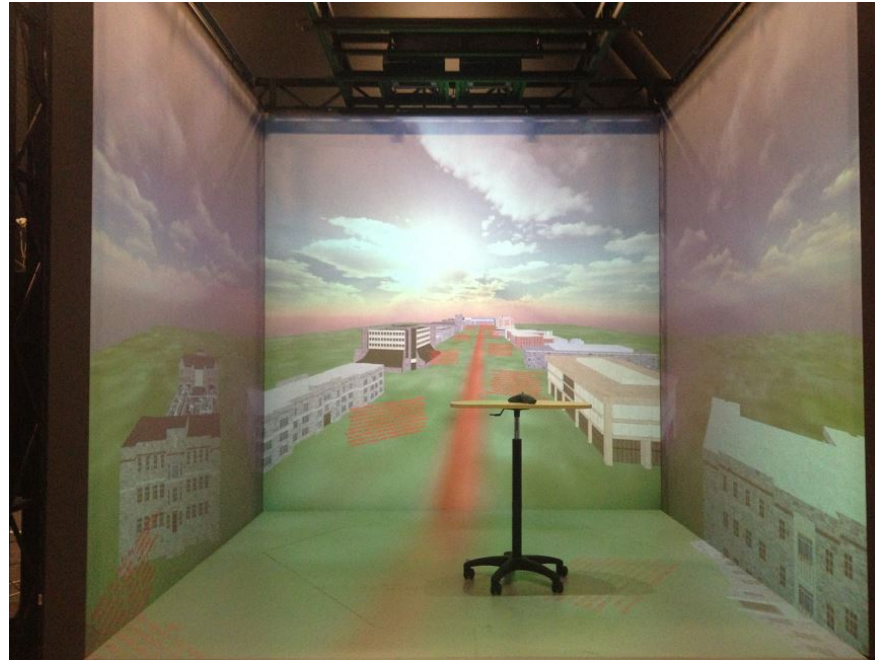# Visualizing Information Panel for Virtual Environment

Wei Huang, Yao Zhang

Introduction

Motivation

- The rise of VR
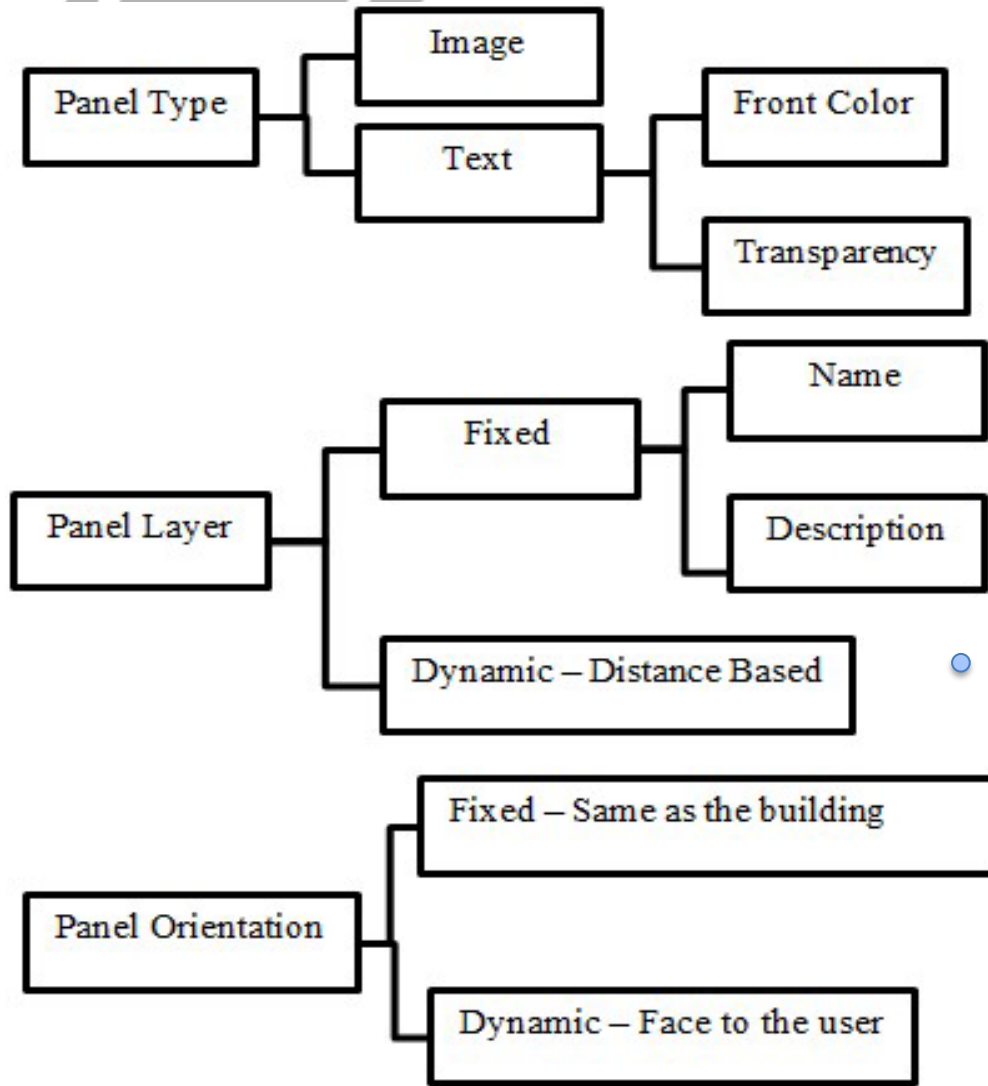
- Information everywhere

