

Lesson 10

Interaction Design (CM3055)

Universal Design | Accessibility | Inclusive design

What kind of users are we designing for?

What is Universal Usability?

“enabling *all citizens to succeed* using communication and information technology in their tasks.”

Ben Shneiderman

Universal Usability

Designers who practice universal usability strive for **designs that gracefully accommodate a diversity of user needs and circumstances.**

How does universal usability differ from accessibility?

Accessibility

concerned primarily with making the content and functionality of web sites accessible—within reach—to all users.

Universal usability

goes one step further, striving to make the content and functionality **accessible** and **usable** by all.







**Microsoft's 'inclusive design' will increase its focus
on accessibility in 2022**

<https://www.windowscentral.com/how-microsoft-accessibility-efforts-are-mainstreaming-inclusive-design-efforts-2019>



Centre for Excellence in Universal Design

<https://universaldesign.ie/Products-Services/Customer-Communications-Toolkit-for-the-Public-Service-A-Universal-Design-Approach/Digital-and-Web-Based-Communication-Guidance/Apps-for-Smart-Phones-and-Devices/>

IOS

<https://developer.apple.com/design/human-interface-guidelines/>

Android

<https://developer.android.com/design/>



extend standard design principles to include **people of all ages and abilities, but remains at the level of generality**, so it does not address all the specific needs of any particular disability.

Making design accessible to everyone in society

7 Principles of Universal Design

developed in 1997 by a working group of architects, product designers, engineers and environmental design researchers, led by the late Ronald Mace (Design Pioneer, internationally recognized Architect) in North Carolina State University

Principle 1: Equitable Use

The design is useful and marketable to people with diverse abilities



7 Principles of Universal Design

Principle 2: Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.



Right & left-handed scissors



A user at a computer table. The table height can be easily adjusted to suit different user needs.

7 Principles of Universal Design

Principle 3: Simple and Intuitive Use

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.



7 Principles of Universal Design

Principle 4: Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.



Looking down the length of the symmetrical platform, lighting accentuates train doorways and the adjoining gates that prevent riders from falling onto the tracks.
Nanakuma Line, Japan



NanakumaLine, Japan.
Each station is color coded and is identified in English, Japanese, and by its accompanying unique symbol. Symbols generally relate to the station's surroundings

7 Principles of Universal Design

Principle 5: Tolerance for Error

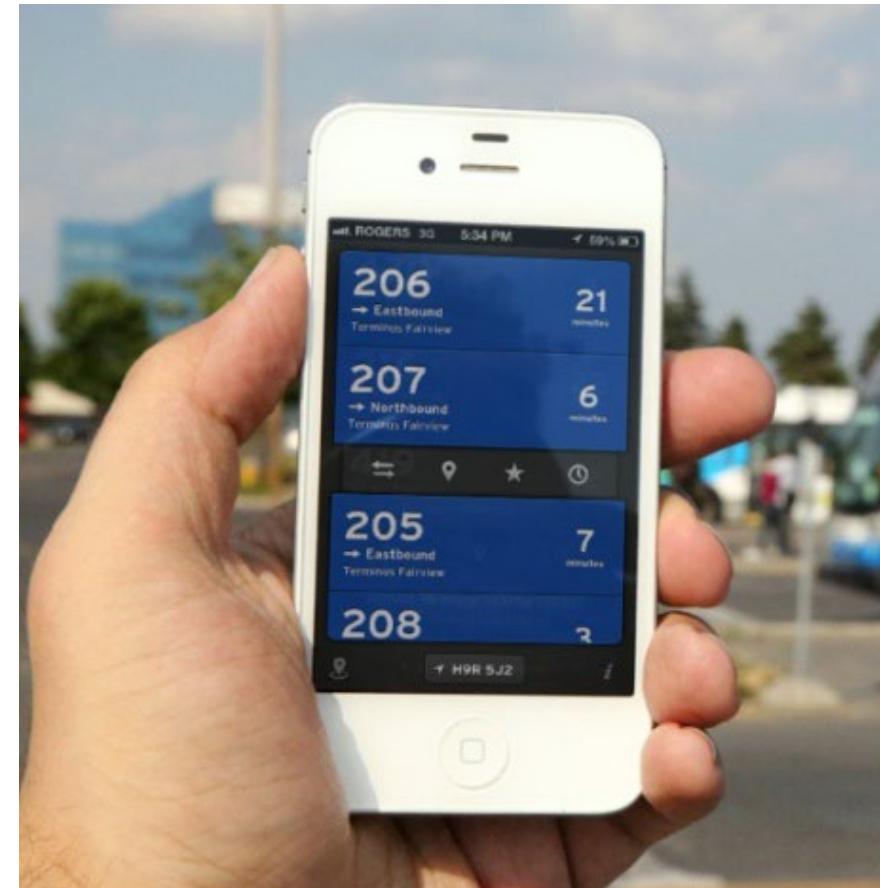
The design minimizes hazards and the adverse consequences of accidental or unintended actions.



7 Principles of Universal Design

Principle 6: Low Physical Effort

The design can be used efficiently and comfortably and with a minimum of fatigue.



7 Principles of Universal Design

Principle 7: Size and Space for Approach and Use

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.



Wider fare gates



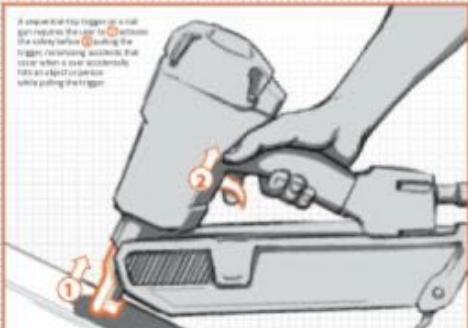
Barrier free entrances and exits

The Principles of Universal Design



1 Equitable Use

The design is useful and marketable to people with diverse abilities.

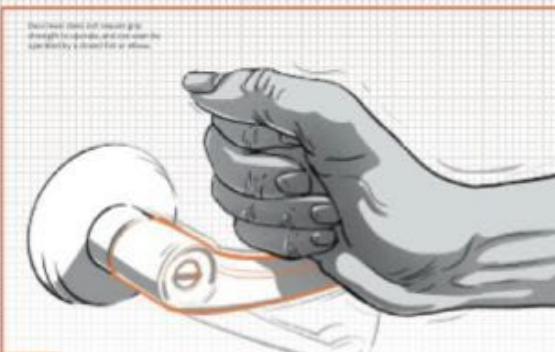
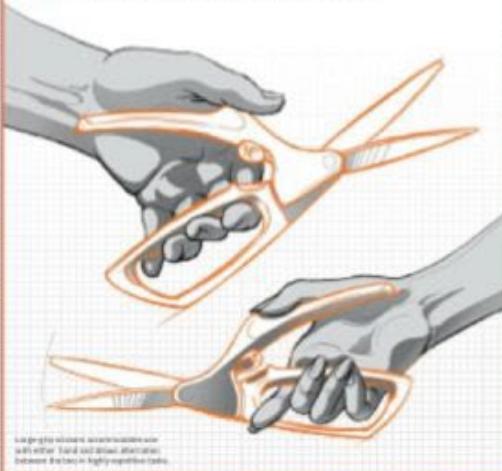


5 Tolerance for Error

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

2 Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.



6 Low Physical Effort

The design can be used efficiently and comfortably and with a minimum of fatigue.

3 Simple and Intuitive Use

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or education level.



4 Perceivable Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.



7 Size and Space for Approach and Use

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

AI for Accessibility and Inclusion

How can AI help improve the quality of life and promote inclusion? Inventor and IBM Fellow Chieko Asakawa, who lost her vision since the age of fourteen, is working on answering these questions. She will also touch on some of the possible biases to overcome, and how to design new systems that harness AI for greater accessibility to benefit every user.

