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Included in Social Sciences Citation Index

BEING DIGITAL

UNCOVERING THE PERSPECTIVES OF PEOPLE WITH DISABILITY

Disability & Society

THE LEADING JOURNAL IN DISABILITY STUDIES

DISABILITY & SOCIETY / THE LEADING JOURNAL IN DISABILITY STUDIES

ONE CENTRAL AIM OF DISABILITY STUDIES IS TO SHIFT UNDERSTANDINGS OF DISABILITY, SUCH THAT DISABILITY COMES TO BE UNDERSTOOD AS ABOUT THE SOCIAL DISADVANTAGE/ OPPRESSION THAT PEOPLE FACE WHEN SOCIETY DOES NOT CATER TO IMPAIRMENT OF BODY/MIND. NEVERTHELESS, THERE REMAINS A NEED FOR MORE PRACTICAL TOOLS FOR DISABILITY ADVOCACY, THROUGH WHICH TO TRANSMIT DISABILITY STUDIES' IDEAS OF DISABILITY TO THE GENERAL COMMUNITY. DRAWING ON A QUALITATIVE STUDY OF THE PERSPECTIVES OF 23 PEOPLE WITH PHYSICAL AND SENSORY IMPAIRMENTS, THIS PAPER PROPOSES VIRTUAL REALITY AS AN ADVOCACY TOOL TO COMMUNICATE THE PRINCIPLES AND BELIEFS OF DISABILITY STUDIES. THE FINDINGS HIGHLIGHT THAT, DUE TO THE NATURE OF THE TECHNOLOGY, PARTICIPANTS FEEL VIRTUAL REALITY HAS CLEAR POTENTIAL AS A DISABILITY ADVOCACY TOOL THAT CAN FACILITATE EMPATHY, PERSPECTIVE-TAKING AND POSITIVE SOCIAL CHANGE, WITH A PARTICULAR FOCUS ON HOW IT IS THE ENVIRONMENTAL BARRIERS AND SOCIAL ATTITUDES AROUND PEOPLE THAT DISABLES THEM.

POINTS OF INTEREST
MORE PRACTICAL ADVOCACY OR INFORMAL EDUCATION TOOLS ARE NEEDED THAT ALIGN WITH THE PRINCIPLES OF DISABILITY STUDIES.

THIS RESEARCH CONDUCTED IN-DEPTH INTERVIEWS WITH 23 PEOPLE WITH PHYSICAL AND SENSORY IMPAIRMENTS.

THE RESEARCH FINDS THAT VIRTUAL REALITY HAS CLEAR POTENTIAL AS A DISABILITY ADVOCACY TOOL.

THE PARTICIPANTS REPORTED THAT VIRTUAL REALITY CAN FACILITATE EMPATHY, PERSPECTIVE-TAKING AND POSITIVE SOCIAL CHANGE.

THE RESEARCH FINDS THAT VIRTUAL REALITY FOCUSES ON HOW ENVIRONMENTAL BARRIERS AND SOCIAL ATTITUDES AROUND PEOPLE WITH DISABILITY DISABLE THEM, RATHER THAN FOCUSING ON IMPAIRMENT EXPERIENCES.

BOTTOM LINE: USING AR/MR GOGGLES TO ALLOW FOR PLANNERS TO EXPERIENCE THE ISSUES OF A BUILDING WHILE STILL AT PLANNING STAGE.

RESEARCH

Desktop virtual reality and the disabled

There are desktop virtual reality systems which enable wheelchair users to navigate a virtual world, for example a busy street or shopping centre. They learn how to move around and avoid obstacles in a virtual setting before putting these into practice in the real world. They wear a head mounted display (HMD) and use an input device such as a joystick or trackball.

This is useful in the design of buildings with disabled access as a means of testing prototypes before they are built. The aim is to see if the wheelchair user can successfully negotiate their way around a building and if not, what the potential hazards are.

The aim of this technology is to enable the disabled to lead an independent life wherever possible and to interact with others. Virtual reality can teach them basic skills which able bodied people often take for granted but nevertheless, are still important for day to day living. These include cooking, shopping and other household tasks.

The aim is to boost confidence and self-esteem thereby leading to improved quality of life. The disabled person is able to engage with society and feel a sense of value from doing so.

Motor disabilities

VR gives users the chance to explore new worlds and try new experiences, which may be especially meaningful for people with motor disabilities. In particular, VR environments can allow people with motor disabilities to virtually overcome certain physical limitations.
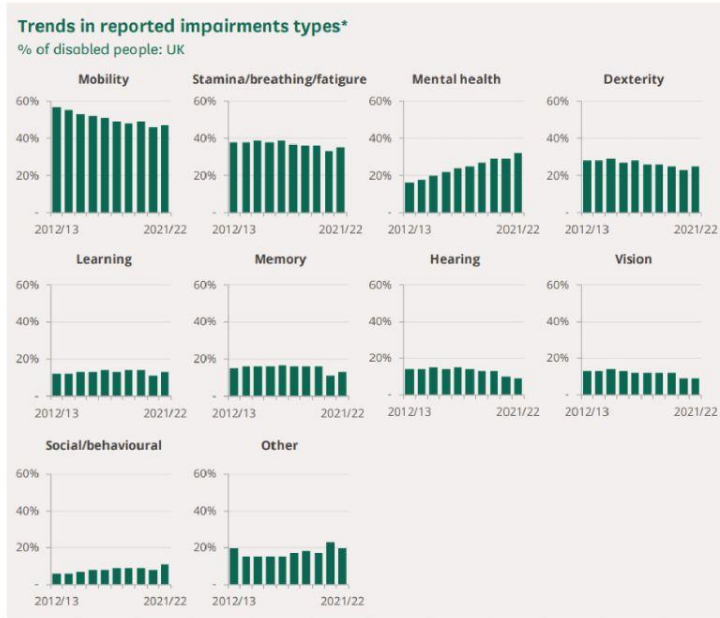
Danny Kurtzman, who has muscular dystrophy and uses a wheelchair, spoke about his feeling of elation after trying out a surfing experience in VR: "It gave me that awesome feeling —that butterfly happiness feeling. It allowed me to experience something I thought I never could experience."

