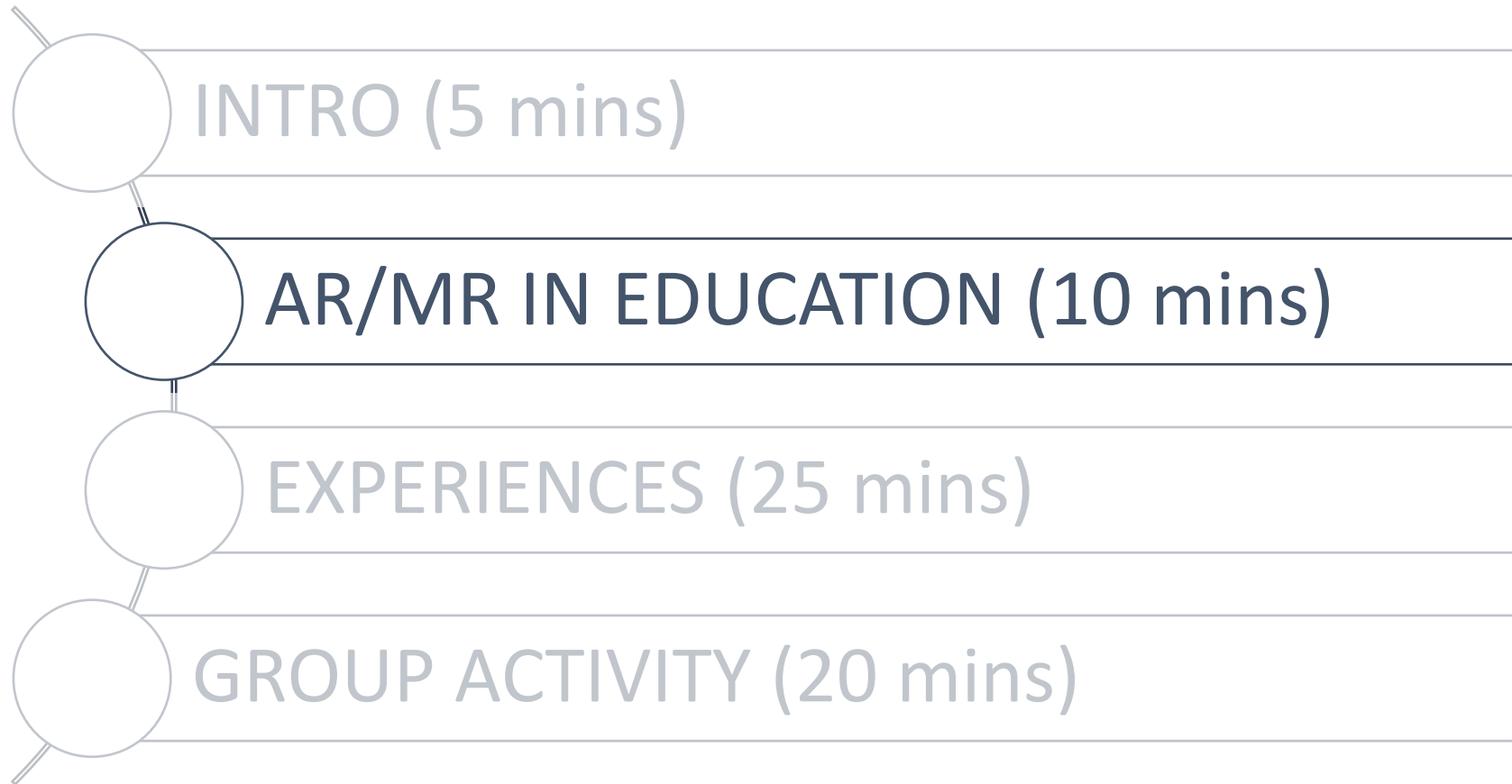
Funding: Funding of around €530k from EIT Digital from October 2019



EIT DIGITAL PROJECT

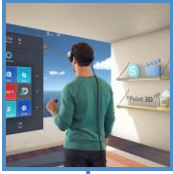


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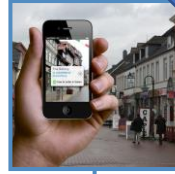
XR



XR

XR is an umbrella term to cover the multiple types of experiences and technologies across VR, AR, MR and any similar areas.