Chieko Asakawa, IBM Fellow, IBM



<https://youtu.be/lPEzGCuMFfw>



<https://www.designsystem.tech.gov.sg/guides/designers-accessibility/>



<https://enablingvillage.sg/universal-design/>

Unify to UDify

Library@Orchard: Deliberately Designed With Users In Mind

<https://www.psd.gov.sg/challenge/ideas/deep-dive/deliberately-designed-with-users-in-mind>

Universal Design - Accessibility For All Ages And Abilities

<https://www.psd.gov.sg/challenge/ideas/deep-dive/universal-design-accessibility-for-all-ages-and-abilities>

Great User Experience (UX) is
Usability + Graphic Design + Accessibility

Accessibility is the concept of whether a product or service can be used by everyone

Types of Accessibility Issues

1. Visual
2. Motor/mobility
3. Auditory
4. Seizures
5. Learning/cognitive

Practical Guidelines for Accessibility

World Wide Web Consortium (W3C) stipulates standards for accessible design in its latest Web Content Accessibility Guidelines (WCAG).

UNIVERSAL/
INCLUSIVE
DESIGN:
ACCESSIBLE TO
EVERYONE REGARDLESS
OF DISABILITIES OR OTHER
LIMITATIONS, FACTORS.

A USER
THERE IS NO
AVERAGE/NORMAL/TYPICAL
USER!

THE GOAL IS TO DESIGN & CODE
DIGITAL PRODUCTS & SERVICES IN A WAY
THAT USERS WITH DISABILITIES ARE ABLE
TO USE THEM.

MAIN TYPES OF DISABILITIES & LIMITATIONS:

VISUAL - BLINDNESS OR COLOR-BLINDNESS
(OR VISUALLY IMPAIRED)

AUDITORY - DEAFNESS (OR HARD-OF-HEARING)

SPEECH - MUTENESS, SPEECH IMPAIRMENT

MOTOR - E.G. LOSS OF LIMB(S), DISEASES THAT
AFFECT MOTORIC SKILLS - E.G. PARKINSON'S

COGNITIVE - IT CAN AFFECT E.G. MEMORY, ATTENTION

+ ABILITY CHANGE CAUSED BY AGING
+ LIMITATIONS CAUSED BY CONTEXT - E.G. BRIGHT LIGHT
+ TEMPORARY DISABILITY - E.G. MANGOVER
+ LIMITATIONS CAUSED BY INFRASTRUCTURE - E.G. SLOW INTERNET
CONNECTION
+ USING DEVICES WITH SMALLER SCREENS,
LOWER QUALITY DISPLAYS

INTRODUCTION TO ACCESSIBILITY

UX Knowledge Base Sketch #76

"THE POWER OF THE WEB IS IN ITS UNIVERSALITY.
ACCESS BY EVERYONE REGARDLESS OF DISABILITY
IS AN ESSENTIAL ASPECT."

TIM BERNERS-LEE

WEB CONTENT ACCESSIBILITY
GUIDELINES 2.0 (WCAG 2.0)
4 PRINCIPLES
POUR

PERCEIVABLE: INFORMATION
& UI COMPONENTS APPEAR IN
A PERCEIVABLE WAY

OPERABLE: USERS ARE ABLE TO
INTERACT WITH THE UI

UNDERSTANDABLE: BOTH THE
INFORMATION & THE OPERATIONS
ARE UNDERSTANDABLE

ROBUST: AS THE ASSISTIVE
TECHNOLOGIES EVOLVE THE CONTENT
STAYS INTERPRETABLE

3 CONFORMANCE LEVELS:

A - MINIMUM LEVEL (LEVEL A)

AA - GOOD (LEVEL A+AA)

AAA - GREAT (LEVEL A+AA+AAA)

(IN SOME CASES IT'S NOT POSSIBLE
TO REACH THE AAA LEVEL)

THERE IS A SUCCESS CRITERIA
ATTACHED TO EACH GUIDELINE
E.G. PROVIDING TEXT ALTERNATIVES FOR
NON-TEXT CONTENT IS LEVEL A.

A - DESIGN FOR
ACCESSIBILITY DURING
THE PRODUCT DEVELOPMENT
PROCESS!
E.G. INCLUDE THIS ASPECT
IN THE UX RESEARCH!
+ USE TOOLS (E.G. BROWSER
EXTENSIONS) TO CHECK YOUR
SITE

FOCUS ON THE USER'S
GOALS, NOT ON HER/HIS
DISABILITIES!

THERE ARE 12 GUIDELINES
ATTACHED TO THE PRINCIPLES,
SOME EXAMPLES:

A SCREEN READER IS AN ASSISTIVE
TECHNOLOGY USED BY E.G. BLIND
OR VISUALLY IMPAIRED PEOPLE.
IT TURNS TEXT INTO SPEECH.

> TEXT ALTERNATIVES FOR NON-TEXT
CONTENT
img.jpg
vs.
Mount Everest
ONE RELATED TECHNIQUE:
USING THE ALT ATTRIBUTE

> SECONDARY CUES NEXT TO COLOR
(E.G. TEXT, ADDITIONAL VISUAL CUES -
E.G. PATTERNS)

> CONTRAST RATIO BETWEEN TEXT
& BACKGROUND: AT LEAST 4.5 TO 1
(EXCEPTION: LOGOTYPES)

> CAPTIONS ARE PROVIDED FOR
PRERECORDED AUDIO CONTENT (L1A)
+ LIVE AUDIO CONTENT (L1AA)

> THE WHOLE CONTENT CAN BE OPERATED
BY USING A KEYBOARD

> CONSISTENT NAVIGATION:
SAME ORDER ON EACH PAGE

> GUIDELINES FOR FORMS
+ ERROR PREVENTION
+ LABELS & INSTRUCTIONS

UsableNet

Web Accessibility: Your Roadmap to Building Inclusive Digital Experiences



<https://info.usablenet.com/web-accessibility-your-roadmap>

Inclusive Design Principles are about putting people first.

Designing for the needs of
people with permanent,
temporary, situational, or
changing disabilities

Approximately one billion people, or
15% of the world's population,
experience some form of disability



www.worldbank.org

Inclusive Design Principles

1. Provide comparable experience
2. Consider situation
3. Be consistent
4. Give control
5. Offer choice
6. Prioritise content
7. Add value

1. Provide comparable experience

Ensure your interface provides a comparable experience for all so people can accomplish tasks in a way that suits their needs without undermining the quality of the content.

2. Consider situation

Ensure your interface provides a comparable experience for all so people can accomplish tasks in a way that suits their needs without undermining the quality of the content.

3. Be consistent

Use familiar conventions and apply them consistently.

4. Give control

Ensure people are in control. People should be able to access and interact with content in their preferred way.

5. Offer choices

Consider providing different ways for people to complete tasks, especially those that are complex or non standard.

6. Prioritise Content

Help users focus on core tasks, features, and information by prioritising them within the content and layout.

7. Add Value

Consider the value of features and how they improve the experience for different users.

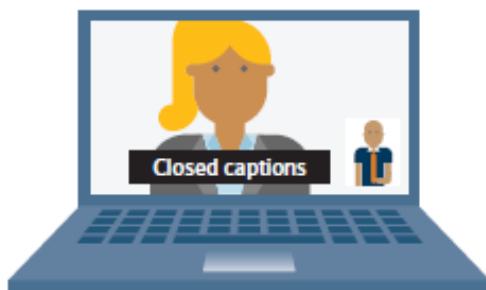


These Inclusive Design Principles are about putting people first. It's about designing for the needs of people with permanent, temporary, situational, or changing disabilities – all of us really.