VR also has the potential to help people with motor disabilities in physical rehabilitation programs. Scientists have shown how simply imagining an activity stimulates the motor cortex, the part of the brain used for voluntary movements. The Swiss neurotechnology startup MindMaze has raised $100 million in funding to develop VR goggles for people who have suffered brain injuries. By using these goggles, the hope is that patients' brains can be "tricked" into believing that a paralyzed body part is moving, helping to accelerate the recovery process.

Finally, VR can serve as a virtual "training ground" for people with motor disabilities. For example, people who have started using a wheelchair can use VR to practice navigation in challenging environments, such as a busy street or narrow sidewalk, or to plan accessible routes in advance.

AN ESTIMATED 16.0 MILLION PEOPLE IN THE UK HAD A DISABILITY IN 2021/22. THIS REPRESENTS 24% OF THE TOTAL POPULATION. THE PREVALENCE OF DISABILITY RISES WITH AGE: AROUND 11% OF CHILDREN WERE DISABLED, COMPARED WITH 23% OF WORKING AGE ADULTS AND 45% OF ADULTS OVER STATE PENSION AGE. MOBILITY IS THE MOST FREQUENTLY REPORTED IMPAIRMENT TYPE (47%), FOLLOWED BY STAMINA, BREATHING OR FATIGUE (35%), AND MENTAL HEALTH (32%). AS OF FEBRUARY 2023, THERE WERE 6.3 MILLION PEOPLE CLAIMING AN EXTRA-COST DISABILITY BENEFIT IN GREAT BRITIAN, REPRESENTING 9.6% OF THE TOTAL POPULATION.

ACCORDING TO THE ONS LABOUR FORCE SURVEY, 9.6 MILLION PEOPLE OF WORKING AGE (16 TO 64) REPORTED THAT THEY WERE DISABLED IN JANUARY TO MARCH 2023, REPRESENTING 23% OF THE WORKING-AGE POPULATION. THIS IS AN INCREASE OF 600,000 PEOPLE FROM THE YEAR BEFORE. 23 IN THE SAME PERIOD, AN ESTIMATED 5.1 MILLION DISABLED PEOPLE WERE IN EMPLOYMENT. THIS WORKS OUT AS AN EMPLOYMENT RATE OF 53.7%, UP FROM 51.7% IN 2019.

Trends in reported impairments types*
% of disabled people: UK

Source: DWP, Family Resources Survey (various editions)

Disability prevalence by age and gender
UK: 2019/20 – 2021/22

| Age | Male respondents | | Female respondents | |
---	Number (millions)	% male population	Number (millions)	% female population
0 to 14	0.6	10%	0.3	5%
15 to 24	0.5	13%	0.5	16%
25 to 44	1.2	14%	1.6	19%
45 to 64	2.1	25%	2.6	30%
65 to 79	1.7	40%	1.8	41%
80+	0.7	54%	1.1	61%
Total	**6.7**	**21%**	**8.2**	**24%**

Note: Data is presented as an average over three years as there are small sample sizes for some age groups by gender. Analysis is based on rounded data, meaning totals may not sum.

Source: DWP, Family Resources Survey: financial year 2021/22, disability table 4.3

Impairment types reported by disabled people
UK: 2021/22

Impairment type	Children	Working age	State Pension age	All ages
Mobility	16%	43%	64%	**47%**
Stamina/breathing/fatigue	18%	34%	43%	**35%**
Mental health	30%	44%	13%	**32%**
Dexterity	9%	23%	35%	**25%**
Memory	10%	13%	13%	**13%**
Learning	26%	15%	8%	**13%**
Social/behavioural	50%	10%	2%	**11%**
Hearing*	5%	5%	16%	**9%**
Vision	5%	7%	13%	**9%**
Other	16%	20%	20%	**20%**

*Data for the 'Hearing' category should be treated with caution because of the possible sampling limitations of interviewing by telephone this survey year.

Note: Column totals sum to more than 100% because respondents can report more than one impairment

Source: DWP, Family Resources Survey: financial year 2021/22, disability table 4.6

Proportion of trips taken by main mode of travel in England, 2021

Disabled people: 42% car driver, 19% car passenger, 28% walking, 5% local bus, 4% other

Non-disabled people: 48% car driver, 12% car passenger, 30% walking, 3% local bus, 7% other

Note: The number of shaded squares does not exactly match the percentage point figures due to rounding.

