INTEGRATION OF BIM,VR & MIXED REALITY SOFTWARE IN PROJECT-BASED TRAINING

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AGENDA

- Who is FOSH?

- Introduction

- Why

- Advantages

- Implementation

WHO IS FOSH?

FOSH specializes in the development of learning content, training material and learning experiences for various trades, including plumbing, electrical, bricklaying and more. A collaborative and community-based approach ensures that industry associations, employers, technical experts, non-governmental organisations and the public sector actively participate in shaping the products and services of FOSH. By optimizing digital, virtual and online technology and combining this with new age methodologies, FOSH creates multi-dimensional and reality-based learning experiences that allows the participant to be successful in the South African and African workplace.

INTRODUCTION

We here at FOSH believe that we currently stand on the brink of a technological revolution, a digital revolution, that has been occurring since the middle of the last century. A fusion of technologies which will blur the lines between the physical and digital world. Therefore, it is imperative that we prepare new artisans for the 4IR working world, through exposure of apprentices to digital and technically advanced learning, assessments and workplace environments.

WHY BIM, VR & MIXED REALITY SHOULD BE INTEGRATED INTO PROJECT-BASED TRAINING & LEARNING

AUTODESK

AUTODESK REVIT

Using BIM (Building Information Modelling) for project-based learning allows individuals without specialist architectural training to view and learn from architectural content. This encourages open accessibility, enabling anyone to explore and access this information without the requirement to duplicate data. Lecturers can collaboratively work in this open space from multiple locations that would traditionally be limited to on-site learning. Having a single dataset also allows edits to be made to the curriculum that will automatically propagate throughout the entire system.

VR and mixed reality technologies improve artisans' technical abilities that are applied within the digital BIM environment. These systems are interactive, dynamic and draw on the skills required of the artisans who operates in the 4th industrial revolution.

ADVANTAGES TO USING BIM, VR & MIXED REALITY

Exposure to learning digitally within VR and mixed reality environments.

Digitising technical content and curricula.

Introducing new digital assessment tools.

Improving apprentices' technical ability within a digital environment.

Development of alternative assessment tools to the current trade tests which could test the ability of apprentices on a wider range of skill sets.

Improving soft skills so that theoretical knowledge can be applied to a fast paced, dynamic work environment.

IMPLEMENTATION OF BIM, VR & MIXED REALITY INTO PROJECT-BASED LEARNING

1:          Pilot Trade Test

2:          Lecture Capacity Training

1: PILOT TRADE TEST

In this test participants were exposed to virtual reality and mixed reality construction sites during the Phase 1 Assessments. Participants had the opportunity to experience a virtual reality (VR) construction site as well as simulations with the aid of a digitized 3-D virtual construction site. The VR house offered a virtual world environment where problems and tasks had to be solved.

In addition to solving interdisciplinary professional and work-related problems, the virtual house forced participants to interact inside of, and with other participants on a digital interface.

The VR component was also combined with physical tasks which emphasises the focus on improving both soft skills as well as technical skills.