Adapted from inclusive-design-principles.org/

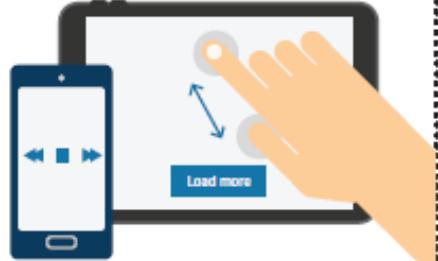
1 Provide comparable experience

Ensure your interface provides a comparable experience for all so people can accomplish tasks in a way that suits their needs without undermining the quality of the content.



2 Give control

People should be able to access and interact with content in their preferred way.



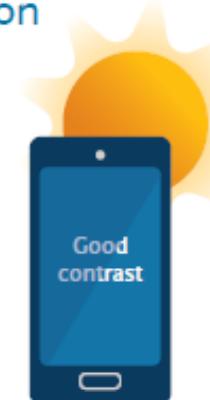
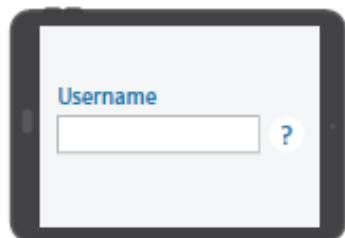
3 Offer choice

Consider providing different ways for people to complete tasks, especially those that are complex or non standard.



4 Consider situation

Make sure your interface delivers a valuable experience to people regardless of their circumstances.



5 Be consistent

Use familiar conventions and apply them consistently.



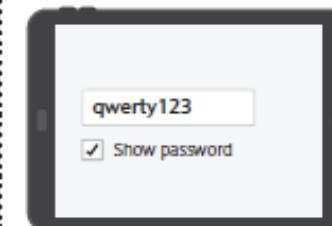
6 Prioritise content

Help users focus on core tasks, features and information by prioritising them within the content and layout.

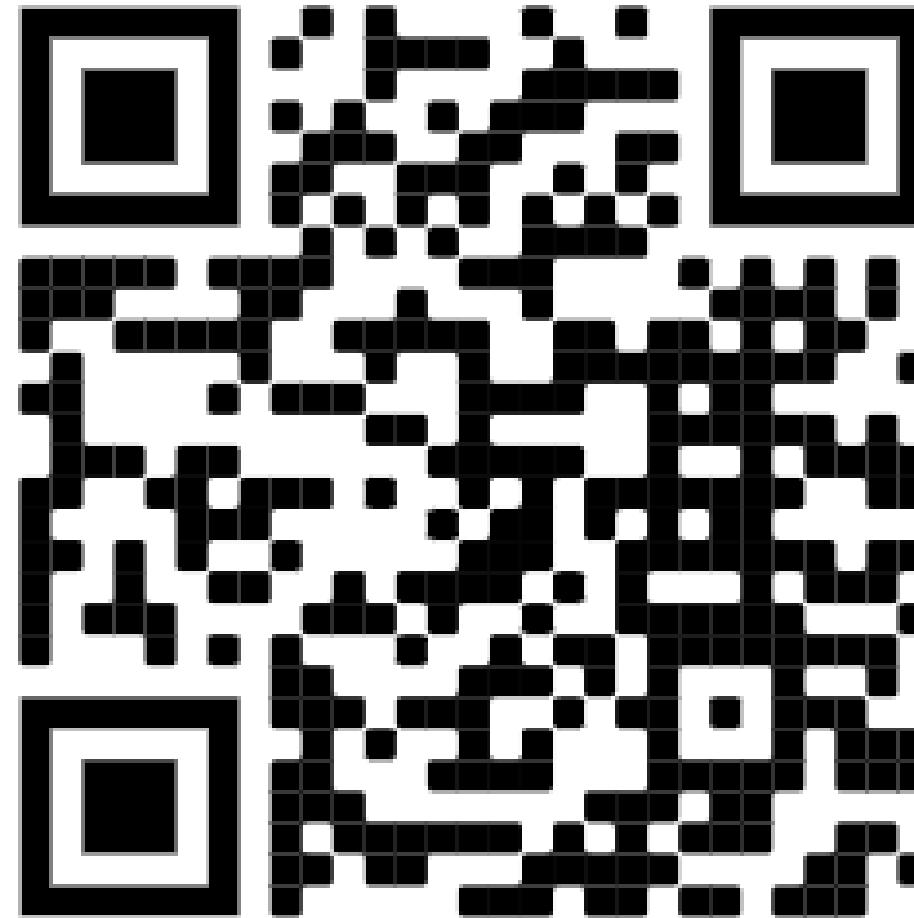


7 Add value

Consider the value of features and how they improve the experience for different users.



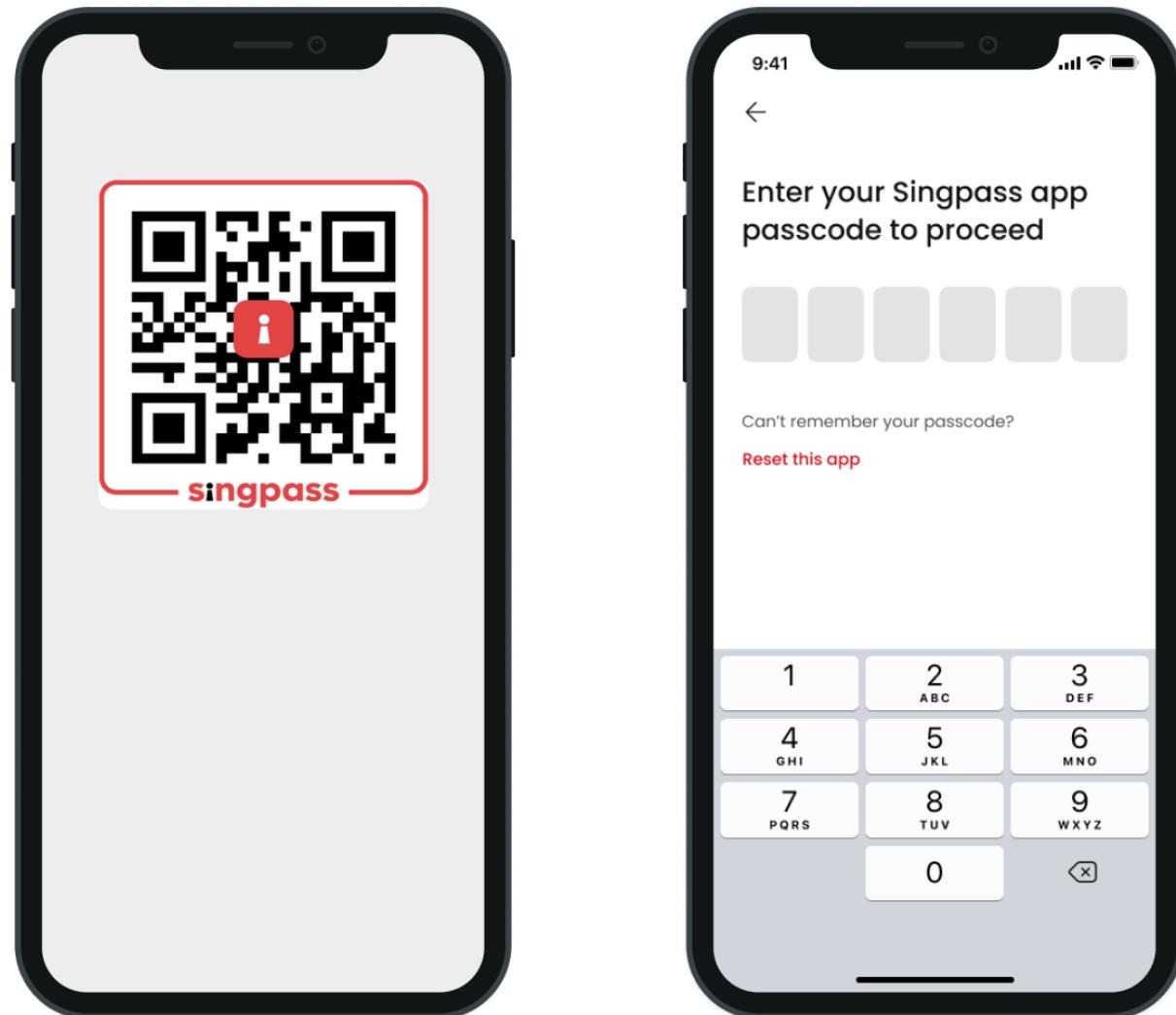
Universal Design	Inclusive Design
Caters to users' needs in the physical space	Addresses users' needs in the digital space
Outcome-focused , produces one concrete solution	Process-focused , conceives multiple ways for interaction as a result
Users who can engage with this solution benefit, but others who can't are still relegated to the sidelines	Users of different walks of life can engage with this product/service in different ways because of multiple solutions ; they're able to hence find a way that suits them best
Benefits the groups that designers had in mind, but does not improve the experience for groups that weren't considered	Benefits the groups that designers had in mind as well as other users , who might find these solutions convenient or preferable