X serves as the placeholder for augmented (A), mixed (M) and/or virtual (V) [1]

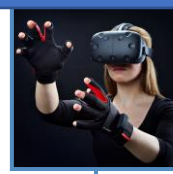


AR

Augmented Reality (AR) overlays digitally-created content into the user's real-world environment. [1]

Users interact with virtual objects integrated into the real world in real-time [2]

Can be device agnostic with mobile devices used often



VR

Fully virtually immersive environment affecting or altering the sensory input(s) (e.g., sight, sound, touch, and smell) and can allow interaction with those sensory inputs by the user's engagement with the virtual world [1]

Use of wearables such as head mounted displays (HMD)

Could be computer generated, video, image or combination



MR

MR seamlessly blends a user's real-world environment with digitally-created content, where both environments coexist to create a hybrid experience. [1]

Occlusion

MR is an extension of AR

All MR is AR not all AR is MR

WHAT IS XR AR VR MR

What are the advantages and the most promising opportunities in learning that AR and immersive technologies can help fulfil?

- Visualize and understand complex spatial relationships and abstract concepts [3][4][5]
- Experience phenomena impossible in real world and in a safe environment [6]
- Improves learning and provides enriched and immersive learning experiences [7][8]
- Fostering remote collaboration [8]
- Empowering Learners as Creative Designers and Makers [8]

ADVANTAGES OF AR/MR

What are the advantages and the most promising opportunities in learning that AR and immersive technologies can help fulfil?

- Cultivating immersive and blended-reality learning spaces, laboratories and practises that cannot be developed and enacted in other technology-enhanced learning environments [8][9][10][11]
- Interact with 2D and 3D computer generated objects in mixed reality [12]
- Improves content understanding, long-term memory retention increased student motivation and improved physical task performance [13]

ADVANTAGES OF AR/MR

What are the advantages and the most promising opportunities in learning that AR and immersive technologies can help fulfil?

- Opportunity to facilitate the process of educational inclusion[14]
- Stimulates students' ability to innovate [15][16]
- Reduces the cognitive load of students [16][17]
- Improvement in cognitive, motivational and social processes[18]

ADVANTAGES OF AR/MR

What are the greatest barriers for institutions and educators adopting XR and immersive learning technologies?

- Accessibility [18]
- Affordability [8]
- Privacy concerns
- Technology evolution [18]
- Interoperability [8]
- Contextualising the content [18]

CHALLENGES

What are the greatest barriers for institutions and educators adopting XR and immersive learning technologies?

- Suitability to audience and goals [18]
- Lack of Content [8]
- Space requirements [18]
- Teacher support and inadequate XR teacher training programs [8][18]
- Pedagogical approaches [18]

CHALLENGES



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EXPERIENCES

Anatomy Experience

Ecology Experience

**DOWNLOAD THE EDAR APPLICATION FOR YOUR OPERATING SYSTEM
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https://edar.online/?page_id=606

If you cannot download the app videos of the Experiences can be found here:

https://edar.online/?page_id=777

ANATOMY EXPERIENCE

- Was developed in collaboration with the Medical School, University of Edinburgh.
- The purpose of this Experience is to help Medical students interpret medical images and better understand the anatomy presented in the scans.



