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Media & Learning

MODERNIZING LABORATORY SKILLS TRAINING: STUDENT PERCEPTIONS OF XR-BASED SIMULATIONS FOR MICE DRUG ADMINISTRATION

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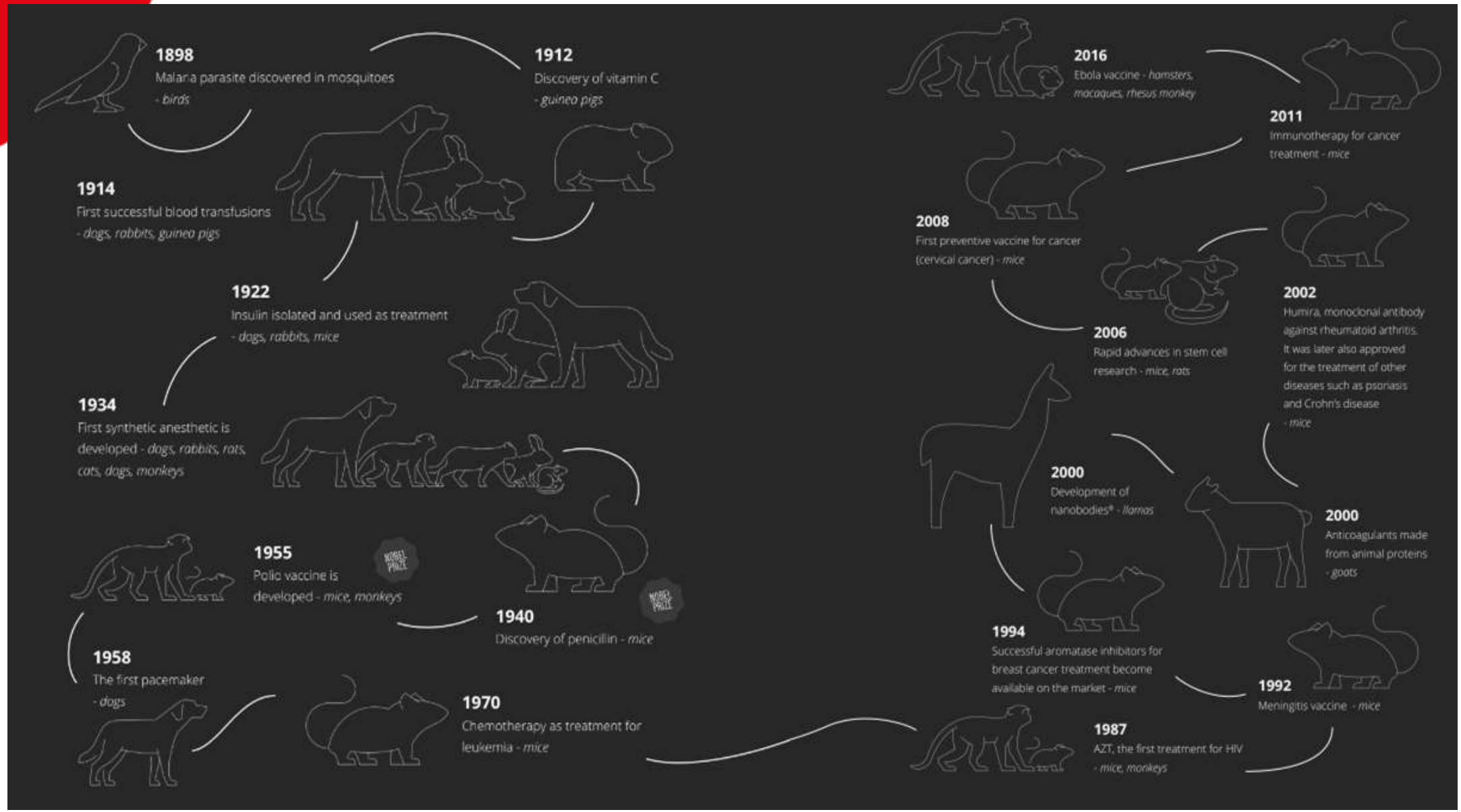
INTRODUCTION



Bron: Dossier Dierproeven, VIB.