Inclusive Design by NNG



“Usability is Accessibility”



DIGITAL GROWTH

CHANGE IN THE USE OF CONNECTED DEVICES AND SERVICES OVER TIME

TOTAL
POPULATION**+1.0%**

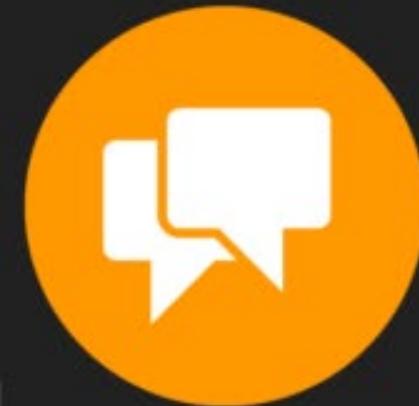
YEAR-ON-YEAR CHANGE

+80 MILLIONUNIQUE MOBILE
PHONE USERS**+1.8%**

YEAR-ON-YEAR CHANGE

+95 MILLIONINTERNET
USERS**+4.0%**

YEAR-ON-YEAR CHANGE

+192 MILLIONACTIVE SOCIAL
MEDIA USERS**+10.1%**

YEAR-ON-YEAR CHANGE

+424 MILLION

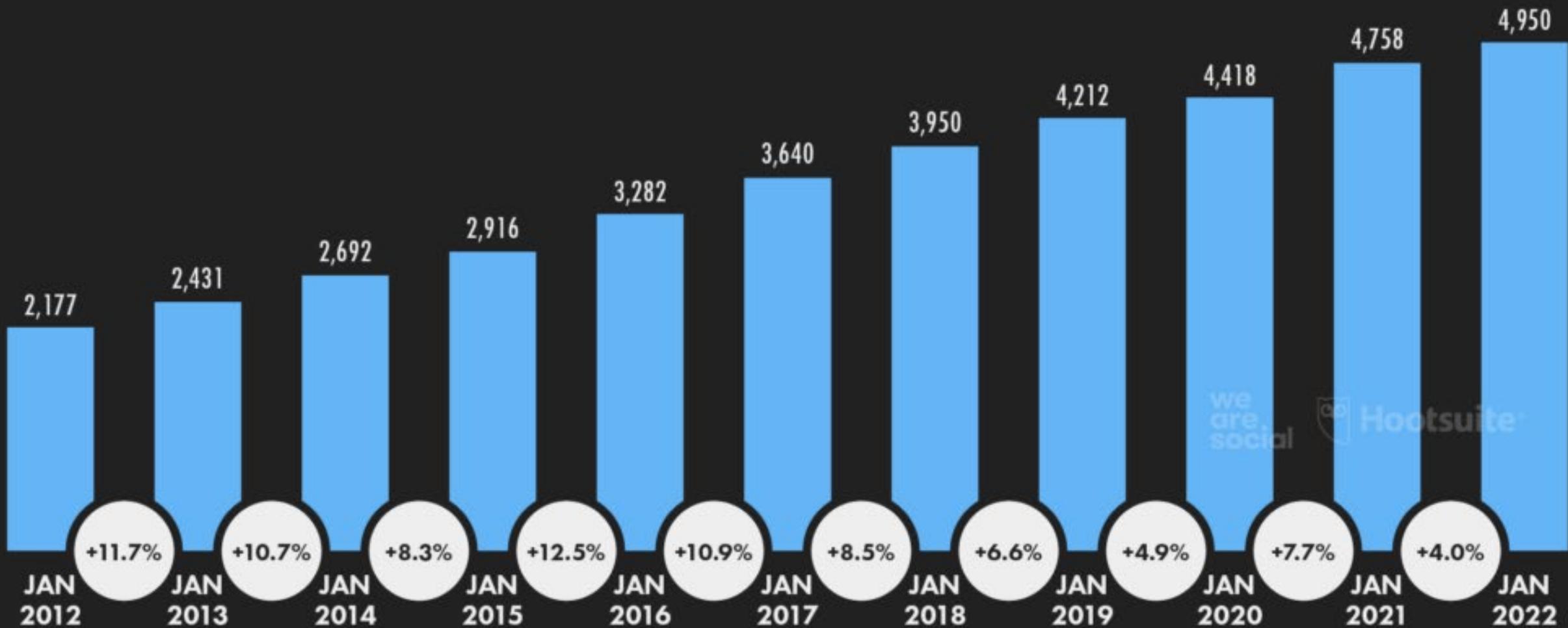
KEPIOS

we
are.
social

SOURCES: UNITED NATIONS; U.S. CENSUS BUREAU; GOVERNMENT BODIES; GSMA INTELLIGENCE; ITU; GW; EUROSTAT; CNNIC; APII; CIA WORLD FACTBOOK; COMPANY ADVERTISING RESOURCES AND EARNINGS REPORTS; OCDH; TECHRASA; KEPiOS ANALYSIS. **ADVISORY:** DUE TO COVID-19-RELATED DELAYS IN RESEARCH AND REPORTING, FIGURES FOR INTERNET USER GROWTH MAY UNDER-REPRESENT ACTUAL TRENDS. SEE NOTES ON DATA FOR MORE DETAILS. SOCIAL MEDIA USERS MAY NOT REPRESENT UNIQUE INDIVIDUALS. **COMPARABILITY:** SOURCE AND BASE CHANGES