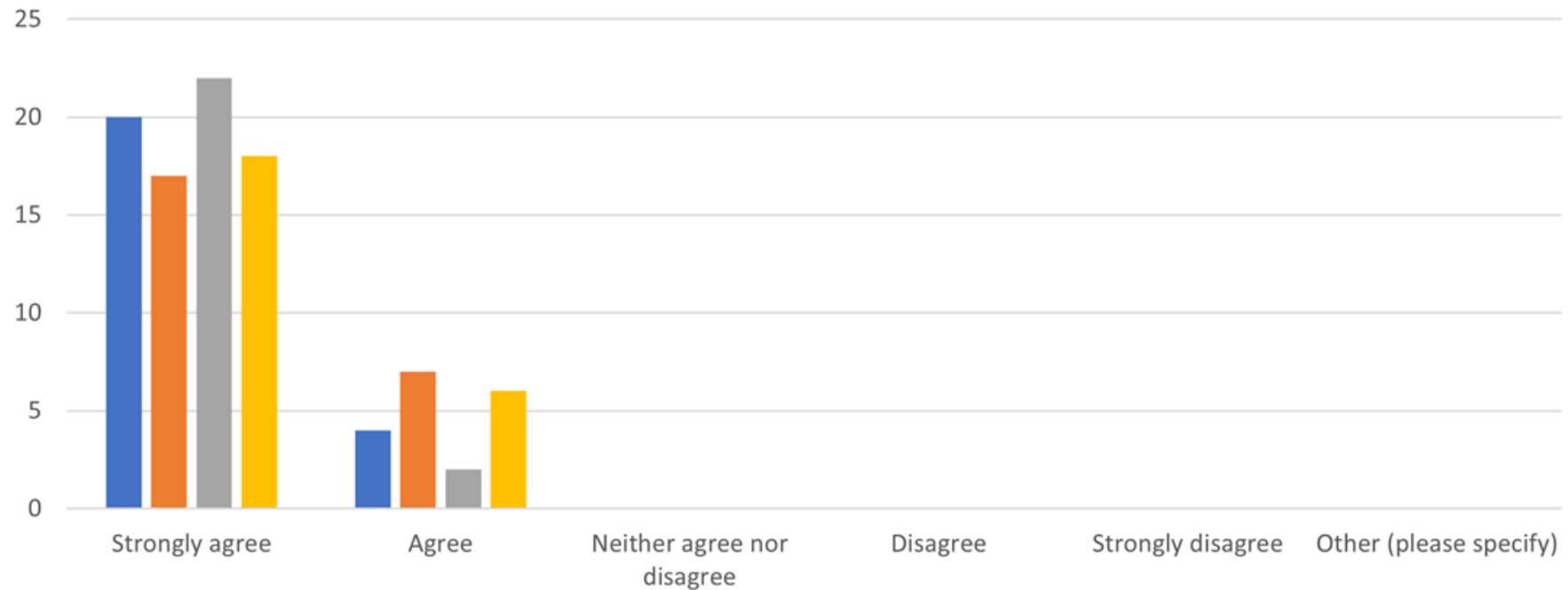
Medical students trying out the Anatomy Experience, December 2020

ANATOMY EXPERIENCE



ANATOMY EXPERIENCE

EdAR - Augmented Reality Pelvis - UoE Clinical Skills 04-18/12



- Do you agree that the EdAR application can enrich the learning process?
- Do you agree that this AR experience can improve your UNDERSTANDING of pelvic anatomy / radiology?
- Do you agree that this AR experience can assist in the TEACHING of pelvic anatomy / radiology?
- Would you recommend this AR application to colleagues / fellow students?

ANATOMY EXPERIENCE

Please complete the survey

OPEN THE APPLICATION AND SCAN THE QR CODE ON THE PELVIS OR THE QR ON THE RIGHT. MAKE SURE YOUR CAMERA IS FACING THE QR CODE AT ALL TIMES.