Image 01: Apprentice completing the virtual trade test

Image 02: VR component combined with physical task

EXAMPLES OF BIM INFORMATION USED IN TRADE TEST
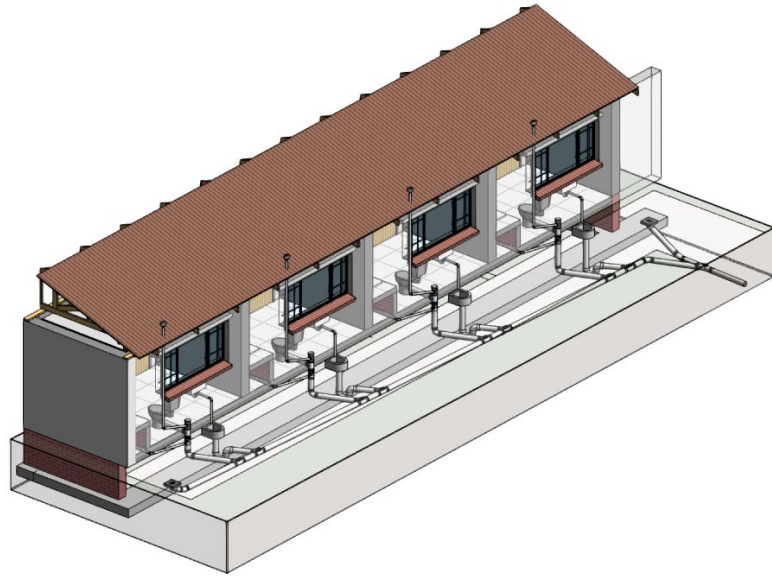
Image 03: Multiple cubicle plumbing installation
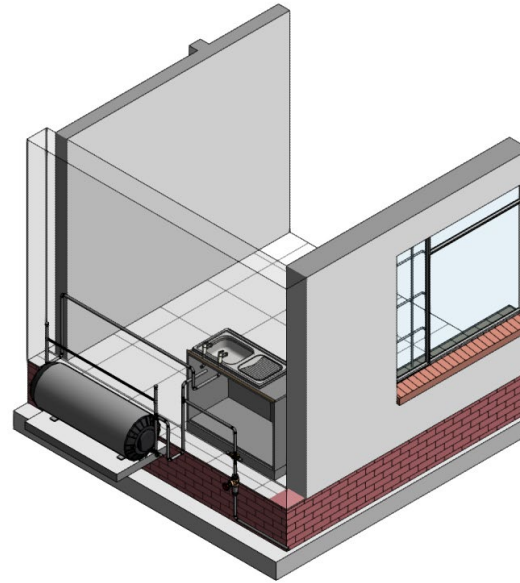
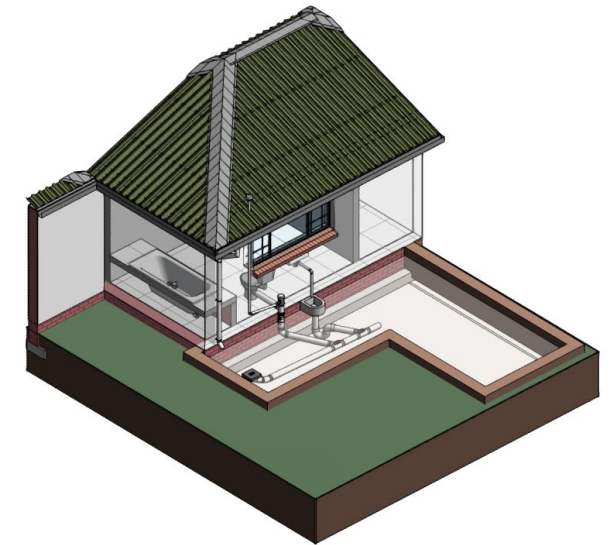Image 04: Outside H&C water kitchen installation

Image 05: Bathroom plumbing and gutter installation

2: LECTURE CAPACITY TRAINING

The lecture capacity training implemented BIM material, VR as well as live streaming to showcase the efficiency of using these tools in a training environment. This allowed artisans from different environments to collaborate in this virtual environment from multiple locations.