INTRODUCTION

Legislation: EU Directive 2010/63

- Working with lab animals?
  - Certification required
  - Skills training obligation

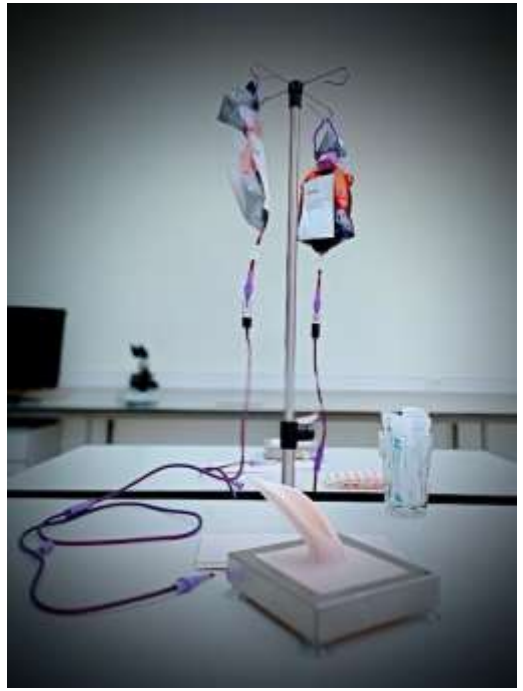
- Ethical animal use:

INTRODUCTION

Laboratory animal science course @VIVES:

•Theoretical lectures

• Hands-on training on dummies
  • Animal handling
  • Blood sample collection



INTRODUCTION

Laboratory animal science course @VIVES:

- Theoretical lectures

- Hands-on training on dummies
  - Animal handling
  - Blood sample collection
  - Administration of medication
    - per os
    - subcutaneous
    - intraperitoneal

INTRODUCTION

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Innovation and Education

NON-EMPIRICAL RESEARCH Open Access

Experiential learning with virtual reality: animal handling training

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Abstract

Training in handling laboratory animals is fundamentally imperative to the responsible use of animals in research. Animal welfare topic is underdeveloped in the tertiary education, where instruction is majorly delivered in the format of lecture and group discussion only. Students with limited exposure to the laboratory were inattentive to animal welfare and uncertain how ethics intertwine with science. This paper describes a multi-disciplinary experience in devel-

⇒ "How do students experience XR as part of their skills training?“

MATERIALS AND METHODS

- Academic year 2024-2025
- Students bachelor Agro- and Biotechnology @VIVES
- Theoretical lectures + hands-on training with dummies
- XR-based simulation
  - In-house developed by the Chinese University of Hong Kong
  - Utility software with the Meta Quest 3 headset
- Questionnaire evaluating the XR application
  - Engagement
  - Realistic interaction
  - Involvement
  - Active learning
  - Learning capability

MATERIALS AND METHODS

- Laboratory environment
- Realistic sequence of tasks:
  - Desinfect their workspace
  - Selecting necessary materials
  - Preparing correct cage of mice
  - Handle the mice
  - Perform an IP injection
  - Transfer mice to empty cage

RESULTS

STUDENT PROFILE

In total 97 students:  & 

Of which 42 students  & 

GENDER:

 **30 students**

 11 students

 1 student

STUDY PROGRAM:

 **36 students**

 4 students

 2 students

LEARNING MODALITY:

 **32 students**

 10 students

EXPERIENCE:

 16 students

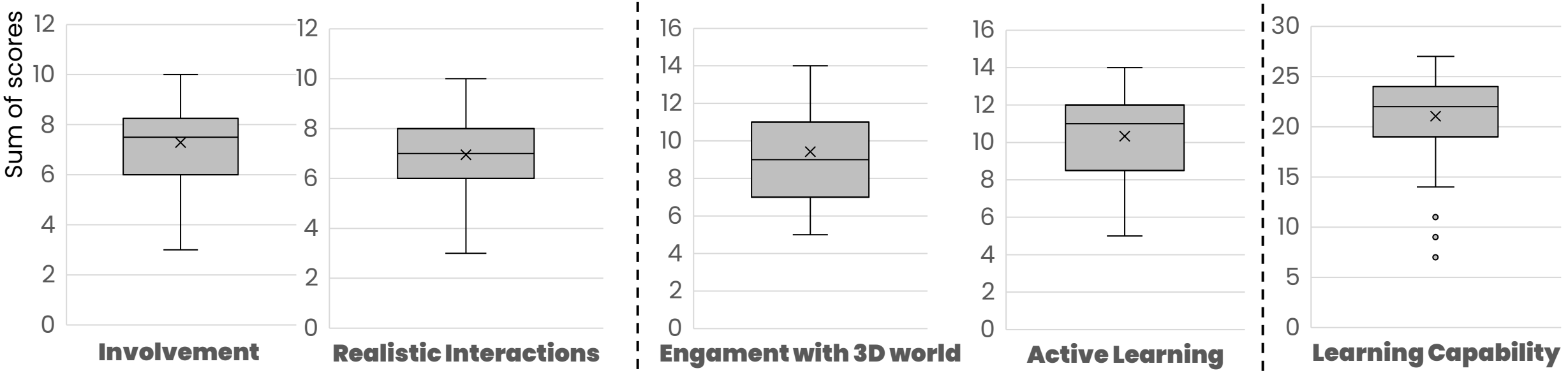
 **26 students**

RESULTS

XR-EXPERIENCE

RESULTS

STUDENT PERCEPTIONS



Sum of 2 statements

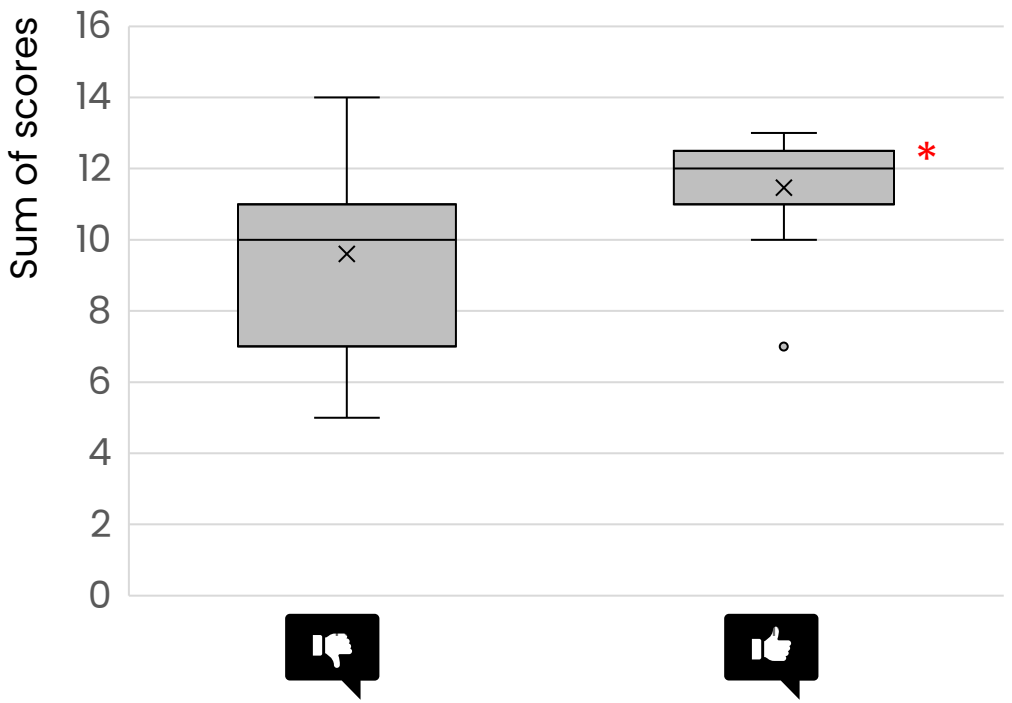
Sum of 3 statements

Sum of 6 statements

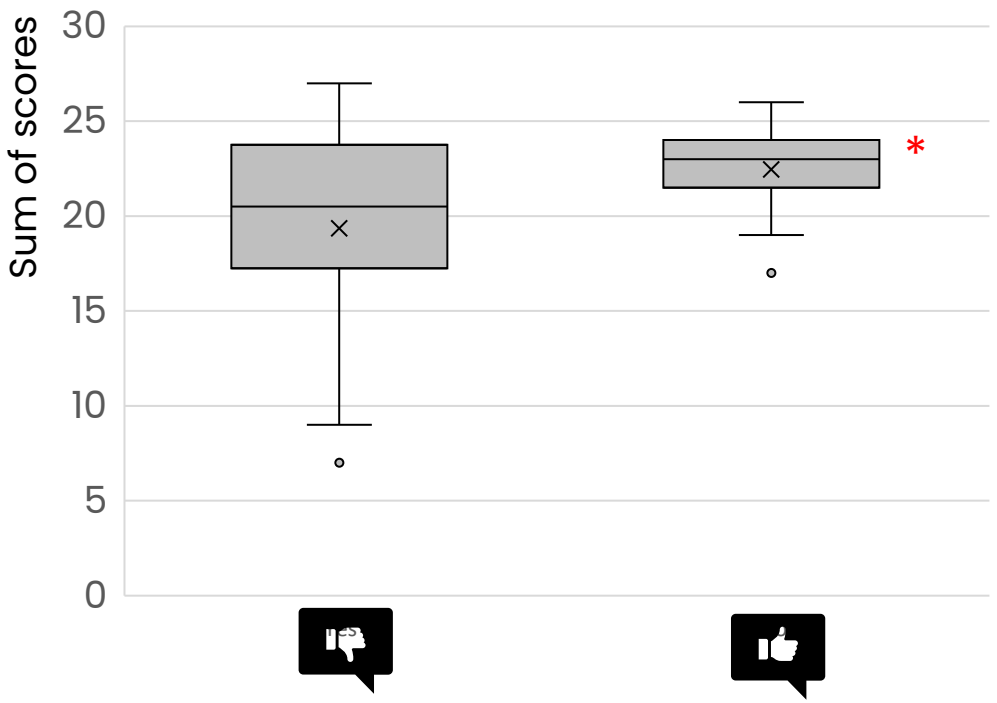
RESULTS

FACTORS INFLUENCING STUDENT PERCEPTIONS

Active learning



Learning Capability



DISCUSSION

- XR-application = effective and ethical educational tool
  - eliminating animal use
  - training skills with cognitive process for the high order thinking
  - Future focus: effect on learning capability of the students
  - However: not for ALL students (42/97 students)
- Introductory sessions for less experienced users
- Instructor insight into the student's view = better feedback & support
- Single player => multiplayer
- Addressing usability concerns as nausea and headaches


Better learning. Fewer animals.
A future made possible with XR.

ACKNOWLEGDMENTS

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The Chinese University of Hong Kong, Shenzhen

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THE REEF | XR cocon

Statements overview

Engagement with 3D world

1. The immersive VR system creates a realistic-looking lab environment.
2. The immersive VR system gives me the perceptual feeling to manipulate the 3D objects.
3. I can psychologically study in the lab when using the immersive VR system.

Realistic Interaction

4. I can recall myself for the interaction with the virtual mice by playing the immersive VR system.
5. The VR system can enhance my knowledge of the virtual learning environment.

Active Learning:

6. The VR system helps me understand the learning content beyond the lecture.
7. The VR system can motivate me to learn more.
8. I like to have a gamified learning arrangement in the class with competition.

Involvement

9. The VR system can deepen my knowledge acquisition.
10. The VR system can make me to enjoy and embrace learning process.

Statements overview

Learning Capability

1. The VR system can facilitate my learning capacity. The immersive VR system gives me the perceptual feeling to manipulate the 3D objects.
2. The VR system can consolidate my memory in knowledge.
3. The VR system can migrate my theoretical knowledge to practical application.
4. It can provide other opportunities to work with technology for interactive learning.
5. I believe that the learning Space is value-added to consolidate the learning progress.
6. Overall, VR gamification can be my learning preference.