การประยุกต์ใช้แบบจำลองเสมือนจริงในการช่วยลดการเปลี่ยนแปลงงานในช่วงการก่อสร้าง
Application of Virtual Model Utilization for Reducing of Change Order in Construction

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บทคัดย่อ

Abstract

The objective of this research is to propose an application of Virtual Environment (VE) technology in the construction focused for change orders in the construction project. The possibility of Virtual Environment technology to apply for reducing the problems of change order in the construction project was studied. The assumption of this research is the feeling of users measured by using VE applications and the real situations are not different. The assumption was tested by the respondents' feeling using the questionnaire that compared between the feeling measured by VE applications and the real situations. The two cases studies in the real construction project were used for the experiment. The 18 respondents were selected to visit the construction site and compared the feeling between using VE application and the real situations. The statistical analysis was applied to analyze the data from the questionnaires. The results of the research show that the feeling of the respondents who applied the VE applications and the real situations in the construction project for both case studies are not significant difference. Therefore, it can be concluded that the VE technology is possibly applied in order to reduce the problems of change orders in the construction project.

Keywords: Virtual Environment, Change Orders, Construction Project

1. ที่มาและวัตถุประสงค์

2. ทฤษฎีและงานวิจัยที่เกี่ยวข้อง

2.1

Shop Drawing

[1]

X Y
D)

2.3.3 Virtual Reality (VR)
Virtual Reality VR

VR

VR simulation
4]

5 [5]

1.
Desktop VR Window on a World (WoW)
2. Video Mapping

3. Immersive Systems VR

Head-Mounted Display (HMD)

4. Telepresence

5. Augmented Mixed Reality Systems
Telepresence Virtual Reality System

Telepresence

2.4 Head Mounted Display (HMD)

Head Mount Display (HMD)

2.2

2.2.1

2.2.2

[3]

2.2.3

[2]

2.3

2.3.1

BIM (Building Information
Modeling)

Software)
building model)
information) [3]

2.3.2 Augmented Reality (AR)
Augmented Reality (AR)

Revit

Head Mounted

Display

รูปที่ 1 Head Mounted Display (HMD)

3. วิธีดำเนินการวิจัย

Virtual Environment : VE)

รูปที่ 3 Enscape

3.3

3.1

Head Mount Display Enscape

Virtual

Environment)

2

3.2

Autodesk Revit

Visual Reality)

รูปที่ 2 3 Autodesk

Revit 2019

Enscape

Autodesk

ตารางที่ 1

	5
	4
	3
	2
	1

ตารางที่ 2

	5
	4
	3
	2
	1

,

,

ตารางที่ 3

	5
	4
	3
	2
	1

ตารางที่ 4

	5
	4
	3
	2
	1

3.4

2

2 Paired-Simples test)

30 [6]

, μ_{pre}

, μ_{post} D_{ij})

S.D. (1) - (4)

$$\mu_{pre} = \frac{\sum_{i=1}^{N} x_i}{N} \quad 1$$

$$\mu_{post} = \frac{\sum_{i=1}^{N} y_i}{N}$$

$$\overline{D} = \frac{\sum_{i=1}^{N} D_i}{N}$$

$$S.D. = \sqrt{\frac{N\sum_{i=1}^{N} D_i - (\sum_{i=1}^{N} D_i)^2}{N(N-1)}}$$

Xi =

Yi =

Di =

N =

Sample t-test)

t-score 2-tailed

degree of freedom : df) N-1

Hypothesis)

H0)

H1) 0.05 (= 0.05)

$$H_0 : \mu_{post} = \mu_{pre}$$

$$H_1 : \mu_{post} \neq \mu_{pre}$$

H_0 μ_{pre}

μ_{post}

H_1 μ_{pre}

μ_{post}

4. การวิเคราะห์ความแตกต่างของสภาพแวดล้อมจริงกับสภาพแวดล้อมเสมือนจริง

4.1 1:

1: 4 ,

,

1 4

7 8 Pair Sample Test

5 6

รูปที่ 4

ตารางที่ 5 **Paired-Simples test)**

1 **0.05)**

	Mean	S.D.	Sig. (2-tailed)	H0	H1
	-0.800	1.398	0.104	Accept	Reject
	-0.800	0.632	0.758	Accept	Reject
	-0.100	0.994	0.081	Accept	Reject
	-0.500	0.707	0.052	Accept	Reject

H0)

Sig.
(2-tailed) 0.05 H0)
Virtual Reality)

5. สรุปผลการวิจัย

Change
Order)

Virtual Environment)

18 2

18 2
2
1: 8 2: 10

Virtual Reality)

6. ข้อเสนอแนะ

เอกสารอ้างอิง

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[6]

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