Source: DfT, Disability, accessibility and Blue Badge statistics: 2021 to 2022, Table dis0402

GOOD PRACTICE NARRATIVE

SINCE OCTOBER 1, 2004, SERVICE PROVIDERS HAVE BEEN MANDATED TO TAKE REASONABLE STEPS TO ENHANCE ACCESSIBILITY FOR DISABLED INDIVIDUALS, WITH SEVERAL LOCAL AUTHORITIES ADOPTING THIS GUIDE TO ENSURE CONSISTENT STANDARDS NATIONWIDE. IN OUR PURSUIT OF UNDERSTANDING GOOD PRACTICES IN THE FIELD OF ARCHITECTURE, WE HAVE REFERRED TO THE 'DESIGN FOR ACCESSIBILITY' GUIDELINES. WHILE 'DESIGNING FOR ACCESSIBILITY' LACKS LEGAL STATUS, ADHERING TO ITS GOOD PRACTICE GUIDANCE DEMONSTRATES AN ARCHITECT'S OR DESIGNER'S DUTY OF CARE TO A CLIENT.

AN INTEGRAL COMPONENT OF THIS APPROACH IS THE ACCESS STATEMENT, OFFERING A DYNAMIC DESCRIPTION OF HOW INCLUSIVE DESIGN PRINCIPLES CAN BE WOVEN INTO A PROJECT OR DEVELOPMENT, EMPHASIZING ONGOING MAINTENANCE AND MANAGEMENT. IN THE CONTEXT OF THE DISABILITY DISCRIMINATION ACT (DDA), WHICH SEEKS TO ERADICATE DISCRIMINATION AGAINST DISABLED INDIVIDUALS, OUR AWARENESS IS DRAWN TO THE NECESSITY FOR REASONABLE ADJUSTMENTS AND THE POTENTIAL CONSEQUENCES OF FAILING TO MEET THIS DUTY WITHOUT JUSTIFICATION.

CURRENTLY, ACCESS AUDITS PROVIDE A SNAPSHOT OF AN EXISTING BUILDING AT A SPECIFIC MOMENT, SERVING AS A VALUABLE STARTING POINT TO ASSESS ACCESSIBILITY. HOWEVER, THERE IS A CONSPICUOUS ABSENCE OF TOOLS THAT ENABLE VISUALIZATION AND EMPATHY FOR THE EXPERIENCES OF DISABLED INDIVIDUALS. OUR TEAM AIMS TO BRIDGE THIS GAP BY CREATING A TOOL THAT EMPOWERS ARCHITECTS TO EMPATHIZE WITH DISABLED INDIVIDUALS DURING THE PLANNING STAGES, FACILITATING TIMELY INTERVENTIONS. MOREOVER, THIS TOOL CAN BE EMPLOYED BY GOVERNMENT BODIES TO CONDUCT ACCESSIBILITY AUDITS ON BUILDINGS, ENSURING A MORE INCLUSIVE BUILT ENVIRONMENT.

EXAMPLE OF GOOD PRACTICES

ACCESSIBLE OFFICE DEVELOPMENTS LIKE THE 500,000 SQFT BARCLAYS CAMPUS IN GLASGOW RAISES THE BAR BEYOND DESIGN FOR PHYSICAL ACCESS THROUGH FEATURES SUCH AS RECALIBRATION ROOMS FOR EMPLOYEES WITH SENSORY NEEDS, USE OF BIOPHILIC DESIGN AND NATURAL MATERIALS TO IMPROVE HEALTH AND WELLBEING AND HELP REDUCE STRESS AND ANXIETY, AND A FOCUS ON THE DESIGN OF LIGHTING AND ACOUSTICS FOR BUILDING USERS WITH A VISUAL AND HEARING IMPAIRMENT. IT IS THE FOCUS ON THE SMALL DETAILS THAT MAKES A BUILDING GENUINELY INCLUSIVE.

- BARCLAYS HAS EMBRACED THIS ETHOS BY REDUCING DECIBEL LEVELS IN THE WASHROOM HAND DRYERS FOR AUTISTIC PEOPLE, SPECIFYING DOOR HANDLES FOR PEOPLE WITH LIMITED DEXTERITY AND CHOOSING FLOOR AND WALL FINISHES THAT GIVE THE NECESSARY CONTRAST FOR VISITORS AND EMPLOYEES WITH A COGNITIVE OR VISUAL DISABILITY.

- MULTISENSORY ENVIRONMENT/SENSORY ROOMS HELP THOSE WHO CAN'T EXPERIENCE ORGANIC OUTDOOR STIMULATION BY CREATING INCLUSIVE IMMERSIVE SENSORY ENVIRONMENTS INSIDE, WHERE USERS CAN EXPLORE THEIR SENSES NATURALLY, IN A SAFE AND ACCESSIBLE SPACE AT THEIR OWN PACE.

