Using Mobile Virtual Reality to Empower People with Hidden Disabilities to Overcome Their Barriers

Dr. Matthieu Poyade
Glasgow School of Art
m.poyade@gsa.ac.uk

Glyn Morris
Friendly Access
info@friendlyaccess.org

Ian Taylor
Crag3D
ian@crag3d.com

Victor Portela
Glasgow School of Art
v.portela@gsa.ac.uk

ABSTRACT

This poster presents a proof of concept for an immersive and interactive mobile application which aims to help people with hidden disabilities to develop tolerance to the environmental stressors that are typically found in crowded public spaces, and more particularly in airports. The application initially proposes the user to rehearse a series of sensory attenuated experiences within digitally reconstructed environments of the Aberdeen International Airport. Throughout rehearsals, environmental stressors are gradually increased making the environments more sensory challenging for the user.

INTRODUCTION

People living with hidden disabilities such as autism, learning disabilities and mental health conditions are far more likely to experience high levels of discrimination, isolation, fear, anxiety and poverty. Environmental stressors like sounds, light and crowds can become huge barriers to independent living.

Currently applied strategies as (1) Social Stories™ which consist of a sequence of images along with descriptions of what to expect; and (2) pre-visits as a reasonable adjustment, used to familiarise people with hidden disabilities to busy environments as airports are often not enough to increase individual's confidence and ability to lead a more independent life as they do not contribute effectively to desensitise to environmental stressors.

Recent researches have suggested the potential of immersive visualisation offering gradual exposure therapy in Virtual Reality (VR) to environmental stressors in order to tackle hidden disabilities and prepare better for demanding experiences [1-3]. In relation to that, nowadays affordable smartphones are powerful platforms that can be used for visualising digital environments in 3D over 360° through affordable (VR) headsets.

This poster presents the development outcomes of the research project "*Dynamic Interactive Navigation for Familiarisation and Desensitisation*" in which the Aberdeen International Airport kindly accepted to participate as a case study.

OUR APPROACH

We present a proof of concept for an VR application for Android mobile phones, which aims to familiarise and desensitise people with hidden disabilities, and more particularly those who live with Autistic spectrum Disorder (ASD) and anxiety disorders, to environmental stressors in airport environments.

Our app was co-designed with 26 volunteers, all living with hidden disabilities, across Scotland, who helped tailor a sensory realistic immersive experience of an airport environment. Aiming to make our app available to most, we built it on Unity 5 using the Google VR SDK for providing

Figure 1. Virtual Reality Scope Headset for Smartphone (£5.99).

head tracked stereoscopic visualisation and Ambisonic audio for Android smartphones (e.g. Samsung 7) mounted on an affordable VR headset (Fig. 1).

We provide users with a series of experiences in 4 airport different environments: (1) the entrance hall and check-in gates (Fig. 2.a); (2) a coffee shop (Fig. 2.b); (3) gender-specific toilets (Fig. 2.c); and (4) a boarding gate (Fig. 2.d); and enable the gradual increase of the environmental stressors as environmental sounds and crowd density, making each environment more challenging throughout repeated use.

Figure 2. Digitally reconstructed airport environments.