This form of training allows for lecturers and artisans from different backgrounds to come together and share their knowledge on this platform. Being able to explore, plan and execute tasks collaboratively proves to be very valuable when training lecturers from different disciplines.
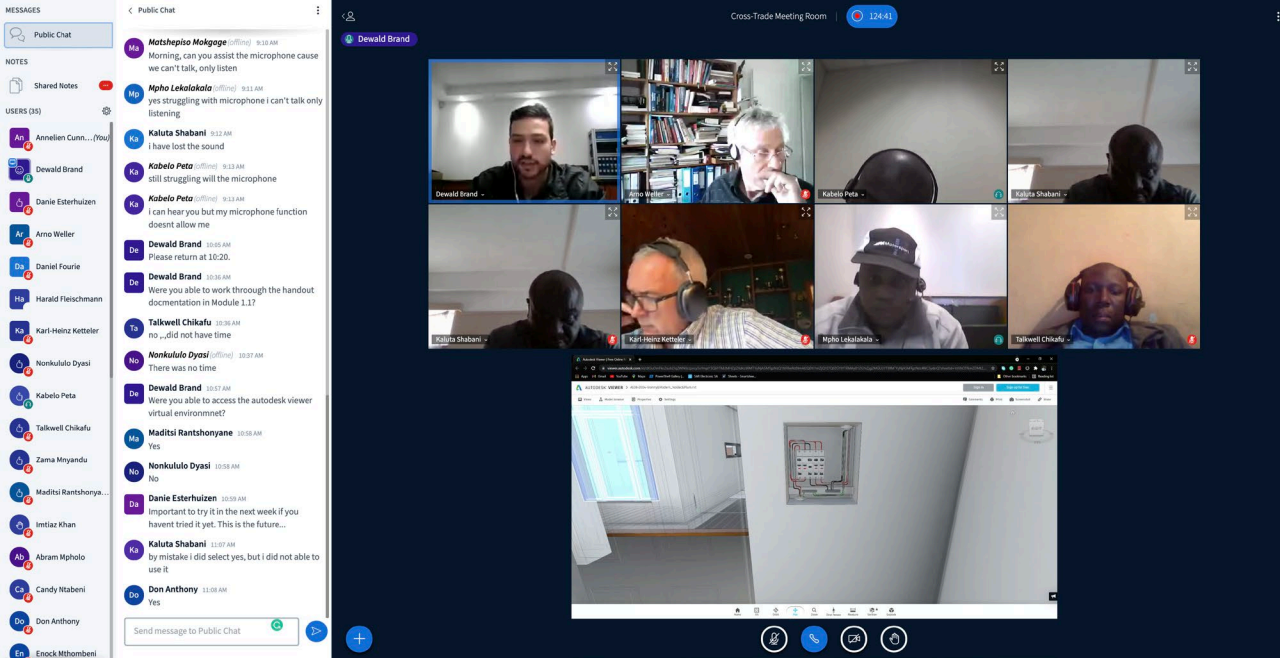
Image 06: Exploring the granny flat model DB Board
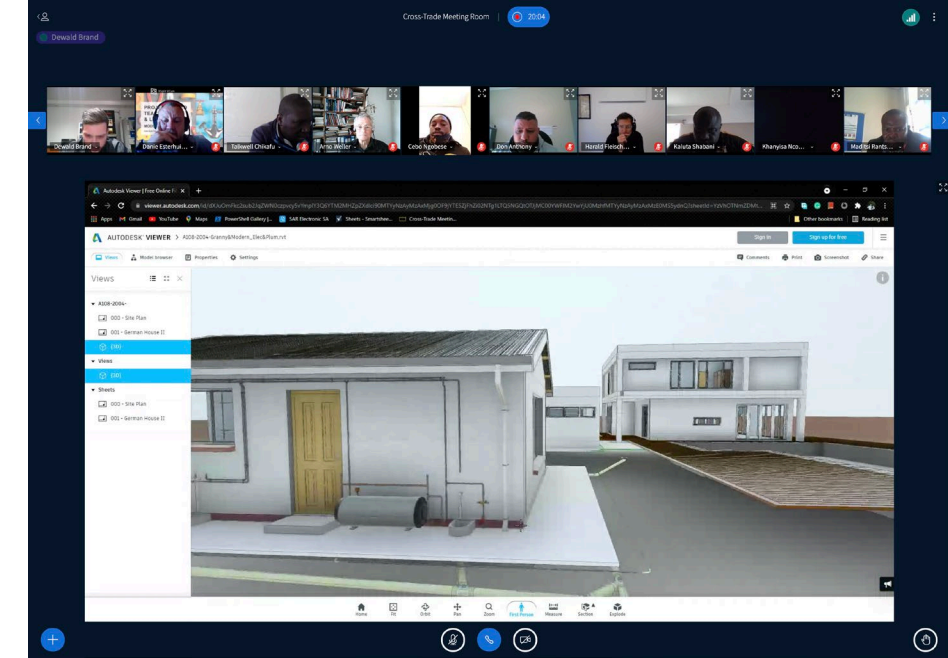
Image 07: Exploring the Granny Flat model underground plumbing
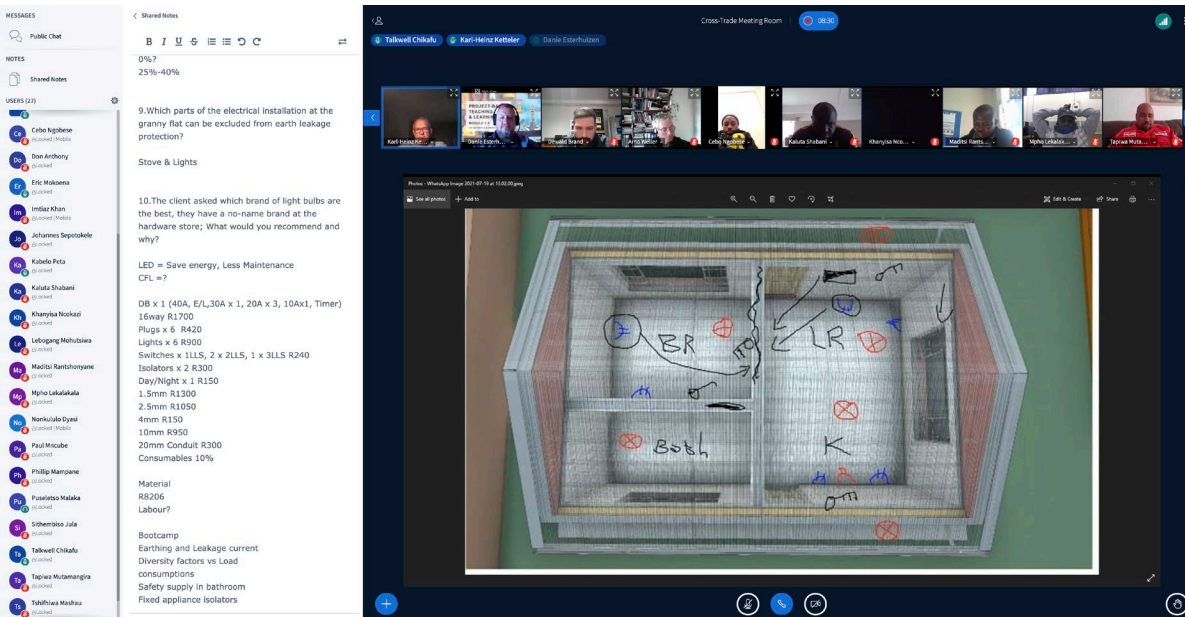
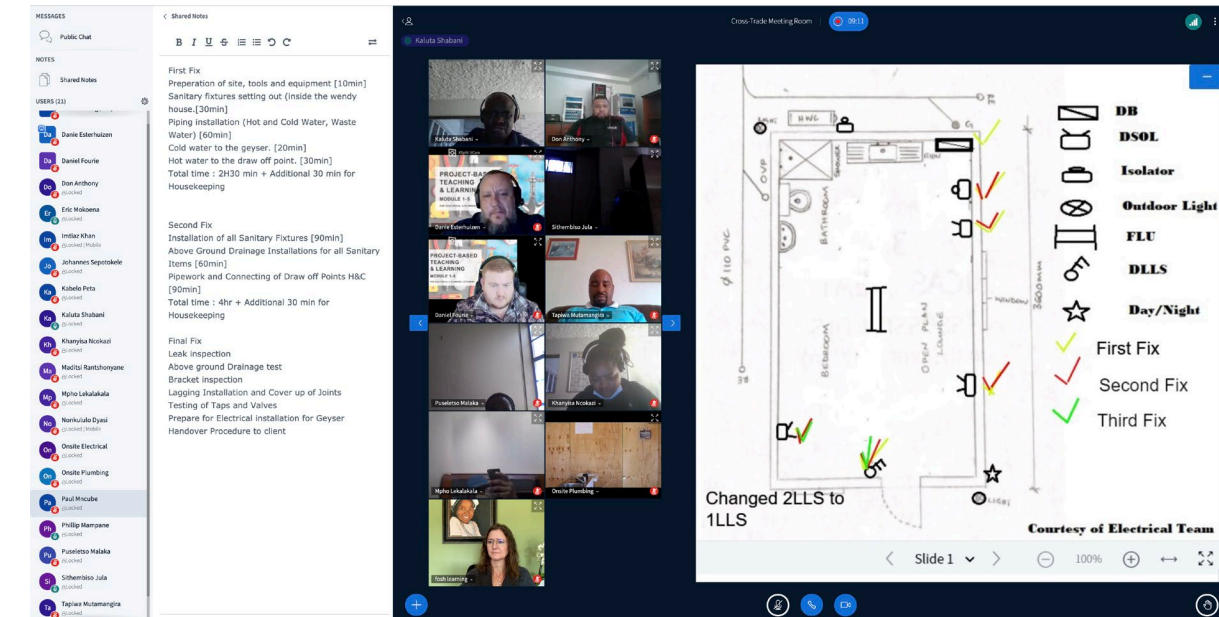Image 08: Planning of electrical layout in Granny Flat Model