PROBLEMS FACED BY AUTISTIC AND ASPERGER'S SYNDROME PEOPLE AND SUGGESTED SOLUTIONS

1. AUTISTIC PEOPLE FACE THE PROBLEM OF SENSORY OVERLOAD. WHEN THE BRAIN BECOMES OVER STIMULATED IT CAN GO INTO OVERLOAD. THE TYPE OF SENSATIONS THAT COULD CAUSE THIS WOULD BE THINGS LIKE BRIGHT LIGHTS OR FLASHING LIGHTS,
LOUD OR CONFLICTING NOISES, STRONG SMELLS, PRESSING UP AGAINST OTHER PEOPLE IN A CROWD, BEING SURROUNDED BY MOVING FACES OR OBJECTS, OR ANY CONFUSING OR OVERWHELMING SENSORY ENVIRONMENTS WHERE ANY NUMBER OF THESE THINGS COULD BE OCCURRING AT THE SAME TIME.

EXAMPLE OF GOOD PRACTICE

PRACTICAL IMPLICATIONS FOR ARCHITECTURE, TO FOLLOW ON FROM THE ABOVE POINTS, MIGHT BE THAT PUBLIC BUILDINGS, HOWEVER BUSY, NEED TO HAVE QUIET (IN TERMS OF CROWDS, COLOUR SCHEMES, LIGHTING, TEXTURES) SPOTS/CORNERS WHERE PEOPLE CAN REGAIN THEIR EQUILIBRIUM.
MANY PEOPLE WHO WOULD NOT DESCRIBE THEMSELVES AS DISABLED ALSO FIND BUSY PUBLIC BUILDINGS A NIGHTMARE AND WOULD MAKE USE OF QUIET AREAS, SO THE BENEFITS WOULD BE WIDESPREAD.

2. CHARACTERISTIC OF AUTISM AND ASPERGER SYNDROME IS A CONSTANT AND HIGH DEGREE OF STRESS WHICH HAS A NUMBER OF EFFECTS ON BEHAVIOUR, AND IS EXACERBATED BY CONFUSING AND UNPREDICTABLE ENVIRONMENTS. THIS CAN BE ASSUAGED BY A LEVEL OF PREDICTABILITY IN THE BUILT ENVIRONMENT. THEREFORE, FOR EXAMPLE, THE UNANNOUNCED LATE ARRIVAL OF A TRAIN CAN CAUSE A HIGH LEVEL OF STRESS TO A PERSON WITH AUTISM AND ASPERGER SYNDROME ^ ANNOUNCEMENTS (BOTH BY SPEAKER AND BY DISPLAY) OF DELAYS ARE ESSENTIAL TO MINIMISE THIS IMPACT. PEOPLE WITH AUTISM AND ASPERGER SYNDROME OFTEN HAVE DIFFICULTY WITH AURAL STIMULI, WHICH ARE EXACERBATED BY POOR ACOUSTICS.

EXAMPLE OF GOOD PRACTICE

THUS, CLARITY IN BOTH THE QUALITY AND CONTENT OF ANNOUNCEMENTS WILL REDUCE STRESS LEVELS, AND ASSIST A PERSON WITH AUTISM.

3. SOME PEOPLE WITH AUTISM HAVE DIFFICULTY UNDERSTANDING WHAT OTHER PEOPLE REQUIRE OF THEM, AND THEREFORE MAY GIVE AN INAPPROPRIATE RESPONSE WHICH ADDS TO CONFUSION, STRESS AND A SENSE OF FAILURE. LOGICAL BUILDING DESIGN AND USE OF PICTORIAL INFORMATION (VISUAL CUES) CAN ASSIST BY PROVIDING CLEAR VISUAL INDICATIONS AS TO WHAT IS LIKELY TO BE REQUIRED OF AN INDIVIDUAL IN A SPECIFIC AREA.

EXAMPLE OF GOOD PRACTICE

THE NAS WOULD ENCOURAGE THE EXTENSION OF THE USE OF PICTOGRAMS FOR EMERGENCY SIGNAGE, TOILETS ETC. TO GENERAL SIGNAGE.

4. SOME PEOPLE WITH AUTISM AND ASPERGER SYNDROME ARE SOCIAL ISOLATES; MANY HAVE DIFFICULTY MAKING SOCIAL RELATIONSHIPS, AND PREFER TO OPERATE ON THE FRINGES OF SOCIAL GROUPINGS. BUILDING DESIGN, SUCH AS WIDE CORRIDORS, CAN ASSIST IN AVOIDING UNNECESSARY STRESS IN SOCIAL SETTINGS.

EXAMPLE OF GOOD PRACTICE

NAS WOULD ADVOCATE THE INSTALLATION IN TRAINS OF MORE SEATS IN PAIRS FACING THE BACK OF THE SEAT IN FRONT, RATHER THAN SEAT LAYOUTS WHERE TWO SETS OF SEATS FACE EACH OTHER. PEOPLE WITH AUTISM AND ASPERGER SYNDROME CAN FIND BEING SEATED DIRECTLY OPPOSITE A STRANGER INTIMIDATING.

AR FOR ACCESSIBILITY
FACILITATING THE UNDERSTANDING OF DISABILITIES IN THE BUILT ENVIRONMENT.