Design

- Two panels: *Hierarchical* vs. *All-In-One*

- Two tasks: Name -> Info, Info -> Name

Hypotheses

- *Hierarchical* panel better than *All-In-One* panel

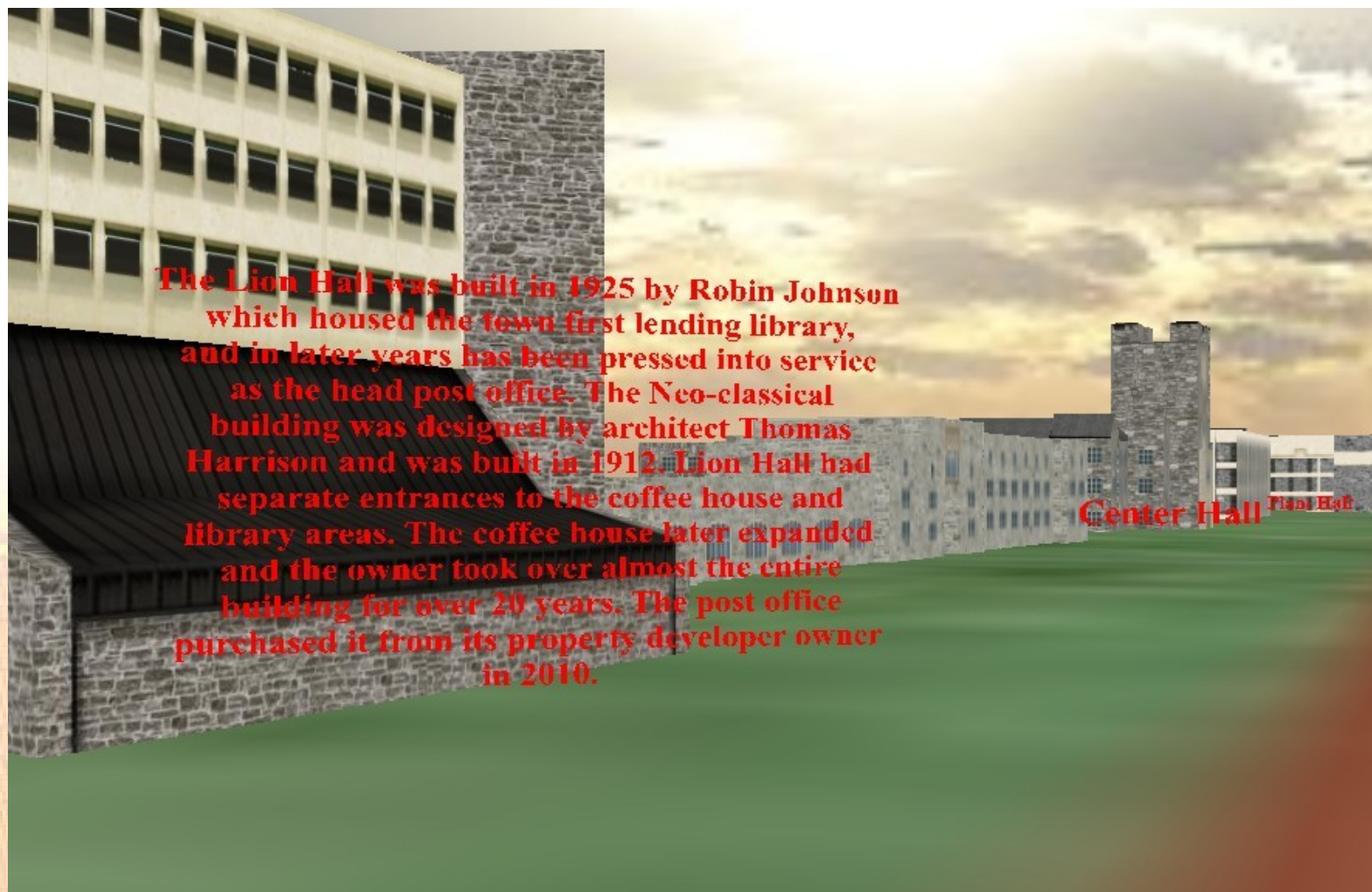- Demographic factors affect user's experience