INTERNET USERS OVER TIME

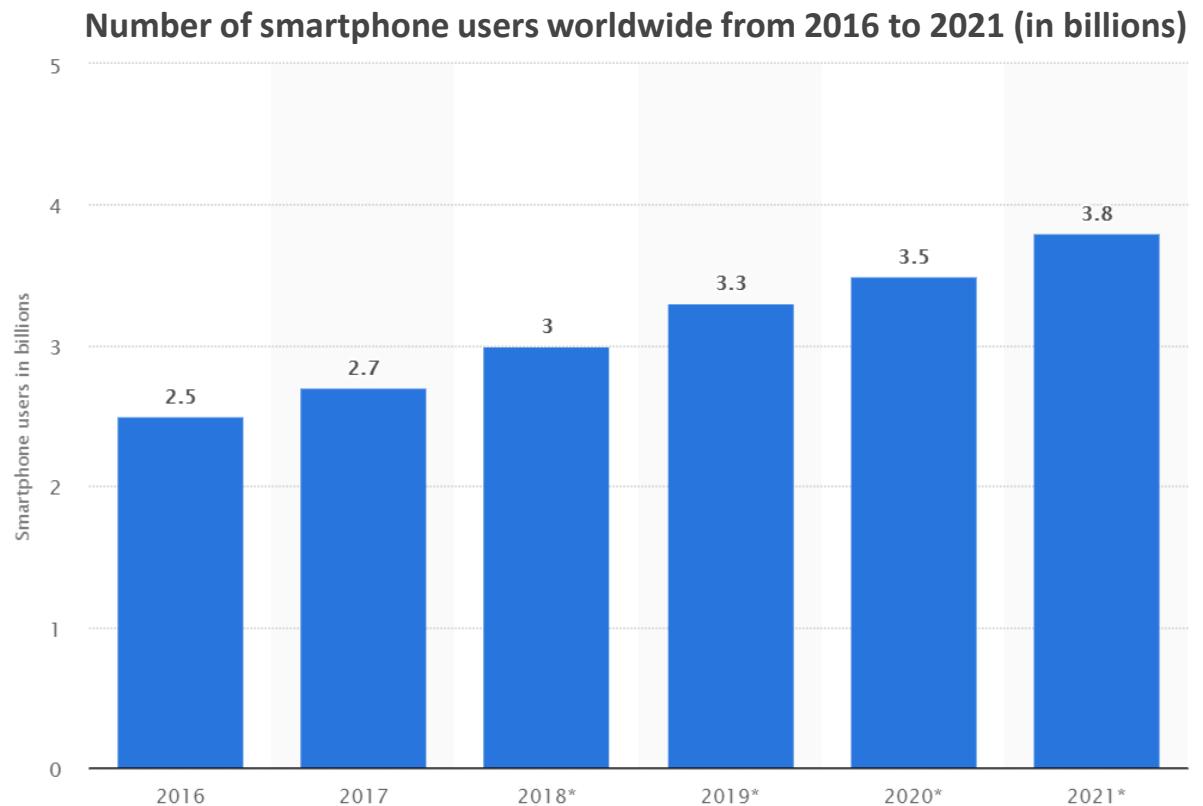
NUMBER OF INTERNET USERS (IN MILLIONS) AND YEAR-ON-YEAR CHANGE



SOURCES: KEPiOS ANALYSIS, ITU, GSMA INTELLIGENCE, EUROSTAT, GWI, CIA WORLD FACTBOOK, CNNIC, APII, LOCAL GOVERNMENT AUTHORITIES. ADVISORY: DUE TO COVID-19-RELATED DELAYS IN RESEARCH AND REPORTING, FIGURES FOR INTERNET USER GROWTH AFTER 2020 MAY UNDER-REPRESENT ACTUAL TRENDS. SEE NOTES ON DATA FOR MORE DETAILS. COMPARABILITY: SOURCE AND BASE CHANGES. FIGURES MAY NOT MATCH OR CORRELATE WITH FIGURES PUBLISHED IN PREVIOUS REPORTS.

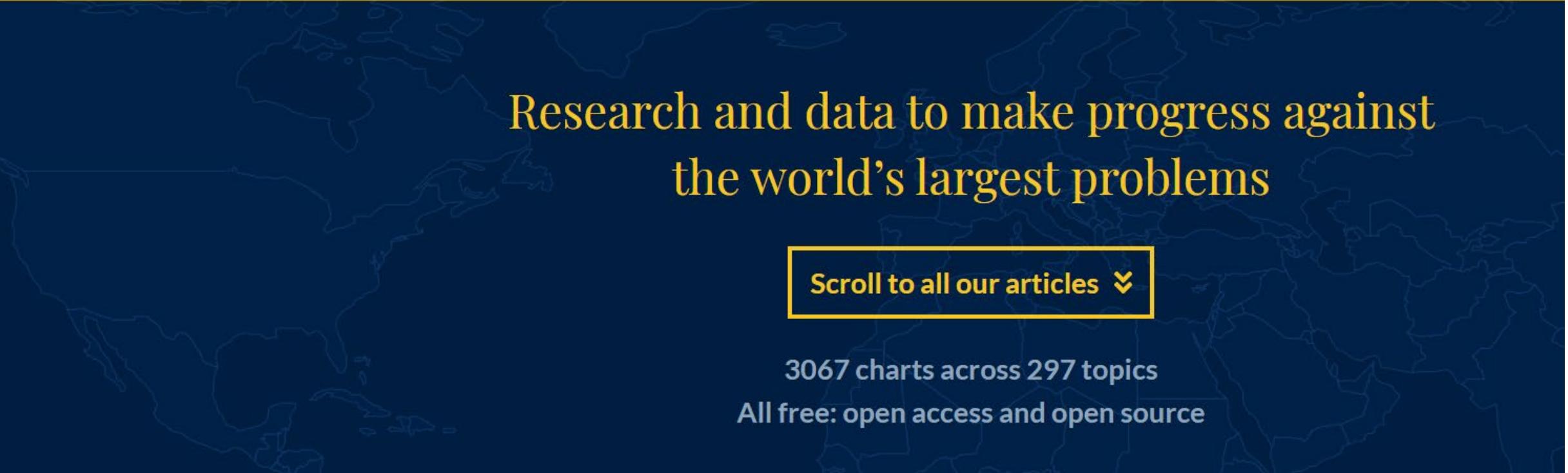
Culture and Universal Usability

- Increased growth rate of mobile phone ownership and usage
- Developers of user interfaces for the web, information appliances and mobile devices must reach across **culturally diverse user communities**.



© Statista 2019

Coronavirus pandemic: daily updated research and data.

[Read more](#)

Research and data to make progress against
the world's largest problems

[Scroll to all our articles](#)

3067 charts across 297 topics
All free: open access and open source

<https://ourworldindata.org/>



- using universal usability within its software and site
- created a simple way of using the website on its app for android/ios
- greatly popular due to the amount of users of the site and thus gives great access to it with the inclusion of the app for mobile devices
- include in their videos an option for subtitles for those who are deaf

Inclusive Interaction

understanding the needs of all potential users and exploring the difficult design problems in providing enabling technology for users with special needs



THE
STRAITS TIMES.

Published Jun 4, 2016

Early inclusive interaction breeds greater empathy

<https://www.straitstimes.com/forum/letters-in-print/early-inclusive-interaction-breeds-greater-empathy>

“Design for All’ or ‘Universal Design’

“The design of mainstream products and/or services that are **accessible to, and usable** by, as many people as reasonably possible on a global basis, in a wide variety of situations and to the greatest extent possible without the need for special adaptation or specialised design”

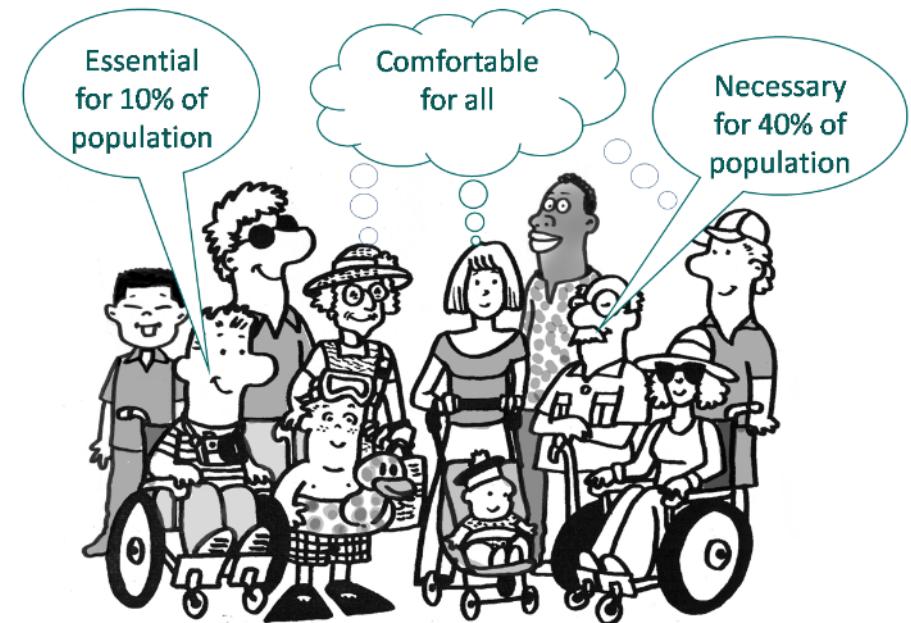
“Design for All” or ‘Universal Design’