WHAT HAS BEEN DONE
DEVICES FACILITATING THE NAVIGATION OF A BUILDING FOR AN INDIVIDUAL AFFECTED BY DISABILITIES ALREADY EXIST. HOWEVER, THE QUESTION OF PREVENTING BAD PLANNING THROUGH THIS METHOD DOESN'T REALLY SEEM TO HAVE BEEN EXPLORED YET. IT'S NOW ALL ABOUT LETTING DISABLED PEOPLE EXPERIENCE A SPACE THROUGH VR INSTEAD OF USING TECHNOLOGY TO PREVENT THEM FROM NOT BEING ABLE TO ACCESS THE SPACE IN THE FIRST PLACE.
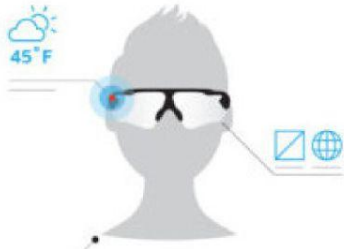
WHAT CAN BE DONE
USING AR/MR TO ALLOW FOR BUILDING PLANNERS TO EXPERIENCE PHYSICAL/MENTAL BARRIERS FROM A VERY EARLY PLANNING STAGE, CATERING TO IMPAIRMENT OF BODY/MIND.

WALKING THROUGH A BUILDING IN PROCESS OF RENOVATION ALLOWING AR GOGGLES TO IDENTIFY PROBLEMATIC BUILT BARRIERS
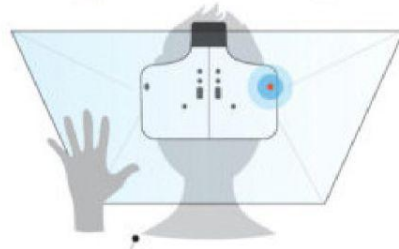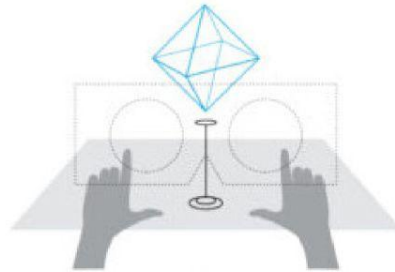
AUGMENTED REALITY (AR)

Real world with digital information overlay

Real world remains central to the experience, enhanced by virtual details.

MERGED REALITY (MR)

Real and the virtual are intertwined

Interaction with and manipulation of both the physical and virtual environment.

MEDIA & EXPLANATION

AR :

AUGMENTED REALITY INTRODUCES THE REAL WORLD INTO THE EQUATION. INSTEAD OF THE VIEWER BEING IN AN ENTIRELY "VIRTUAL," PRE-RECORDED WORLD, THEY CAN SEE THE REAL WORLD AROUND THEM WITH "AUGMENTED" ELEMENTS. THIS HAS BEEN HUMOROUSLY REFERRED TO AS "TERMINATOR" VISION.
DIGITAL GRAPHICS ARE PLACED OVER REAL-WORLD ITEMS TO PROVIDE HELPFUL INFORMATION OR ENTERTAINING ELEMENTS. IMAGINE THE EXPERIENCE OF WALKING THROUGH A MUSEUM AND BEING ABLE TO SEE DIGITAL "INFO POP-UPS" OVER ITEMS OF INTEREST.
CURRENTLY THE MOST POPULAR TECH OFFERING THIS IS THE MICROSOFT HOLOLENS. CURRENTLY THERE ARE ALOT OF TECHNOLOGICAL ADVANCEMENTS IN THIS FIELD WITH THE RECENT UPDATED RELEASE OF UNITY SOFTWARE WHICH ALLOWS A BETTER WAY TO DEVELOP AND INTEGRATE PROJECTS INTO AR.
TEJAS GAIKWAD - SKILLED

MR :

THROUGH MERGED REALITY THE VIEWER CAN USE THEIR HANDS TO MANIPULATE THINGS BOTH IN THE REAL AND VIRTUAL WORLD. THEY ARE NOT ENTIRELY BLINDED FROM THE REAL WORLD AS WITH VR, AND THEY CAN INTERACT WITH THE WORLD MORE THAN WITH AR.
THERE ARE A FEW OPTIONS AVAILABLE FOR HAND TRACKING, INCLUDING THE OCULUS TOUCH AND LEAP MOTION, BUT THE MOST NOTABLE PROPONENT OF MR IS THE INTEL PROJECT ALLOY.
WITH META RELEASING THE LATEST META QUEST 3 AND APPLE RELEASING THE APPLE VISION PRO, THE FUTURE LOOKS QUIET SOLID IN TERMS OF MIXED REALITY AND FEELS JUST LIKE A STARTING POINT TO DISSOLVE INTO VARIOUS DOMAINS, SPECIFICALLY FOR DESIGNERS AND ARCHITECTS TO ANTICIPATE SPATIAL ISSUES AND UNIVERSAL DESIGN CHALLENGES *TEJAS GAIKWAD - SKILLED*

ENOCHLOPHOBIA

ENOCHLOPHOBIA IS AN IRRATIONAL FEAR OF CROWDS. A PERSON WITH THIS PHOBIA EXPERIENCES HIGH LEVELS OF ANXIETY WHEN THEY'RE IN A CROWD OR JUST THINKING ABOUT BEING IN A CROWD. MANY PEOPLE WITH ENOCHLOPHOBIA DO THEIR BEST TO AVOID CROWDS IN ANY SITUATION.