Panel

Panel Type
- Image
- Text
  - Front Color
  - Transparency

Panel Layer
- Fixed
  - Name
  - Description
- Dynamic – Distance Based

Panel Orientation
- Fixed – Same as the building
- Dynamic – Face to the user

Text Wins

Which is better ?

Always Facing to User !

The Lion Hall was built in 1925 by Robin Johnson which housed the town first lending library, and in later years has been pressed into service as the head post office. The Neo-classical building was designed by architect Thomas Harrison and was built in 1912. Lion Hall had separate entrances to the coffee house and library areas. The coffee house later expanded and the owner took over almost the entire building for over 20 years. The post office purchased it from its property developer owner in 2010.
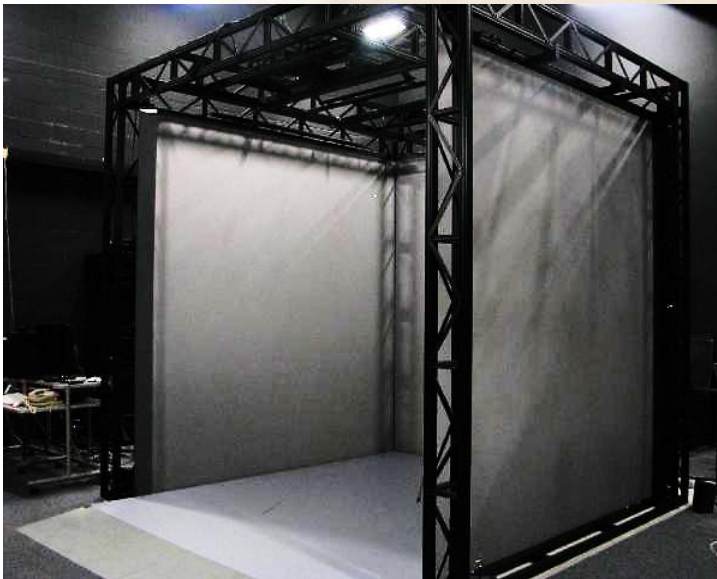
Center Hall

- *All-in-One* Panel
  only one panel contains both name and description

- *Hierarchical* Panel
  far - name panel;   near – information panel

Implementation

Hardware: VisCube (including hand controller)

Software: X3D-Edit, Vivaty Studio

X3D: <Text>, <LOD>, <Billboard>
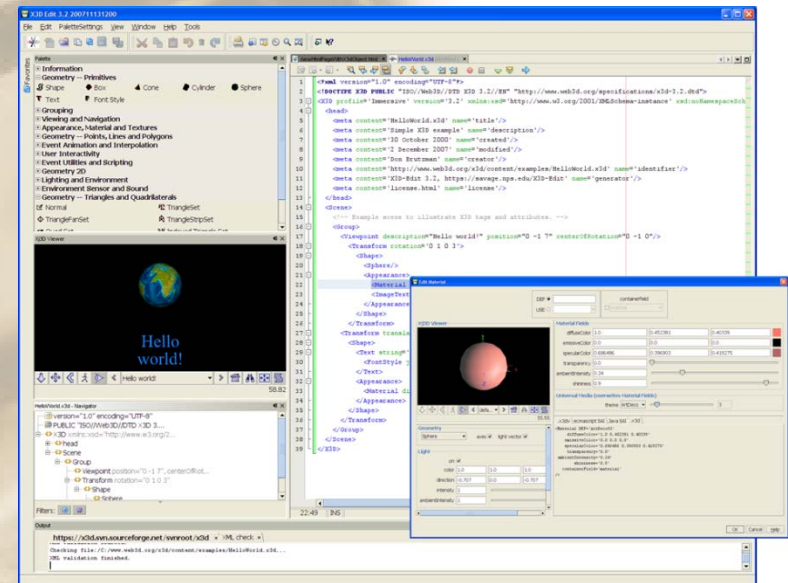
User Study - Procedure

Pre-study Questionnaire
- Demographic
- Background

Training Task
- Preview Interface
- Learn to use hand controller

Tasks (2*2)
- Completion Time
- Accuracy

**Post Questionnaire**
- Subjective Evaluation
- Preference

User Study – Task Set

- Task Type 1, Hierarchical panel

- Task Type 2, Hierarchical panel

- Task Type 1, All-in-One panel

- Task Type 2, All-in-One panel

Type	Task
1	Given some information of a building name, find some specific information.
2	Given some information of a building, find such buildings.