- make working and living with IT easier for everyone by making products, communications, and the built environment more usable by as many people as possible at minimal cost.
- ensure that anyone, including future generations, regardless of age, gender, capacities or cultural background, can participate in social, economic, cultural and leisure activities with equal opportunities
- implemented in all areas - human beings are diverse and everyone has the wish, the need and the right of being independent and choosing the own life style without facing physical and social barriers



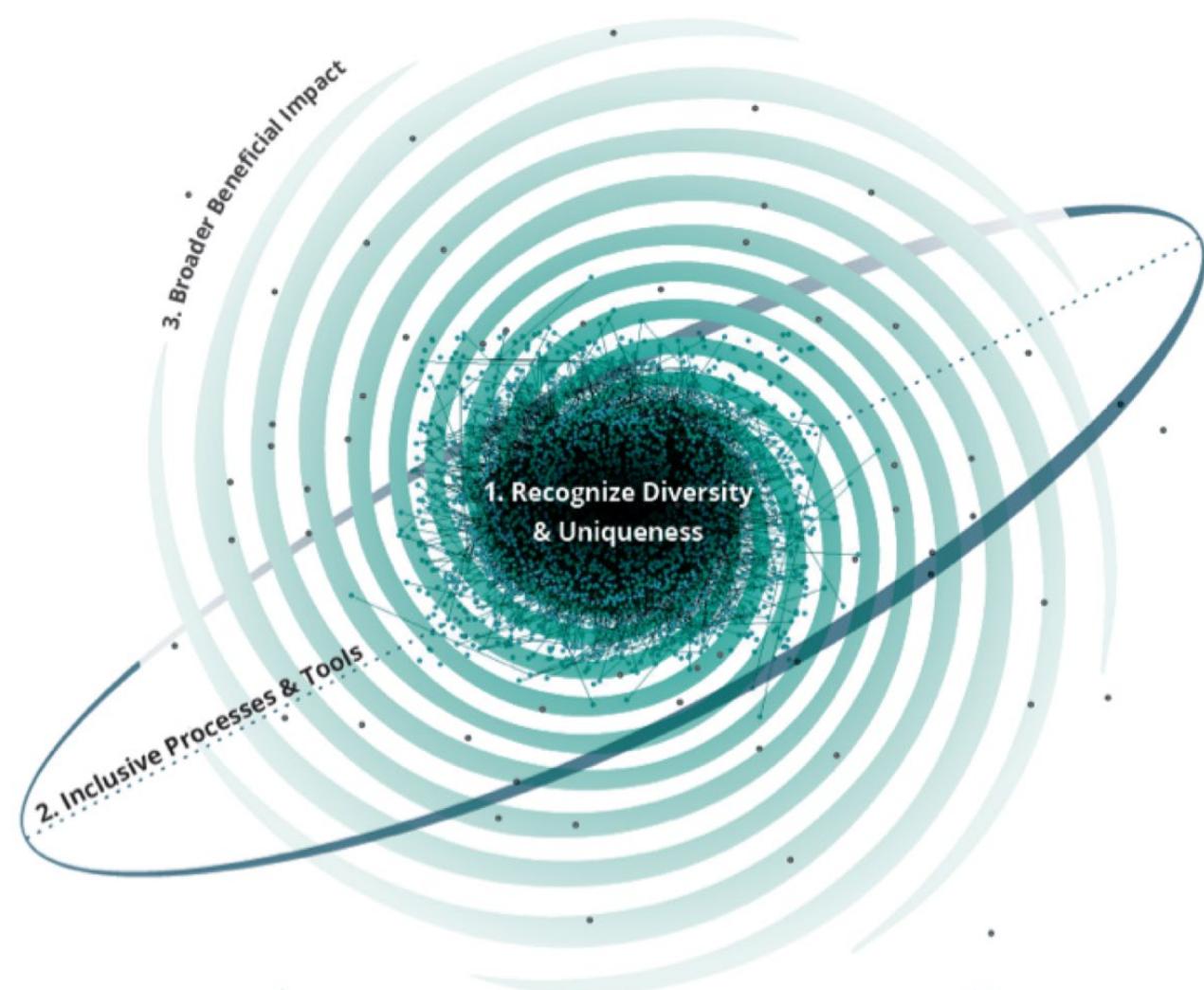
Factors attributed to the Growth of Inclusive Design

- technology and communication growth, especially in telemedicine and healthcare
- an increase in the older population
- adoption of new technology by elders
- expanding consumer expectations
- new legislation and updated governmental procurement policies
- new legislation such as the UK Disability Discrimination Act or the US Americans with Disabilities Act



INCLUSIVE DESIGN

3 Dimensions



**Inclusive Design
Research Centre**
<https://idrc.ocadu.ca/>

Design for All criteria

- **Respectful:** it should respect the diversity of users. Nobody should feel marginalised and everybody should be able to access it
- **Safe:** it should be free of risks to all users. This means that all elements forming part of an environment have to be designed with safety in mind
- **Healthy:** it should not constitute a health risk or cause problems to those who suffer from certain illnesses or allergies. In addition, it should promote healthy use of spaces and products
- **Functional:** it should be designed in such a way that it can carry out the function for which it was intended without any problems or difficulties



Design for All criteria

- **Comprehensible:** all users should be able to orient themselves without difficulty within a given space
 - Clear information: use of icons that are common to different countries, avoiding the use of words or abbreviations from the local language which may lead to confusion.
 - Spatial distribution: this should be coherent and functional, avoiding disorientation and confusion.
- **Sustainable:** misuse of natural resources should be avoided to guarantee that future generations will have the same opportunities as us to preserve the planet
- **Affordable:** anyone should have the opportunity to enjoy what is provided
- **Appealing:** the result should be emotional and socially acceptable but always bearing in mind the seven precedent criteria





<https://www.sgenable.sg/about-us/our-impact/disability-in-singapore>

Number and profile of persons with disabilities (Singapore)

Population Group	Approximate Prevalence Rate
Student population	2.1% of student population ¹
18-49 years	3.4% of resident population ²
50 years and above	13.3% of resident population ³

Reported by [msf.gov.sg](https://www.msf.gov.sg), Feb 2017



¹ Source: Ministry of Education. This is based on the number of reported cases of students with sensory impairment, physical impairment, autism spectrum disorder and intellectual disability. The total student population is put at approximately 460,000.

² Source: National Council of Social Service. Based on a random sampling of 2,000 Singapore citizens and permanent residents aged 18 and above done by NCSS in 2015, the self-reported disability prevalence rate was 3.4% for those aged 18–49 years old. This includes those who acquired disabilities due to accidents and illness. The resident population is put at approximately 3.9 million.

³ Source: National Council of Social Service. Based on a random sampling of 2,000 Singapore citizens and permanent residents aged 18 and above done by NCSS in 2015, the self-reported disability prevalence rate was 13.3% for those aged 50 years and above. This includes those who acquired disabilities due to accidents, illness and old age. The resident population is put at approximately 3.9 million.

