



# Synthesising AR and Learning Analytics for Effective Workplace Training

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presented by Will Guest, Oxford Brookes University  
will.guest@hotmail.com



# Overview

- ▶ Vocational skills, and the way in which they are acquired, is well suited to AR and wearable technology
- ▶ A number of technical and non-technical challenges exist
- ▶ We think that solutions are within reach

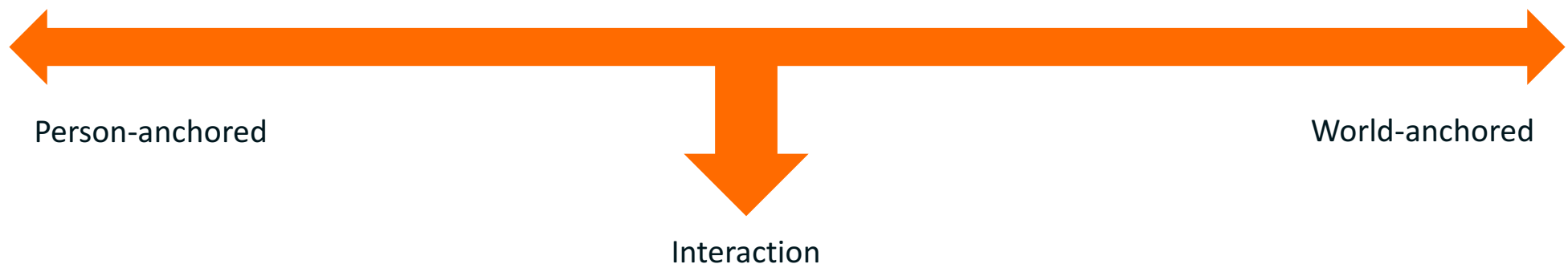




# What does this synthesis mean in practice?

## Training (always) requires a context

- Manual Handling
- Use of machines, vehicles, tools, objects
- Wiring and electrical systems
- Analysis and assessment of parts, structures, interfaces
- Construction and destruction





# Challenges



# Technical Elements

- ▶ Blowing the doors off established interface design
  - (only the doors)
- ▶ Avoiding: Over-engineering, bamboozlement, just-for-the-sake-of-it graphics
- ▶ Gather multi-dimensional data that is capable of describing both the learner's achievements and the nature of their involvement in the task



# Non-Technical Elements

- ▶ Goal is to create experiences rather than exercises
- ▶ Using digital systems shouldn't assume digital know-how
- ▶ Data acquisition & and reporting systems must cater to those who wish to learn practical skills



# Solutions



# Getting “good” data in

eXperience Application Programming Interface (xAPI)

```
{
  "actor":{
    "objectType": "Agent",
    "name": "Gianluigi Di Vito",
    "mbox":"mailto:gianluigi.divito@piksel.com"
  },
  "verb":{
    "id":"http://activitystrea.ms/schema/1.0/watch",
    "display":{
      "en-US":"Watched"
    }
  },
  "object":{
    "id":"http://tellme-ip.eu/media/video/152"
  }
}
```





# Core Design Principles

- ▶ Unobtrusive tools – should not attract attention (of the user)
- ▶ Intuitive feedback – we are aiming to measure learning, not a level of understanding of the system
- ▶ Believable – virtual objects must appear and behave according to natural laws (e.g. gravity, light)



# Collaborative Development

- ▶ Working with engaged experts (trainers/evaluators) to redefine traditional roles within education
- ▶ Just as AR has the capacity to bridge gaps in skill-sharing, so must its utility bridge conventional technology-workplace separations (especially those linked to artisanal or cultural heritage)



# Case Study: Stage Management



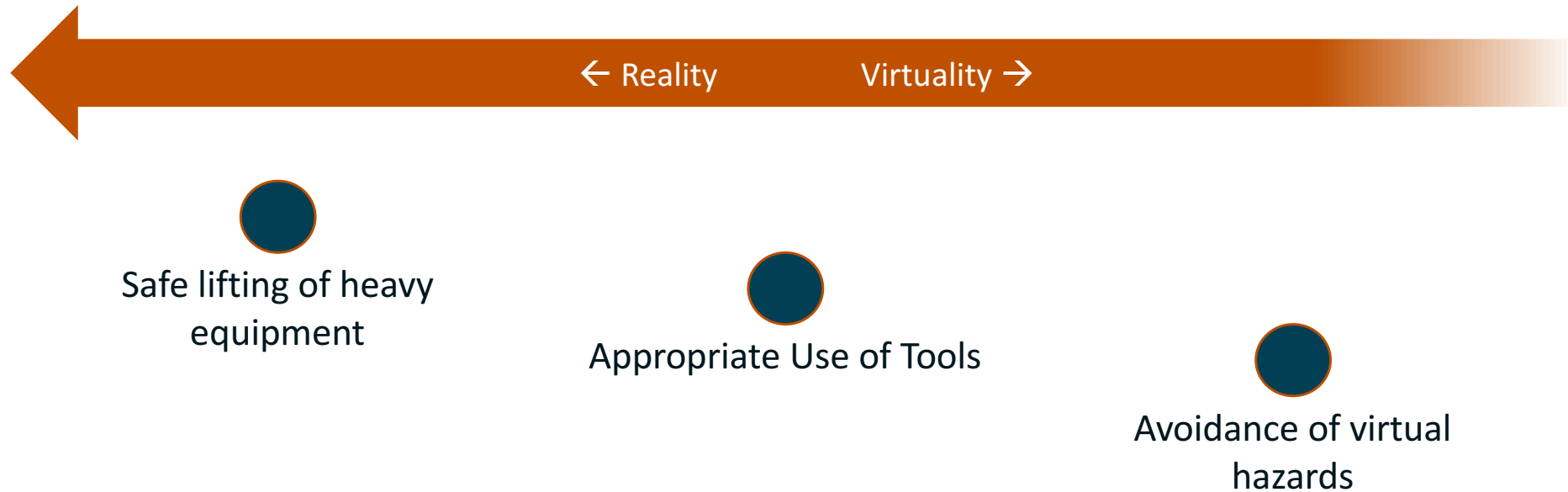
# The Workplace

- ▶ A stage management training program
- ▶ 10 competencies, 300 activities
- ▶ Strategy to reduce the impact of “interaction fails”.



# Triggers Based on Bio-feedback

Person-anchored events



# Triggers Based on World Scanning



World-anchored events



  
Identify Faulty Wiring

  
Improper Use of Safety  
Equipment

  
Chemical Spill  
Management

# Interaction Based on Physical Action



Mixed Reality



- Bringing the environment to life
- Action at a distance
- Interfacing with IoT devices
- Visualisation of progress and learning
- Action-driven audio feedback

**Solutions are Superpowers!**



# Case Study Summary

- ▶ Learning analytics attempts to understand how a person's actions are linked to positive learning experiences
- ▶ Mixed reality offers many new affordances and types of experience that can positively impact learning
- ▶ We need to know which devices and visualisations to use, together with the type and timing of feedback



# Q & A

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PRESENTED BY WILL GUEST  
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