USER EXPERIENCE TESTING

A usability test was conducted on 11 postgraduate students (M = 6; F = 5), with no experience in VR. They were required to use the app as if they were our typical high-end users and rate a series of statements using a Likert scale: Strongly *Unhappy* (1) – *Unhappy* (2) – *Neutral* (3) – *Happy* (4) – *Strongly Happy* (5). Preliminary results were encouraging as shown in Figure 3.
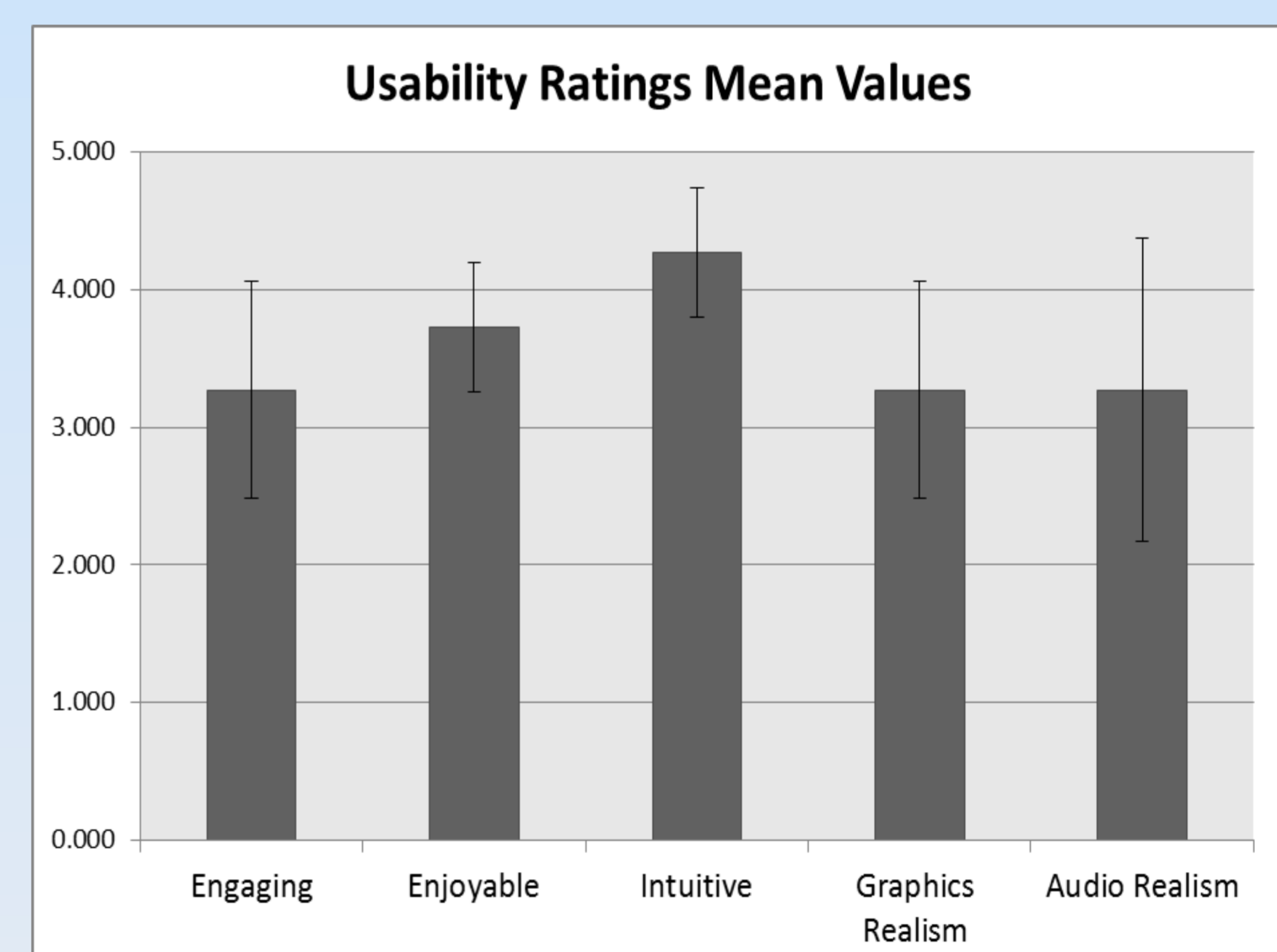

Figure 3. Usability Preliminary Results

REFERENCES

[1] Maskey, M., Lowry, J., Rodgers, J., McConachie, H. and Parr, J.R., 2014. Reducing specific phobia/fear in young people with autism spectrum disorders (ASDs) through a virtual reality environment intervention. PloS one, 9(7), p.e100374.

[2] Yellowlees, P.M., Holloway, K.M. and Parish, M.B., 2012. Therapy in virtual environments—clinical and ethical issues. Telemedicine and e-Health, 18(7), pp.558-564.

[3] Anderson, P.L., Price, M., Edwards, S.M., Obasaju, M.A., Schmertz, S.K., Zimand, E. and Calamaras, M.R., 2013. Virtual reality exposure therapy for social anxiety disorder: a randomized controlled trial. Journal of consulting and clinical psychology, 81(5), p.751.

SCHOOL OF SIMULATION AND VISUALISATION
THE GLASGOW SCHOOL OF ART

friendly access
Making Access Possible

Crag3D

European Union
gov.scot

EUROPE & SCOTLAND
European Regional Development Fund
Investing in a Smart, Sustainable and Inclusive Future