User Study - Participants

12 participants   thanks for SONA system & mailing list & etc…
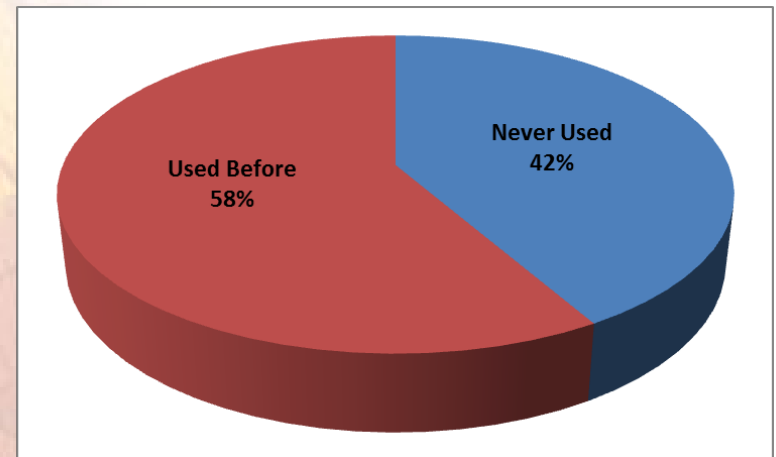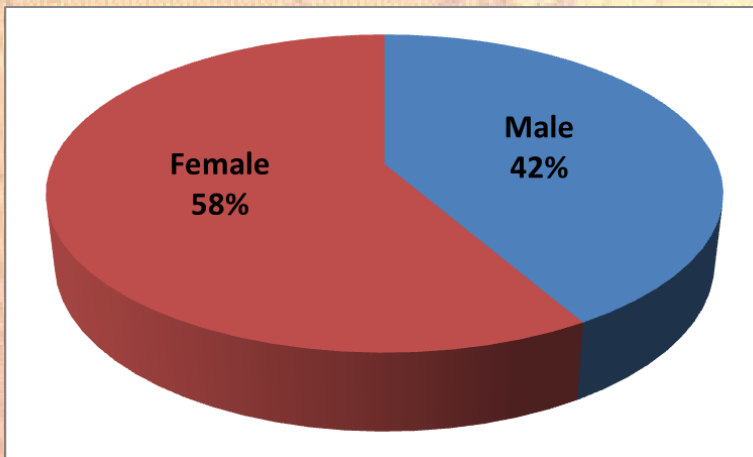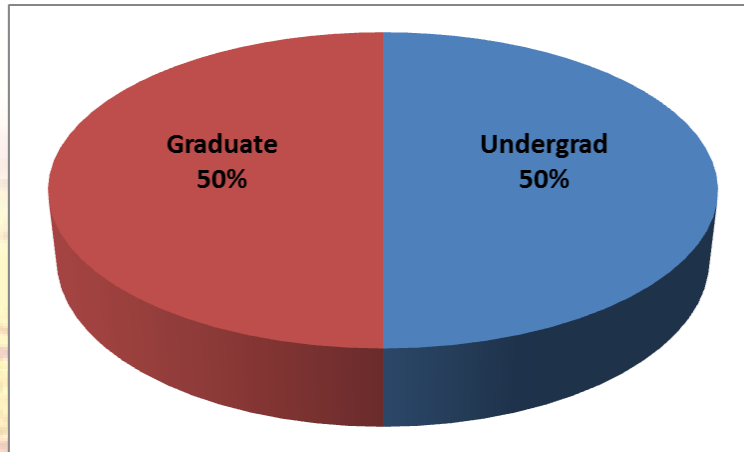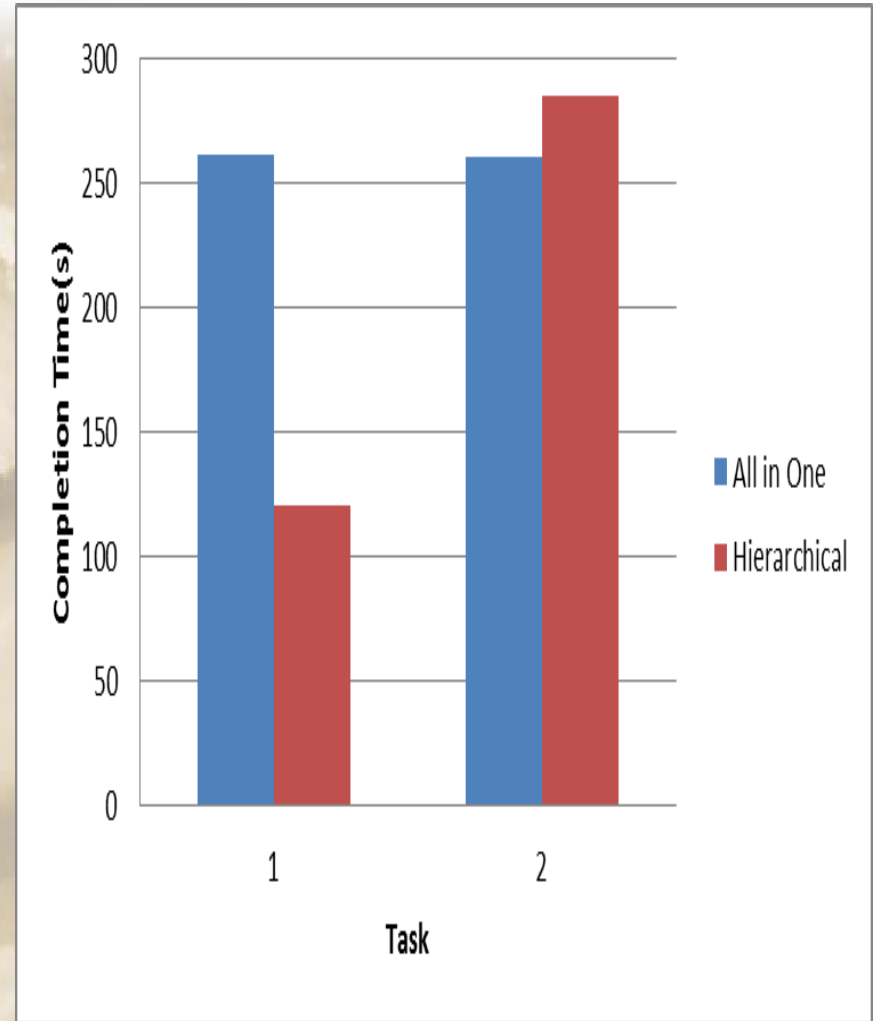
Overall Result