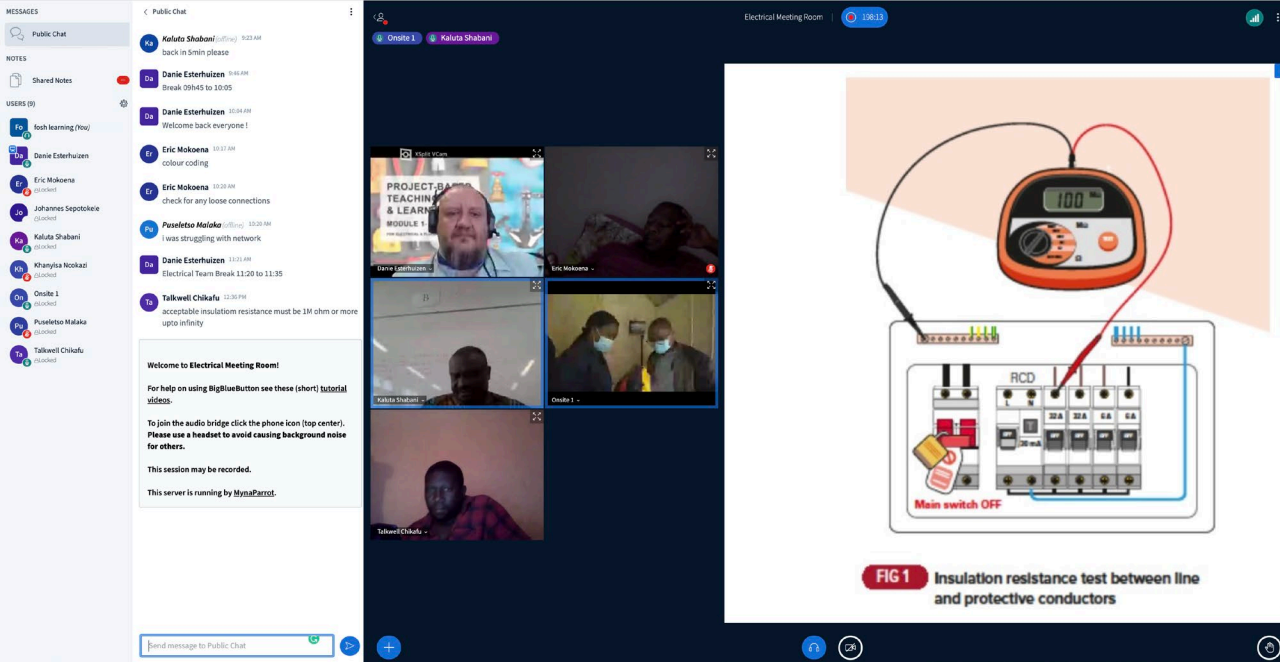Image 09: Collaborative Discussions of electrical layout in Granny Flat Model

