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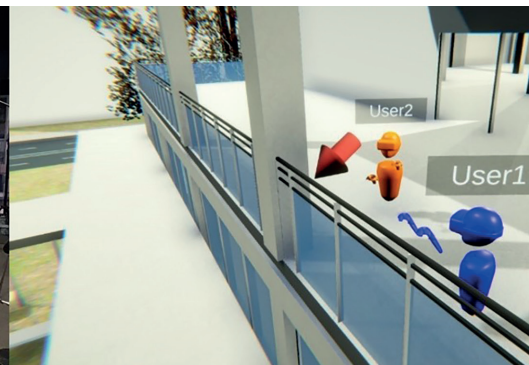
PROJECT NAME  
**An Innovative Approach to Architectural Design Coordination: BIM-Based Multi-User VR Motion Simulator System**

PROJECT LOCATION  
Hong Kong

TYPE  
**Architectural design coordination of a 3-storey community centre**

AUTODESK PRODUCTS USED

- Autodesk® 3ds Max®
- Autodesk® AutoCAD®
- Autodesk® BIM 360® Design
- Autodesk® Revit®

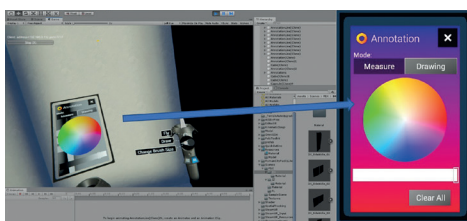


Two participants are performing design coordination tasks by using the MUVR motion simulator system in the physical world (left) and virtual world (right). Image Courtesy of City University of Hong Kong

# An Innovative Approach to Architectural Design Coordination: BIM-Based Multi-User VR Motion Simulator System

## Project Background

Along with the development of advanced technologies, Building Information Modelling (BIM) offers alternative solutions for traditional on-site design coordination in the architecture, engineering and construction industry. As a rich-information model, BIM is useful in terms of collaboration and coordination in design work. Nevertheless, challenges and inefficiencies remain exist during the design coordination process. For example, the relationship between design conflicts is hardly defined and difficult to understand, ideas for solving clash issues are poorly expressed and documented, and soft clashes cannot be well presented in terms of spatial sense. Thus, innovative technology should be used to promote efficient design coordination.



The user interface of annotation and measurement tools. Image Courtesy of City University of Hong Kong

## Project Challenges and Solutions

The challenges encountered during conventional BIM-based design coordination are due to the absence of an interactive platform for designers to visualize, discuss and directly interact within the BIM model. As such, this study aims to present a Multi-User Virtual Reality (MUVR) motion simulator system that integrates BIM into VR technology to enhance efficient design coordination process in the AEC industry.

Firstly, the system incorporates the client-server approach to involve multiple VR users so that they can interact with each other within the BIM design model in the shared virtual environment. Secondly, the system integrates the locomotion

platforms into the MUVR server to resolve the motion constraints when using the conventional VR applications. VR users are no longer restricted to the physical space boundaries. Thirdly, the system includes the VR interaction tools such as annotation and measurement tool to enhance the overall design coordination process in the MUVR environment.

## How does BIM help for your project?

A BIM model can maximize the efficiency in design and documentation process because the parametric modelling helps to manage all the geometric and non-geometric information. For instances, the BIM model developed in this project supports automation of repetitive tasks such as updating floor plans and sections spontaneously as the model is developing.

In terms of capacity, BIM model consists of a huge database of project information. With single click of button, all the related information can be traced easily and reduce the potential of information loss. Especially by using the Autodesk BIM 360 Design, all the data such as the architectural BIM model, VR-BIM walkthrough video, etc. can be exchanged, stored and managed in a good order.

Furthermore, Autodesk BIM model always interoperates with its own native products. In this project, the BIM model is further optimized geometrically and graphically in Autodesk 3ds Max to produce an immersive and realistic 3D VR model for design coordination process.

Finally, I would like to express my sincere gratitude to my supervisor, Dr Calvin Keung, who offers resources, guidance and assistance in this research project.