ANOVA

	F	p
Task 1	61.05	$8.72e-08$
Task 2	0.61	0.44

Completion Time

	T1-H	T1-A	T2-H	T2-A
mean	120.17	260.83	284.3	260
std	32.92	52.97	78.07	77.72
max	186	380	485	400
min	80	190	197	153

Accuracy

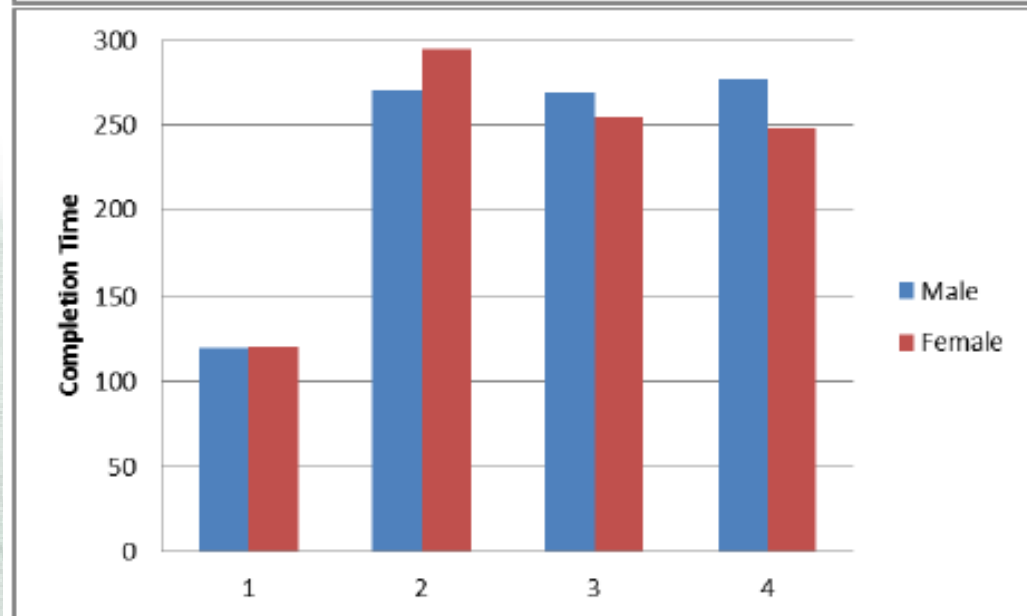|	T1-H	T1-A	T2-H	T2-A
mean	0.945	0.93	0.792	0.875
std	0.128	0.112	0.257	0.199
max	1	1	1	1
min	0.67	0.67	0.25	0.5