<https://www.msf.gov.sg/research-and-data/Research-and-Data-Series/Pages/default.aspx>

Designing for...

- **Children as users**

Majority of work comes from educational technology and game-based learning (so-called '**serious games**')



digital games, simulations, virtual environments and mixed reality/media that provide opportunities to engage in activities through responsive narrative/story, gameplay or encounters to inform, influence, for well-being, and/or experience to convey meaning. The quality or success of serious games is characterized by the degree to which purpose has been fulfilled.

Children as users

- **Understanding the specialised needs of children** (not just children in junior schools but also toddlers and teenagers), and **how to design for them as a diverse group** (i.e. young people of different gender and ages, with or without special needs, from different cultures or ethnic groups).

Main focus

design requirement methods and suitable evaluation approaches

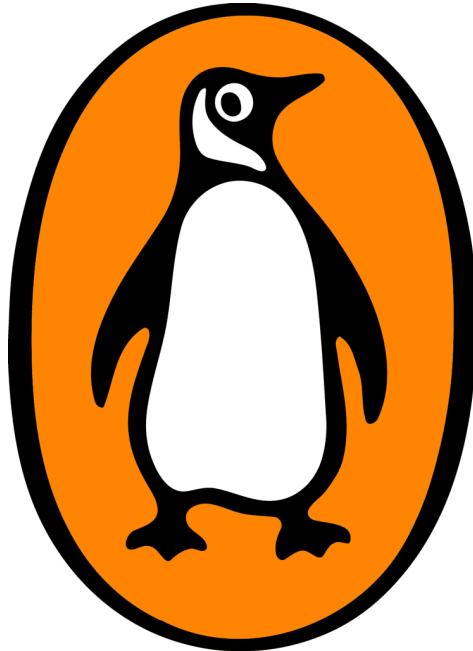


Potential applications:

- innovative educational simulations and interactive games
- mobile communication devices, wireless embedded technologies and robots
- accessible fabrication devices and 'smart' materials
- authoring tools and programming languages such as Scratch8
- interactive playgrounds and intelligent environments.



Interactive
Floor Games



**Future Lions 2016 Winner:
Book Messenger for Penguin Books**



MOE

V.A.S.T (Voice Activated Spy Tech) and Reading Champs, a serious gaming simulation and interactive storybook respectively, to help Singaporean students speak better English.

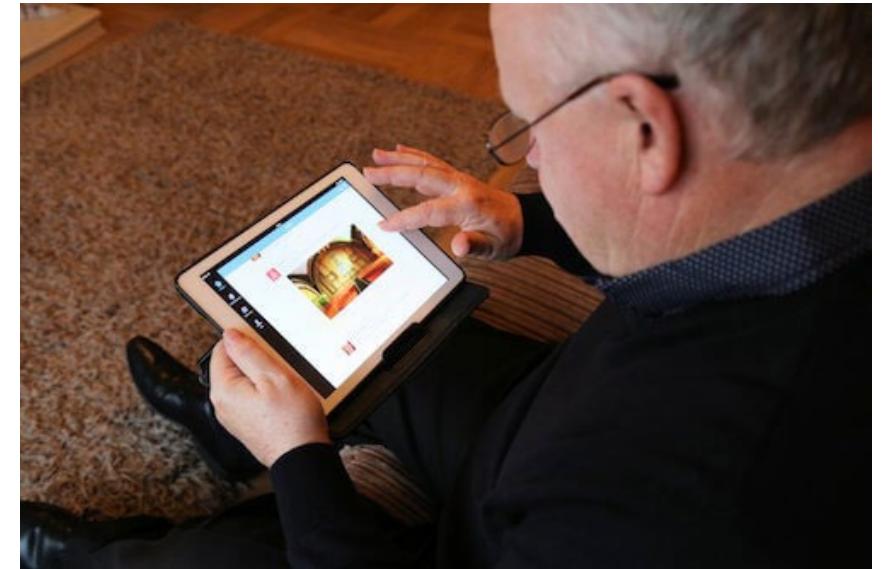
social,
ethical and
cultural
issues to be considered

safe,
effective and
entertaining
Different methodologies to determine how
children use interactive products and how good
interaction and that technology for the child

Designing for...

Older users

- Large and fast-growing number using WWW
- Different life experiences and interaction strategies
- Different levels of skill, the underlying assumptions of requisite knowledge and the physical dexterity needed
- Novel technologies - not necessarily fully take into account elderly's needs and wants and incorrect assumptions can easily be made
- Naïve computer users and find unexpected difficulties in interacting with everyday technologies
- UTOPIA Trilogy - stemmed from research on the UTOPIA project (Usable Technology for Older People: Inclusive and Appropriate)



Extra Reading: Designing a Dementia Friendly Website

<https://www.smashingmagazine.com/2016/05/designing-a-dementia-friendly-website/>

Photo from Dementia Diaries

(Video)

**Stanford Seminar - Designing for Older Adults:
Usability Considerations for Real Users**

<https://youtu.be/ptvRF8JjnuY>

Some issues when designing for the older users

Interaction design issues:

- complex interaction methods
- disastrous functions
- user feedback;
- highlighting of information
- labelling and colour coding
- icon design;
- language;
- metaphors;
- modal errors and the effect of cognitive load;
- patronising design;
- standardisation of interaction metaphors and methods;
- the usability of manuals;
- visual distractions.

Some issues when designing for the older users

Things people worry about:

- dangers in the digital world
- identity theft
- remembering PIN numbers
- the consequences of jargon
- too much choice
- undo methods and operational anxiety
- user confusion
- warning messages
- what is the 'internet'?
- why have a computer?

Age Specific:

- computer classes
- inter-generational differences
- lack of understanding
- reasons for technophobia
- the effects of poor eyesight and manual dexterity
- the interaction of poor eyesight and memory
- the rate of learning new functionality
- visual problems

**Poor memory,
poor vision and/or
less dexterity**

Can be corrected by
concentrating on **design for accessibility**

Videos:

What is Digital Accessibility?

<https://youtu.be/grrx2Lva7T0>

Accessibility 101: Introduction to disability and accessibility with Microsoft

<https://youtu.be/qM7wFZo5yfl>

Microsoft Build: AI for Accessibility

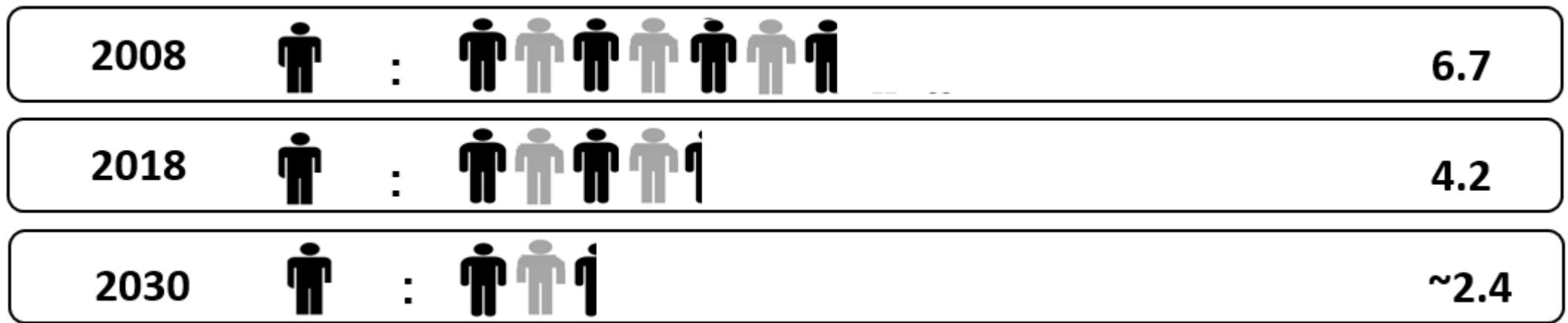
<https://youtu.be/bbrZ2pvubL0>

Accessibility Features in Microsoft 365

<https://youtu.be/oFZoq4h2mV8>

Here in Singapore.....