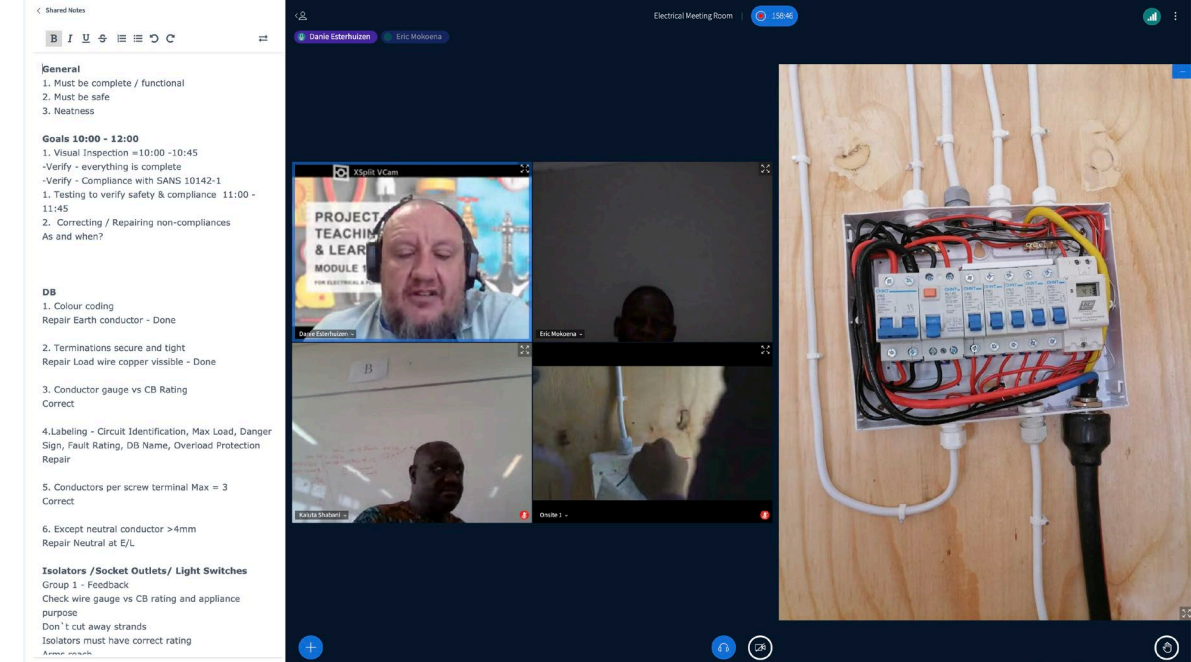Image 10: Collaborative Discussions of test on DB Board

