# Efficacy of Virtual Reality Content Types for **Engagement in Assisted Living Communities**

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#### INTRO

#### BACKGROUND

#### What is Virtual Reality?

 Computer-generated 3D immersive world (Laamarti et. al 2014)



#### Advances in VR

- Low cost and user friendly devices
- Can be applied in many fields (Wexelblat 2014)
- □ Data visualization (Earnshaw 2014)
- □ Education (Nichols et. al 2012)
- □ Entertainment (Anthes et. al 2016)
- □ Training (Santoso & Jacob 2016)

#### PROBLEM

#### IN HEALTHCARE

- Potential as tool in healthcare (Gold et al 2017)
- Immerse patient to reduce pain/discomfort
- Comforted individuals with chronic pain using meditative VR walk (Gromala et al 2017)

#### PROBLEM

- Seniors undergo preventable cognitive decline (Bassuk et. al 1999)
- Cannot experience engaging activities in old age
- Little research into VR is assisted living homes

What VR content is best for seniors? How can VR be used to engage them?

#### METHODS

#### PARTICIPATION

- Institutional Review Board approved
- Conducted at high school & two senior living communities

#### Control Group

- 25 high schoolers ages 15-18 recruited
- Informed minor consent / assent
- 18 had already tried VR

### **Experimental Group**

- 27 senior citizens ages 62-99
- Informed consent from facilities
- No schedule conflicts
- Only 1 had already tried VR

#### Preparation

- Information session held prior to experiment □ Introduced VR, rationale/application, methods
- Headsets adjusted to minimize discomfort

#### ROLE OF MENTOR

- Oversaw research plan & targets
- Helped design content framework & interactive game
- Provided equipment

DATA COLLECTION

Timestamp included in file

Recorded every 10th of a second

7.2M data points, 2.4M filtered

**Head Orientation** 

Head Orientation - Senior Group

Figure 3: Head orientation of both groups accumulated during all trials

**Head Orientation** 

## **Engagement Ratings**

- Rated content on level of engagement felt C# script to log head orientation
  - On-screen number scale or verbal rating









#### □ Age

□ Previous VR experience

**Most Engaging - High School Group** 

Paper survey asking:

Game

- Most engaging content type
- Most enjoyable content type

Post-Test Survey

#### EQUIPMENT

- Samsung Gear VR system
- Samsung Galaxy S7 smartphone
- On-Ear headphones for audio
- Portable & easy to use

# Samsung Galaxy S7

Samsung Gear VR System

#### CONTENT TYPES

#### 1. Images

- 20 panoramic images
- From Google Street View
- Provided variety of scenes
- 20 seconds per image

#### 2. Videos

- 3x 360° videos
- Sourced from YouTube
- Varying scenery

#### 3. Interactive

- Balloon Popper Game
- Interactive & multiplayer
- Pop certain balloons
- Look at balloons to pop

# 1-min abstract fractal

1-min beach sunset

#### DISCUSSION / APPLICATION

#### DISCUSSION

- Lower head mobility among seniors
- Haiti Documentary & Uru Home highly interesting
- Novelty of interactive yielded senior engagement
- Less head movement in VR content is better
- Most engaging content rating:
- 1. Interactive experience
- 2. Still Images
- 3. Videos

#### APPLICATION

- Consideration of data when designing VR for elderly
- Analytics system for clinical setting
- Use same content framework for hospitals & therapy



#### CONCLUSION / FUTURE WORK

#### CONCLUSION

- Better understanding of what VR content is most engaging for seniors
- Created a system to improve elderly living via engaging VR content

#### FUTURE RESEARCH

- Deeper analysis of data
- Expand framework for larger sample size
- Integrate within existing product
- Develop into standalone healthcare tool



#### GOAL

- Understand what VR content is most engaging for seniors
- Deliver more cognitively beneficial content
- Create a system to improve elderly living via engaging VR content