PHYSICAL DISABILITY

A PHYSICAL DISABILITY IS DEFINED AS A "LIMITATION ON A PERSON'S PHYSICAL FUNCTIONING, MOBILITY, DEXTERITY OR STAMINA" THAT HAS A 'SUBSTANTIAL' AND 'LONG-TERM' NEGATIVE EFFECT ON AN INDIVIDUAL'S ABILITY TO DO NORMAL DAILY ACTIVITIES.

SUITABLE INTERFACE
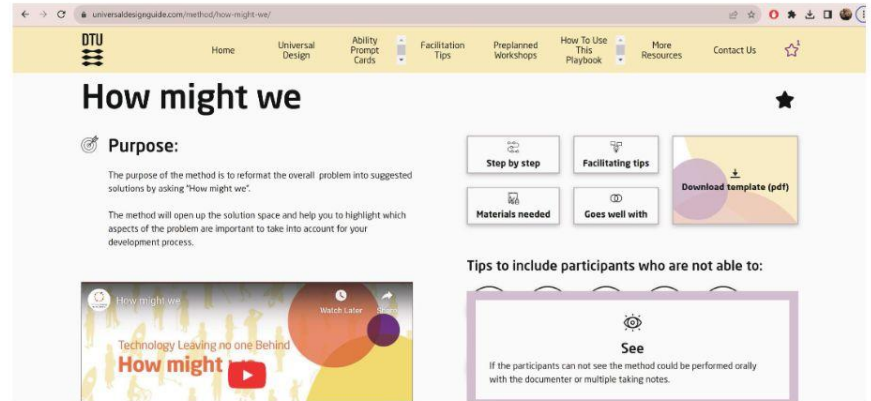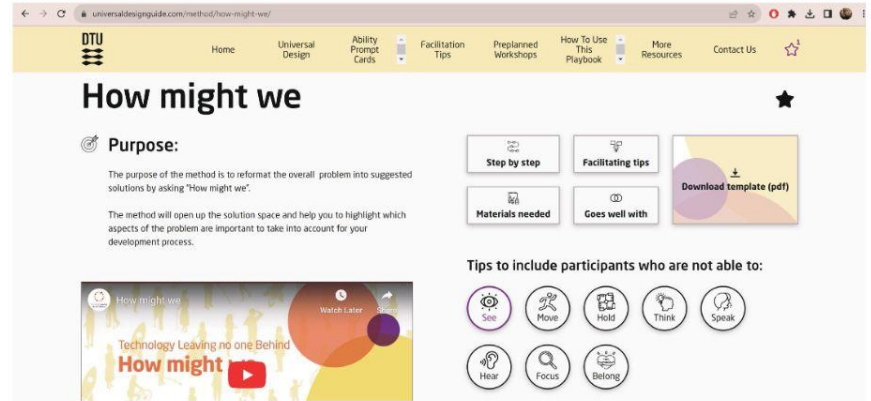
See — IF THE USER CAN NOT SEE THE METHOD COULD BE PERFORMED ORALLY WITH THE DOCUMENTER OR MULTIPLE TAKING NOTES.

Move — IF THE PARTICIPANT CAN NOT CONTROL THEIR MOVEMENTS A DOCUMENTER OR MULTIPLE COULD LEAD THE PEN FOR THE PARTICIPANT.

ETHICS ASSESSMENT

AcrossRCA: Ethics Application

LOW RISK	No	Yes
1. Involves human participants		X
2. Risks that participating individuals and/or organisations could be identified?		X
3. Involves the re-use of data that risks that individuals and/or organisations could be identified?	X	
4. Involves the cooperation of a 'gatekeeper' to access participants	X	
5. Involves participants who could be influenced by your relationship with them or by potential conflicts of interest	X	
6. Involves research methodologies that require additional training	X	
7. Requires ethical approval from a third party	X	

MEDIUM RISK	No	Yes
8. Involves animal participants	X	
9. Takes place outside the UK	X	
10. Offers financial or other forms of incentives to participants	X	
11. Involves the discussion of topics that participants may find distressing.		X
12. Causes a negative impact on the environment beyond normal daily activity	X	
13. Involves deception and/or the collection of data without the consent of participants	X	
14. Involves gathering or preparing non-living biological samples not already held in a university, museum or other collection?	X	

SCHEDULE & PARAMETERS

DECEMBER	JANUARY	FEBRUARY	MARCH
RESEARCH Srinija + Mugdha	RESEARCH Srinija + Mugdha + Tejas	PROTOTYPING "Wizard of oz" Tejas + Aishwarya	TESTING Tejas + Aishwarya + Mugdha
BUILDING STUDY Emily	INTERVIEWS (set 1) - Experts Aishwarya + Srinija (emails) + Mugdha	INTERVIEWS (set 2) - Experts Aishwarya + Srinija (emails) + Emily	PRESENTATION Emily + Srinija
PRESENTATION Emily + Srinija	PRESENTATION Emily + Srinija	PRESENTATION Emily + Srinija	

EXPECTED OUTCOMES

1. AR/VR IMPLEMENTATION OF THE DEVICE THROUGH "WIZARD OF OZ" METHODOLOGY ALLOWING FOR PATTERN STUDY

2. 3D KESINGTON BUILDING STUDY (IMPORT INTO MR AS .OBJ) TO BE SHARED FOR FUTURE PURPOSES

3. ONLINE + JOURNAL PUBLICATION

THE BUILDING REGULATIONS 2010 / ACCESS TO AND USE OF BUILDINGS / APPROVED DOCUMENT M

INTERFACE PARAMETERS: **PHYSICAL DISABILITY (REQUIRING WHEELCHAIR)**

Some people have a weakness on one side. This leads to a requirement for support at both sides of ramps. (p. 19)