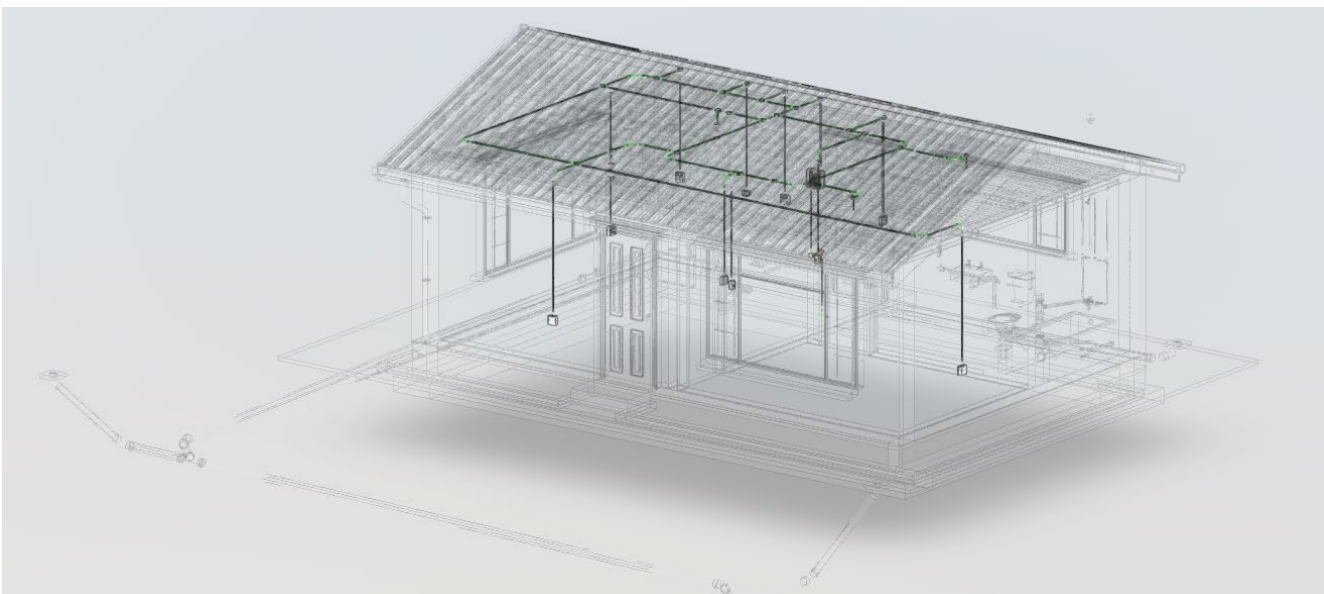Image 11: Collaborative Discussions of test on DB Board On-Site