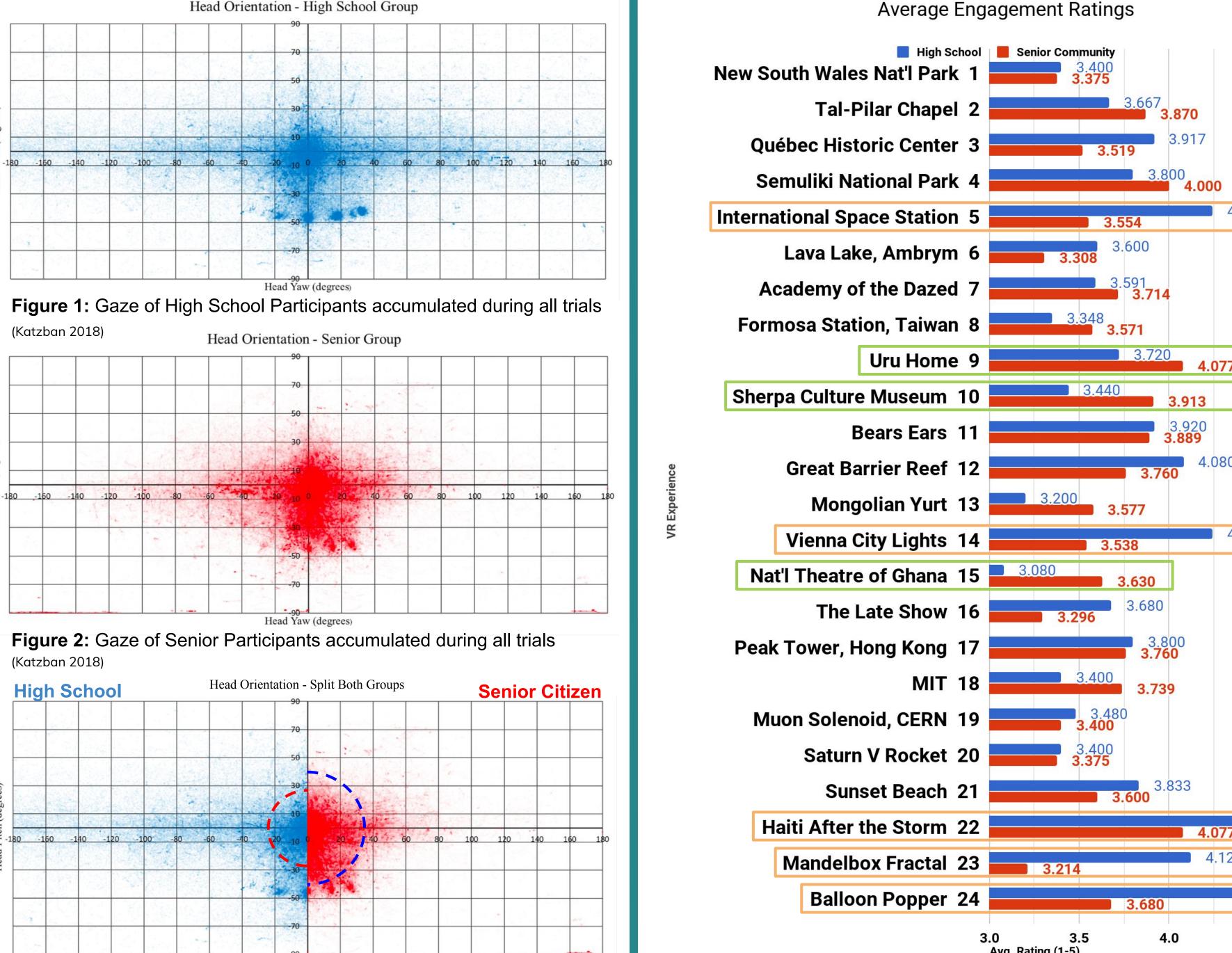
Content targeted at seniors

More engaging experience

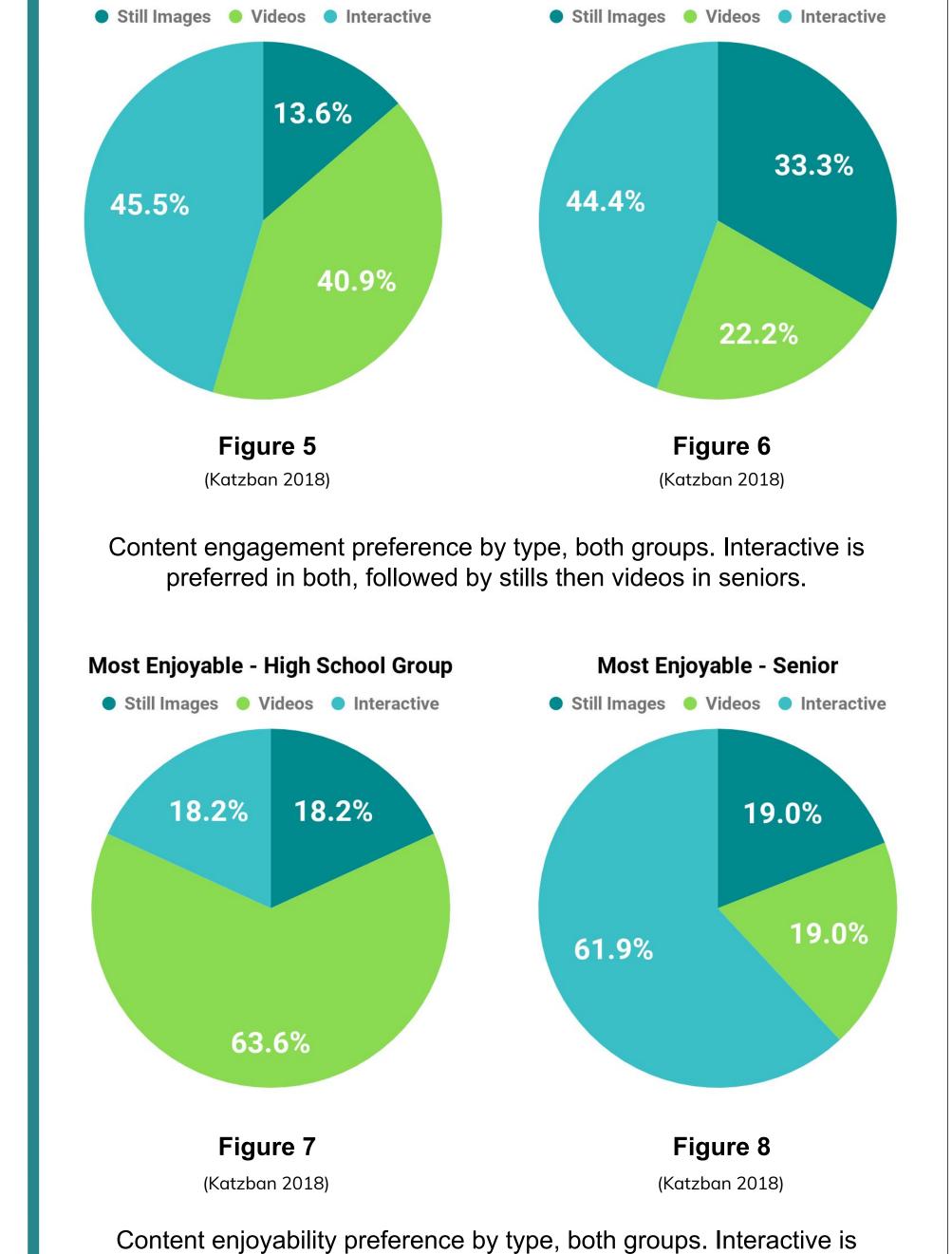
Decreased cognitive decline

#### RESULTS

#### **Engagement Ratings** Average Engagement Ratings



#### **Post-Test Survey**



preferred in seniors; stills and videos are preferred equally.

**Most Engaging - Senior Group** 

(Katzban & Rand 201

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Figure 3: Average content rating on 1-5 scale for 24 content pieces