Analysis – Boys vs. Girls

Male

- Higher Average Accuracy
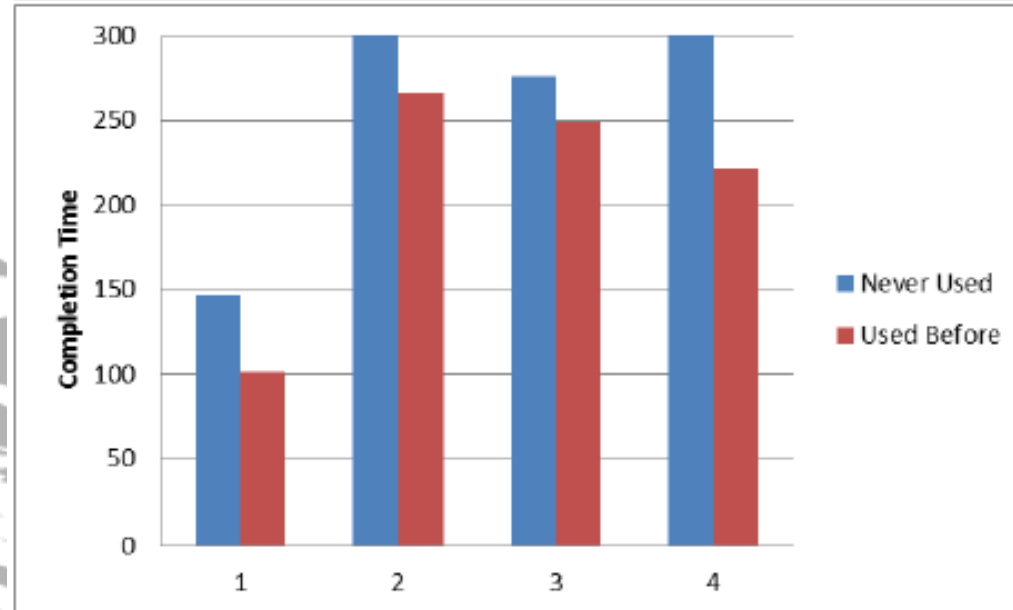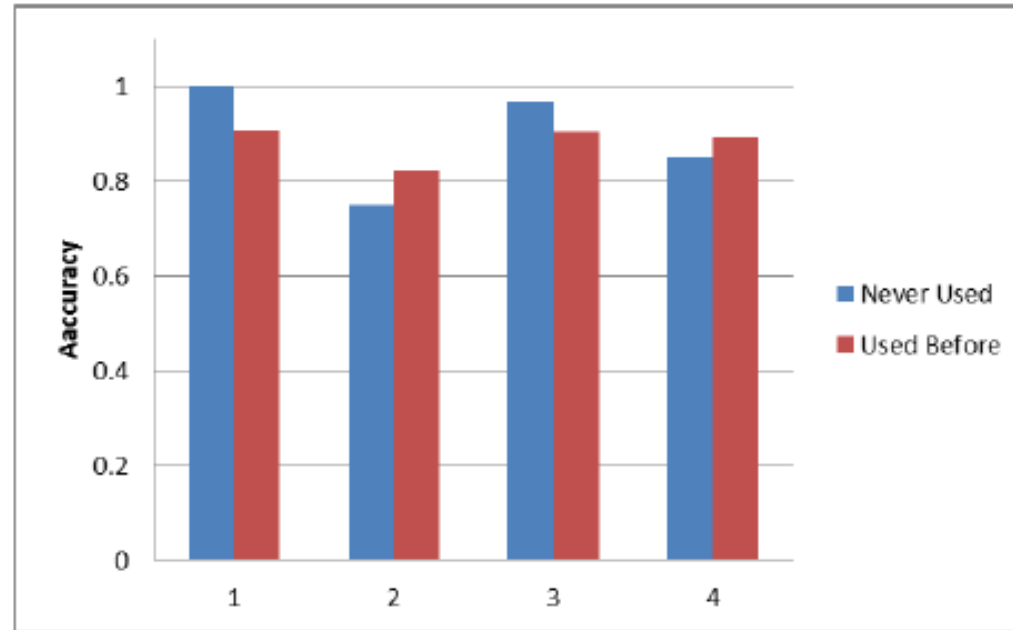
- Shorter Completion Time