Image 12: Isolated electrical layout on Granny Flat
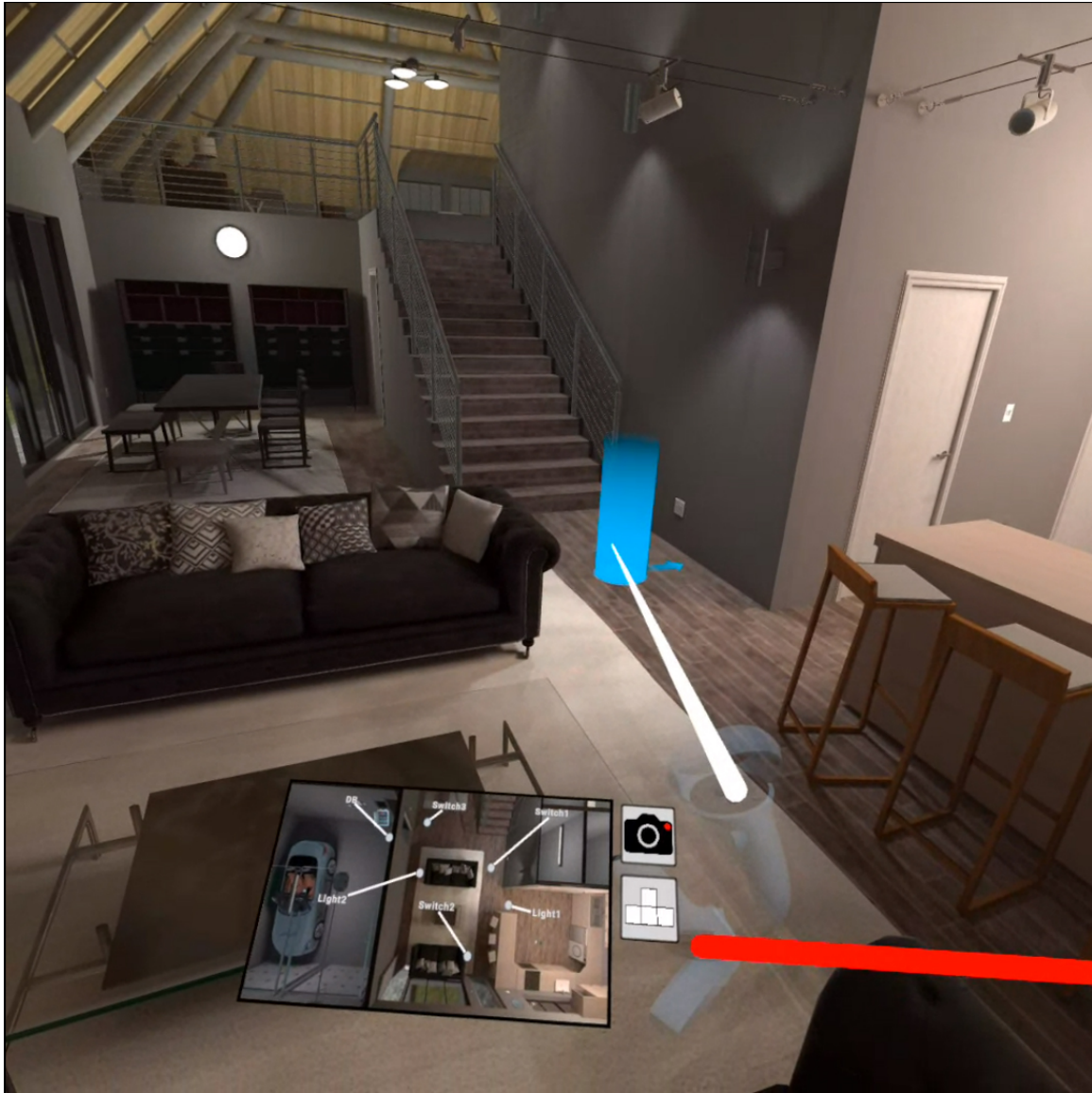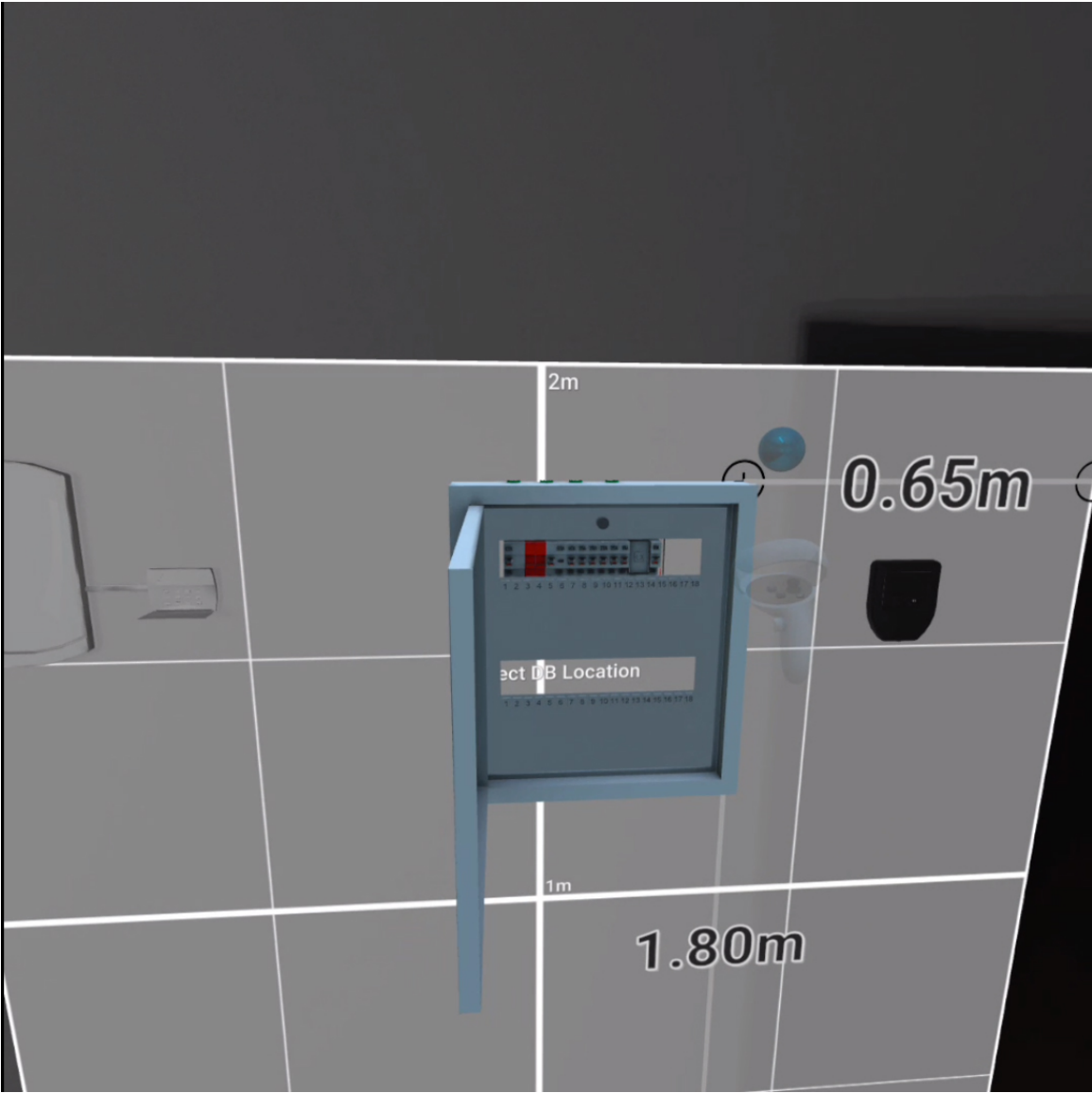
Image 13: Start and overview