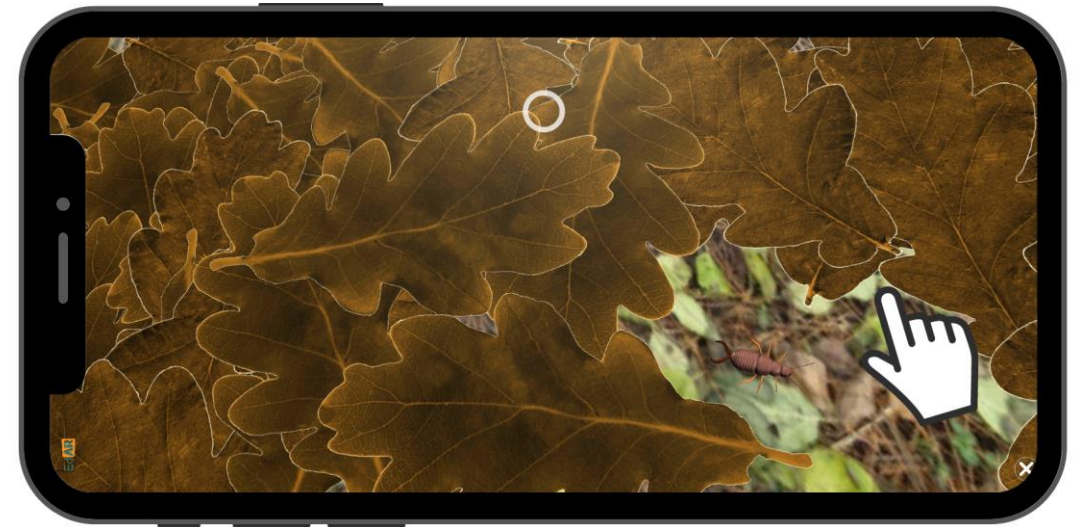


ANATOMY EXPERIENCE

Please complete the survey

ECOLOGY EXPERIENCE

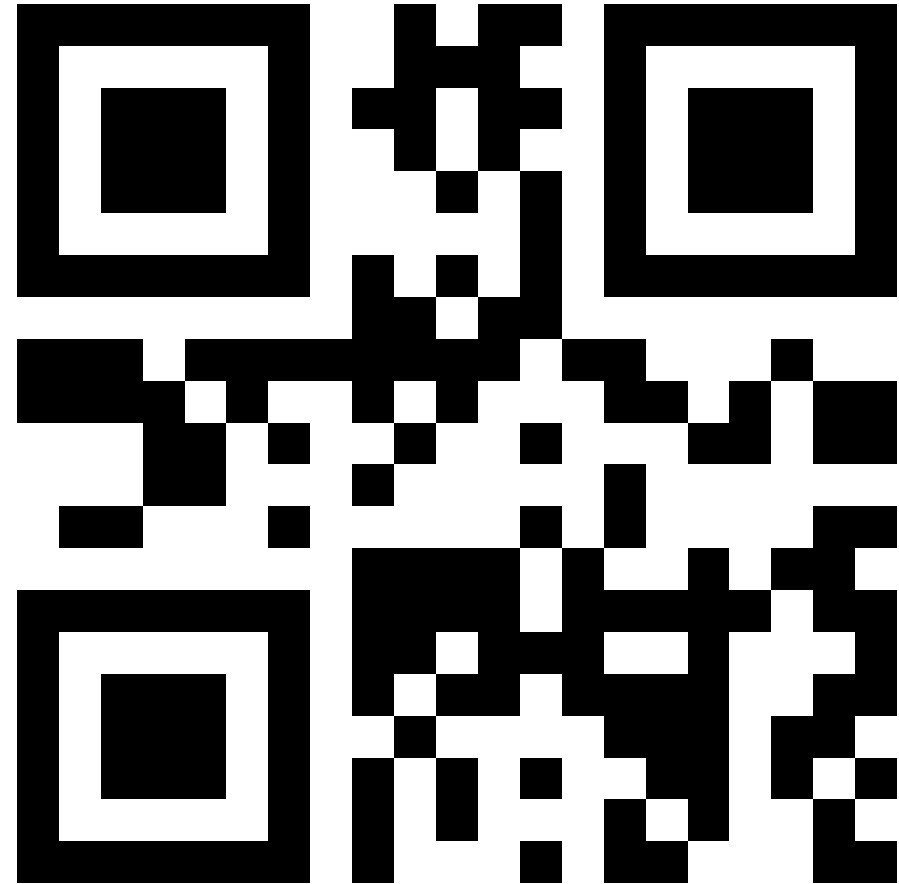
- Was developed in collaboration with the School of Biological Sciences, University of Edinburgh and Dr. Walsh.



ECOLOGY EXPERIENCE

- Please collect 1 organism in the inventory if possible
- Please try to identify the organism using the dichotomous key
 - To do so tap on the organism image in the inventory to see it in 360 view
- Please refer to the **L&T conference - EdAR Ecology - Leaf litter Guidance** document for details.
- Remember to take screenshots of the organisms in 360 view.
- Please send the result to the instructor at danai@edar.online. Results should include a screenshot of the organism and the identification by using the key.
- If you detect a “bug” or issue with the software please mention it to the instructor and take a screenshot which you will add at the notes section of your email.

**OPEN THE APPLICATION AND
SCAN THE QR CODE ON THE
RIGHT. MAKE SURE YOUR
CAMERA IS FACING THE QR
CODE AT ALL TIMES.**



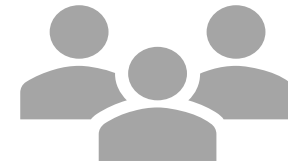


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GROUP ACTIVITY



20 mins



Discussion of XR educational experiences

3 Groups of 8

Come up with subjects where AR can add to the learning experience (5 mins)

Choose 1 and go through the process of capturing objectives (10 mins)

Critique and suggestions (5 mins)

If you liked our work, please follow us on our social media and keep in touch.

For further information and enquires please visit

www.edar.online

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THANK YOU!