  with Hierarchical
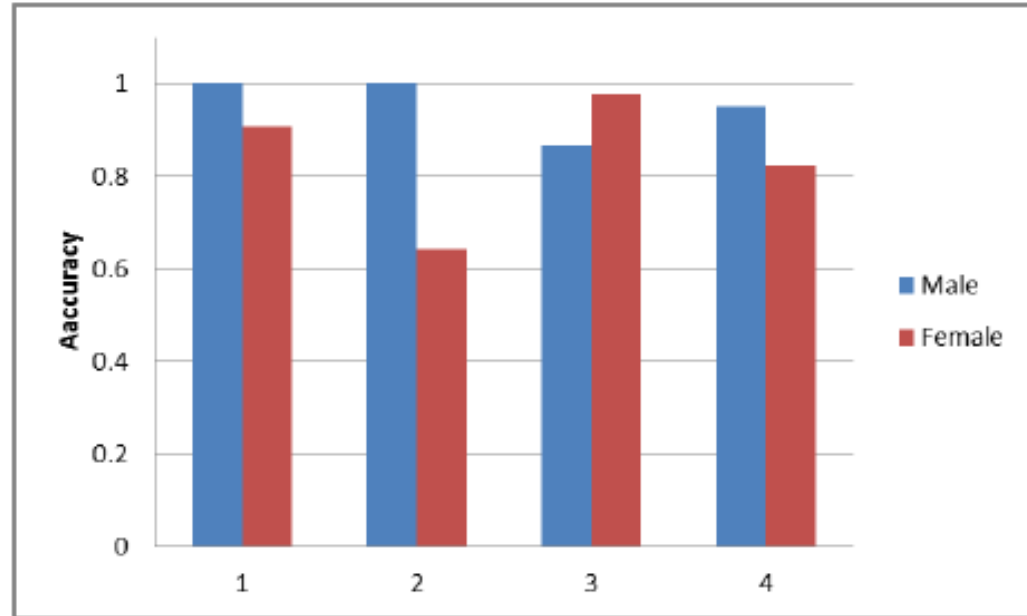
Female

- Two Preferred All-in-One

- Shorter Completion Time
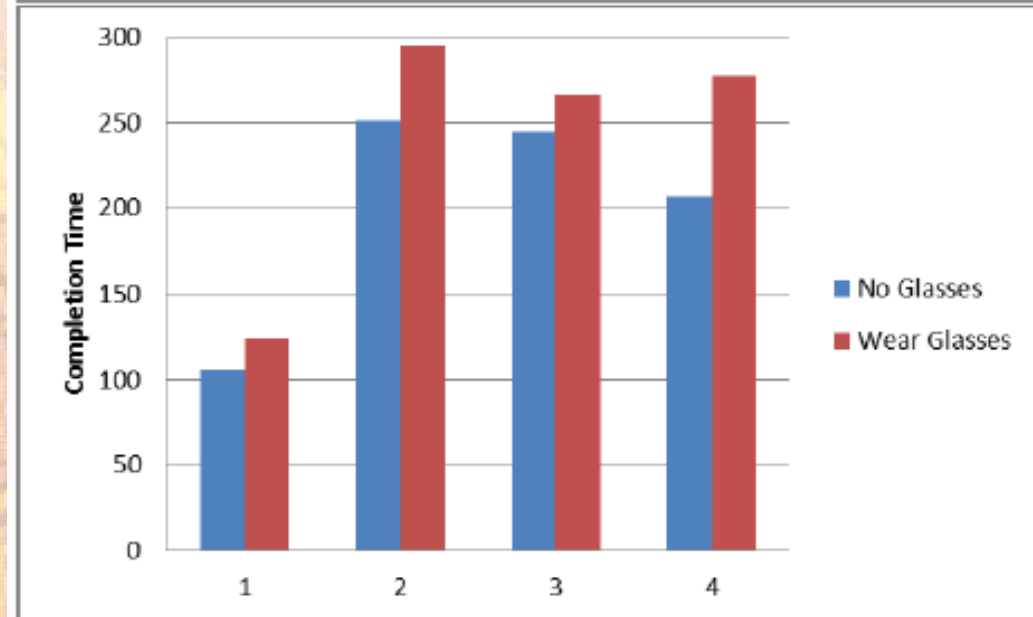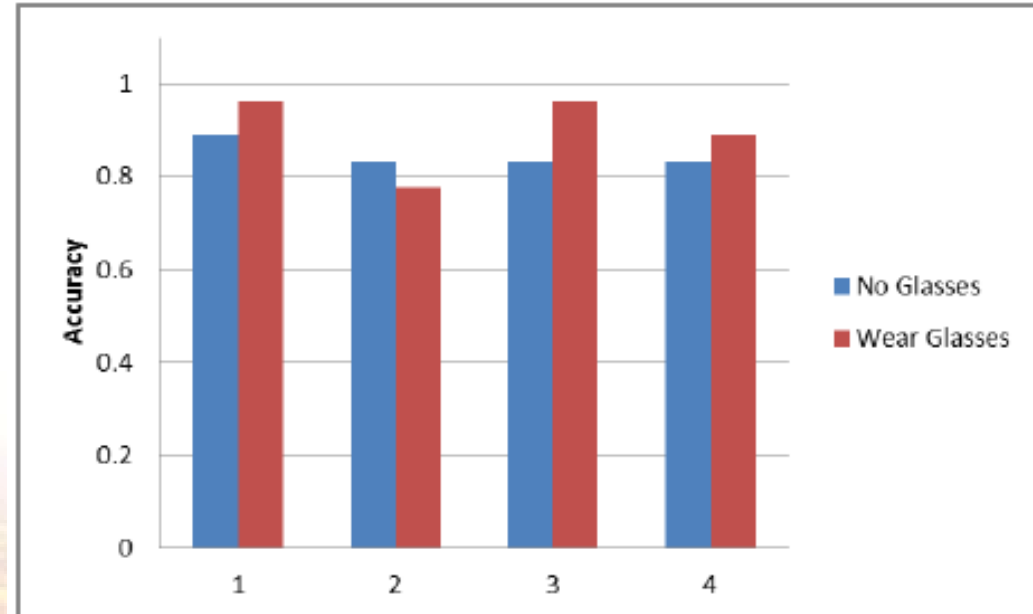
  with All-in-One

Novice Take More Time

- Hand controller

- 3D scene

Analysis – Glasses Really Matter

Myope Take More Time

- VisCube

- 3D scene

Subjective Feedback
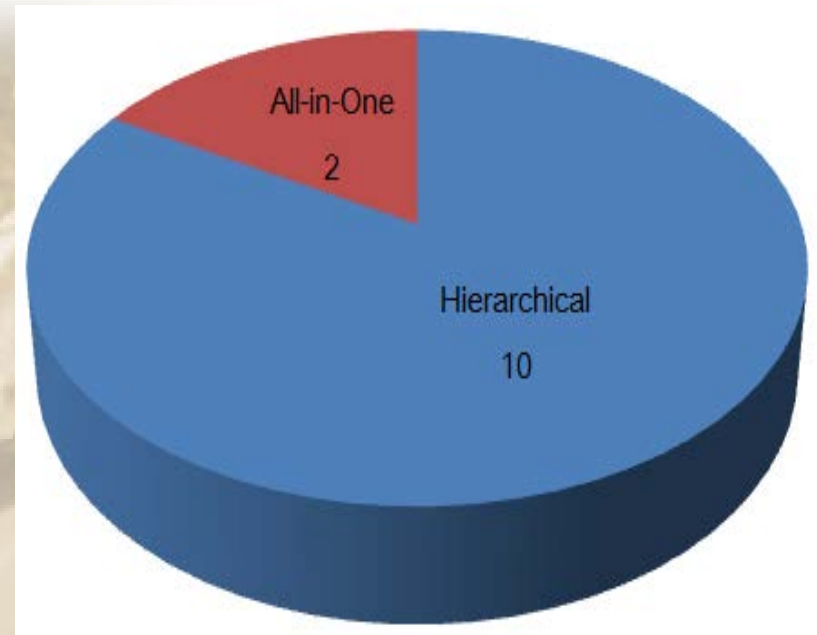
User Interface
Readable and user-friendly (All)

Rendering
Smooth and neutral (Most)

Control
Satisfied with hand controller (Most)
A little difficult to go up/down (Novice)

Conclusion

What We Done

- Design Hierarchical Panel

- Implement Two 3D UIs

- Perform User Experiment

- Analysis & Discussion

What We Found

- Hierarchical is Better

- Demographic Factors' Effect

Thank you~

Q & A