Image 14: Placement of components
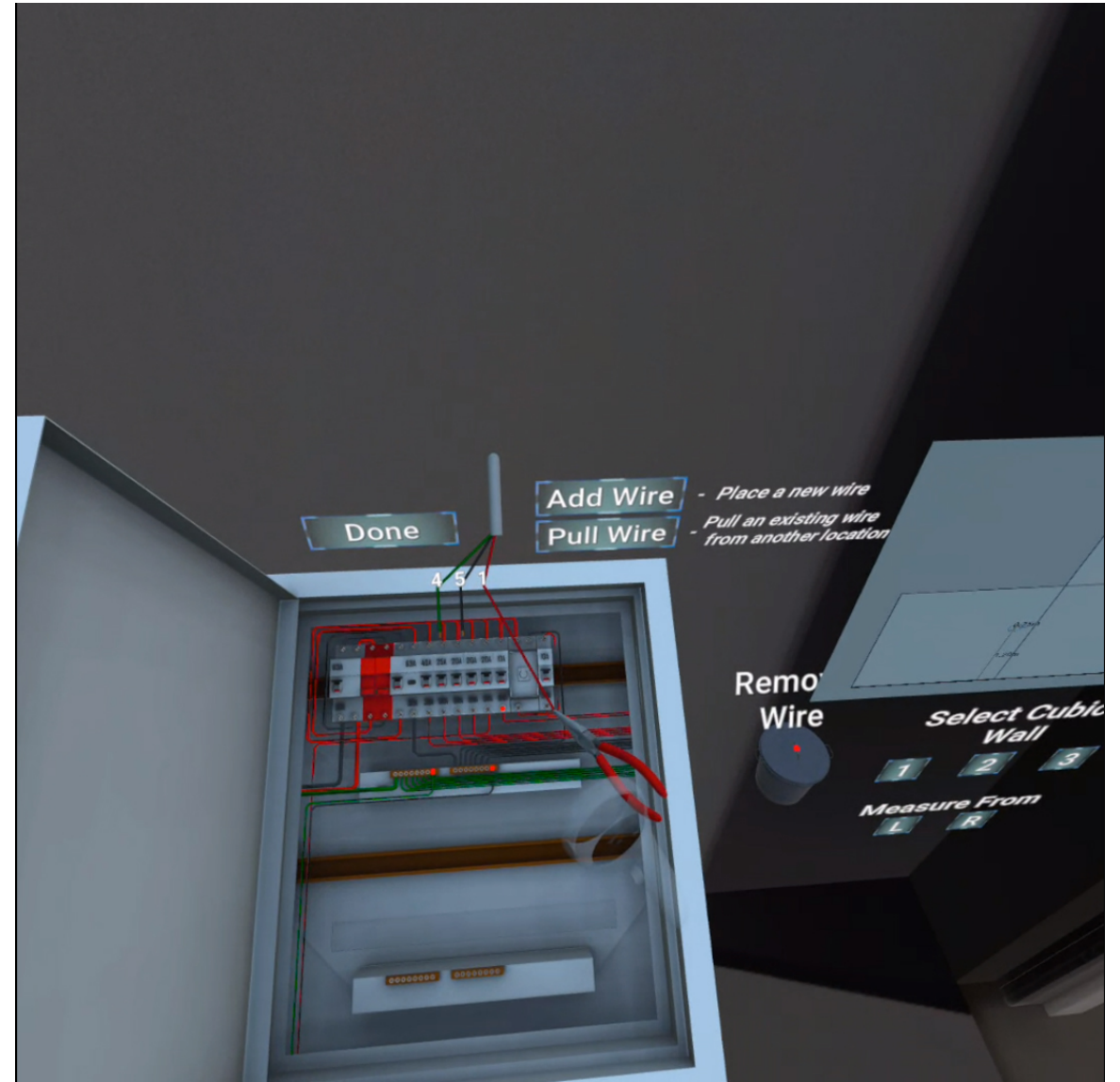
Image 15: Selection of cubicle wall

Image 16: Connection of wires

Image 17: Export function

Image 18: Measuring and Camera Tool