The ramp surface is slip resistant, especially when wet, and of a colour that contrasts visually with that of the landings; (p. 20)

The presence of doors, [...] should be apparent to visually impaired people [...]. For example, when a door is open, people with impaired sight should be able to identify the opening within the wall, as well as the leading edge of the door. (p. 30)

There is a landing at the foot and head of the ramp at least 1.2m long and clear of any food swings or other obstructions (p. 20)

INTERFACE PARAMETERS: **VISUAL IMPAIRMENT**

Contrast visually, [...] difference in light reflectance value between the two surfaces is greater than 30 points. Where illuminance on surfaces is greater than 200 lux, a difference in light projects beyond the face of the door or otherwise creates enhanced differentiation and share (p. 15)

The ramp surface is slip resistant, especially when wet, and of a colour that contrasts visually with that of the landings; (p. 20)

The presence of doors, [...] should be apparent to visually impaired people [...]. For example, when a door is open, people with impaired sight should be able to identify the opening within the wall, as well as the leading edge of the door. (p. 30)

Contrast visually, [...] a minimum difference in light reflectance value of 15 points is considered adequate. (p. 15)

COMPETITOR

MORPHOLIO AR SKETCHWALK
USP (UNIQUE SELLING PROPOSITION): THIS APP ALLOWS ARCHITECTS TO OVERLAY THEIR DESIGNS ONTO THE REAL WORLD USING AUGMENTED REALITY. IT HELPS VISUALIZE AND PRESENT ARCHITECTURAL CONCEPTS AT FULL SCALE, PROVIDING AN IMMERSIVE EXPERIENCE FOR BOTH DESIGNERS AND CLIENTS.

BIMX BY GRAPHISOFT
USP: BIMX (BUILDING INFORMATION MODEL EXPLORER) ALLOWS ARCHITECTS TO EXPLORE THEIR 3D BUILDING MODELS IN AN INTERACTIVE WAY. IT ENABLES USERS TO NAVIGATE THROUGH THE VIRTUAL MODEL, VISUALIZE DESIGN DETAILS, AND UNDERSTAND THE SPATIAL RELATIONSHIPS WITHIN THE BUILDING.

AUGMENT
USP: AUGMENT IS A VERSATILE AR PLATFORM THAT ARCHITECTS CAN USE TO VISUALIZE THEIR 3D MODELS IN THE REAL WORLD. IT FACILITATES COLLABORATIVE DESIGN DISCUSSIONS BY ALLOWING MULTIPLE USERS TO VIEW AND INTERACT WITH THE SAME 3D MODEL SIMULTANEOUSLY.

ARKI
USP: ARKI FOCUSES ON AUGMENTED REALITY FOR INTERIOR DESIGN. ARCHITECTS CAN USE ARKI TO VISUALIZE AND SHOWCASE INTERIOR DESIGN CONCEPTS, FURNITURE PLACEMENTS, AND FINISHES IN A REAL-WORLD ENVIRONMENT, HELPING CLIENTS BETTER UNDERSTAND THE PROPOSED DESIGNS.
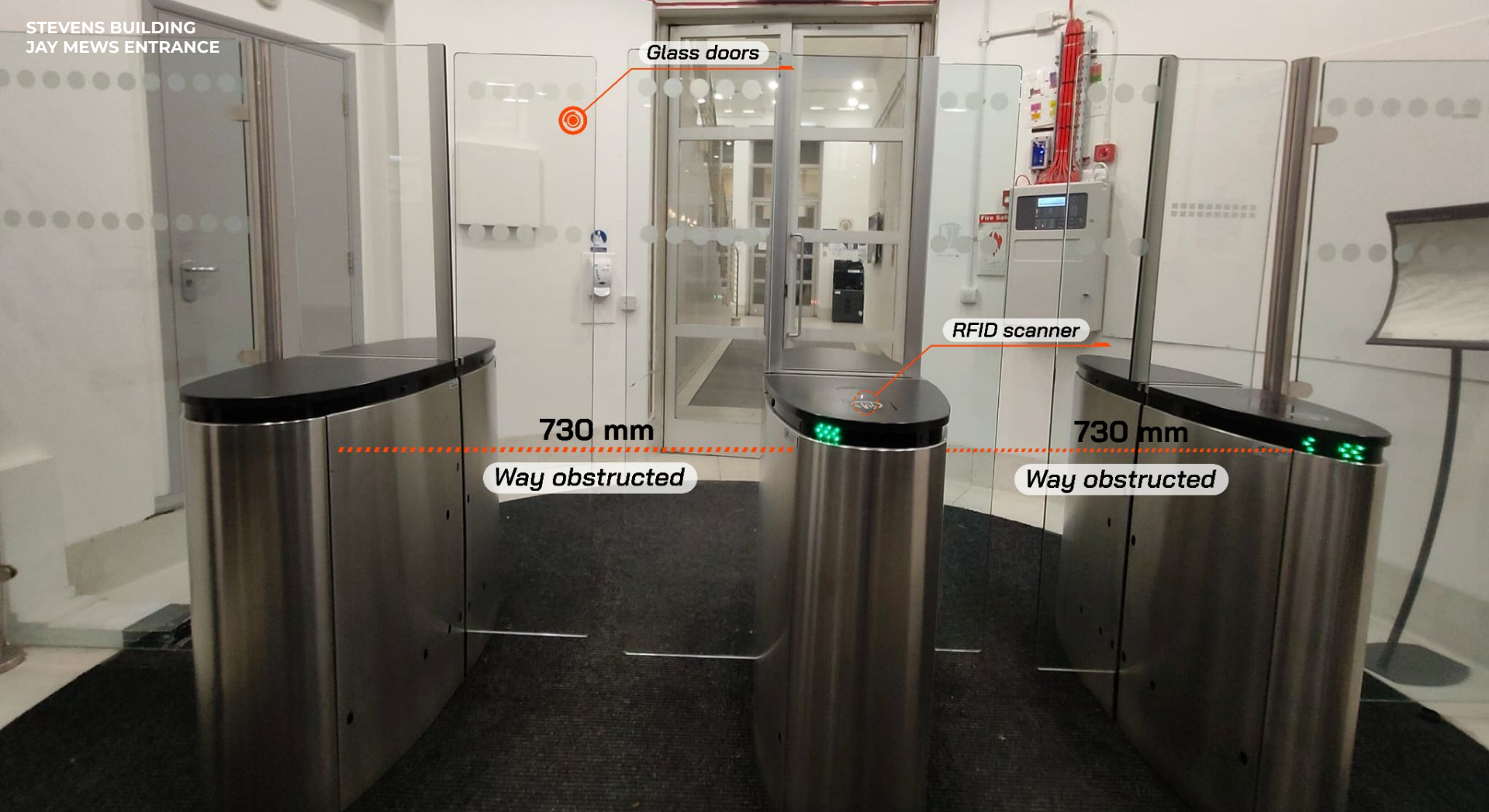
MAGICPLAN
USP: WHILE NOT EXCLUSIVELY AN AR APP, MAGICPLAN UTILIZES AR TECHNOLOGY FOR CREATING FLOOR PLANS. ARCHITECTS CAN USE THEIR MOBILE DEVICES TO CAPTURE AND MEASURE SPACES IN REAL-TIME, TURNING THE MEASUREMENTS INTO ACCURATE FLOOR PLANS.

ISCAPE
USP: ISCAPE IS DESIGNED FOR LANDSCAPE ARCHITECTS, ALLOWING THEM TO VISUALIZE OUTDOOR SPACES BY OVERLAYING DESIGN ELEMENTS ONTO A REAL-TIME CAMERA VIEW. IT HELPS IN PLANNING AND PRESENTING LANDSCAPING IDEAS IN A MORE TANGIBLE WAY.

ANALYSIS

2017	2017	2018	2019	202-	202-
FIRST LIGHT	STATIC IMAGE	DYNAMIC CONTENT	WEARABLE LENS	FEATURE COMPLETE	FIRST PRODUCT
Craft build	Static projector	microLED display	Semi-automated build	Hi-res microLED display	Prescription
Single LED		Wireless data	Oxygenation	Fast wireless data	Cosmetics
Wireless power			Custom-fit	Computer vision	
				Battery power	
				Eye tracking	

Glass doors

RFID scanner

730 mm

730 mm

Way obstructed

Way obstructed

User Flow for buildings which are already built but that will be going through a re-design / repurpose

LOGIN/ sign up

Name, email id, password, city

User dashboard

1.Ask the purpose of using the app- architect/interior designer/ other
2.Create new file
3.Filters to show different disabilities
4.Each disability is colour coded. Different ranges of disabilities have different colour

Upload Area Plan

Point to the area to be tested

Analyzing Screen

Permissions-Camera & Location

Final Screen

1.Notifying the issues for different disabilities and intensity selected in the filter

2.Option to add or change disabilities

3.Option to save the file/export

Example of good practice:
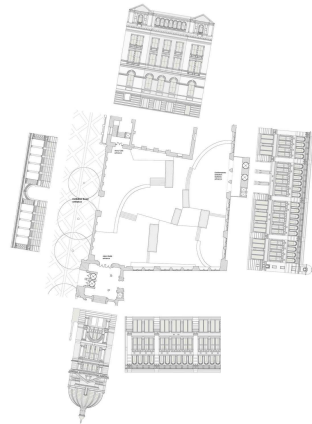V&A Museum - Exhibition Road entrance (Arup)

Interviewee: Graeme Brooker

Interviewer: Emily Marzocchi

Example of bad practice:
Proposed V&A Museum - Exhibition Road entrance (Jamie Fobert Architects)

Project: Hotel - Victorian warehouse in Manchester

Issues: Cost & structurally invasive changes catered for wheelchairs

The interview with Professor & Head of Interior Design at RCA, Graeme Brooker uncovered the structural issues impacting budget when it comes to creating an integral accessibility regulations-compliant design. However, many examples of bad practice prove that in many cases the issue comes from the Design & Architecture team not noticing of being asked to ignore the standards.

Heavy door

Glass door

Doors too heavy for a person to push the door

Ideally the weight of the door should be 40 kgs