- citizens aged 65 years and above - almost double between now and 2030,
- Fewer working-age citizens to each citizen aged 65 and over.
- Ratio will fall by more than half from 4.2 in 2018 to about 2.4 in 2030.



Accessibility

ID - traditionally concerned with the design and development of interfaces used by the average person.

Universal Usability – we can no longer identify an average user

Wide variance in any user population's senses:

- Vision: Depth, contrast, colour blindness, and motion sensitivity
- Touch: Keyboard and touchscreen sensitivity
- Hearing: Audio and sound.



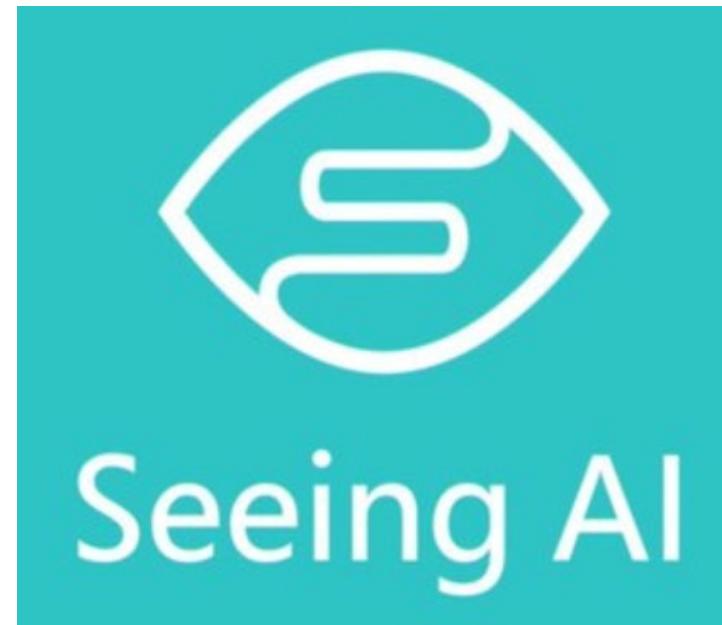
Designing for special needs

Several advantages to designing for a broader range of abilities, rather than for more limited user groups:

- products can have a broader market and application area
 - the legal and ethical rights of the user/consumer are upheld and legislation adhered to it can contribute to a more 'open' society, with fewer disability
 - products, reducing stigmatisation and discrimination.

Web Accessibility Initiative (WAI) – develop guidelines for overall accessibility of websites and associated software applications to make it easier for people with disabilities





Helping the Blind to 'see'

W3C initiative

Web Content Accessibility Guidelines (WCAG)

- Guide for making websites accessible to people with disabilities
- Content accessible to people with disabilities and website evaluation tools are offered
- Provide 65 website checkpoints for web accessibility
- WCAG 1.0 (1999), WCAG 2.0 (2008), WCAG 2.1 (2018)



W3C

The World Wide Web Consortium (W3C) develops international standards for the Web: HTML, CSS, and many more.



WAI

The W3C Web Accessibility Initiative (WAI) develops standards and support materials to help you understand and implement accessibility.



You

You can use W3C WAI resources to make your websites, applications, and other digital creations more accessible and usable to everyone.

Web Content Accessibility Guidelines 1.0

14 guidelines and divided them into **3 priority levels**

Priority 1: Web developers **must** satisfy these requirements, otherwise it will be impossible for one or more groups to access the Web content. Conformance to this level is described as **A**.

Priority 2: Web developers **should** satisfy these requirements, otherwise some groups will find it difficult to access the Web content. Conformance to this level is described as **AA** or **Double-A**.

Priority 3: Web developers **may** satisfy these requirements to make it easier for some groups to access the Web content. Conformance to this level is described as **AAA** or ***Triple-A***.



W3C initiative

Web Content Accessibility Guidelines (WCAG) 2.0

guidelines are more technologically neutral than WCAG 1.0, allowing them to stay useful for longer.

- Principles of WCAG 2.0 (2008) are:

- **P**erceivable
- **O**perable
- **U**nderstandable
- **R**obust

Web Content Accessibility Guidelines (WCAG) 2.0

Perceivable

- all about the senses people use when browsing the web
- Some users may have difficulties with one or more of their senses, making them reliant on assistive technology to browse your website.
- Three main senses that the guidelines can help with are **sight, sound and touch**.

With WCAG 2.0 - can make sure that users can perceive **all** the information on your website.

Web Content Accessibility Guidelines (WCAG) 2.0

Operable

- About the actions people take when browsing
- Covers the different ways in which your users browse the web.
- Motor difficulties - use their keyboard to navigate, Sight impairments - use a keyboard rather than a mouse too.

Main issues

Ensuring good keyboard-only navigation, avoiding setting time limits for your users and helping them out if they make errors on forms.

Web Content Accessibility Guidelines (WCAG) 2.0

Understandable

- Different kind of task to the first two principles
- Perceivable and operable website means nothing if your users can't understand it.

i.e. Website

- Clear terms
- simple instructions and explain complex issues.
- function in a way that your users understand, by avoiding unusual, unexpected or inconsistent functions.

Web Content Accessibility Guidelines (WCAG) 2.0

Robust

- One that third-party technology (like web browsers and screen readers) can rely on

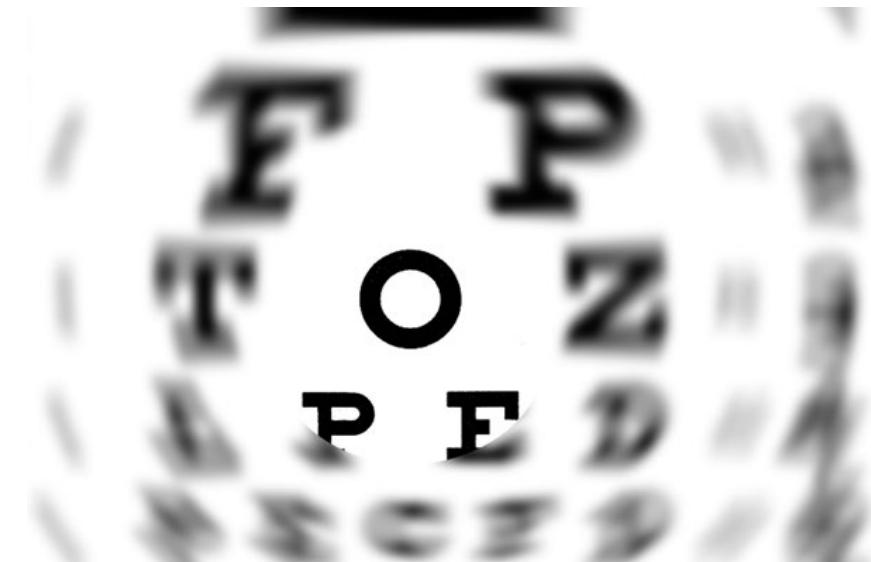
Website

- meet recognised standards, such as using clean HTML and CSS
- This minimises the risk of your users relying on technology that cannot correctly process your website

W3C initiative

Web Content Accessibility Guidelines (WCAG) 2.1

- WCAG 2.1 (April 2018) provides 17 additional success criteria to address:
 - mobile accessibility
 - people with low vision
 - people with cognitive and learning disabilities



**Web Content
Accessibility
Guidelines 2.0
Checklist**



There are more WCAG related resource in google drive

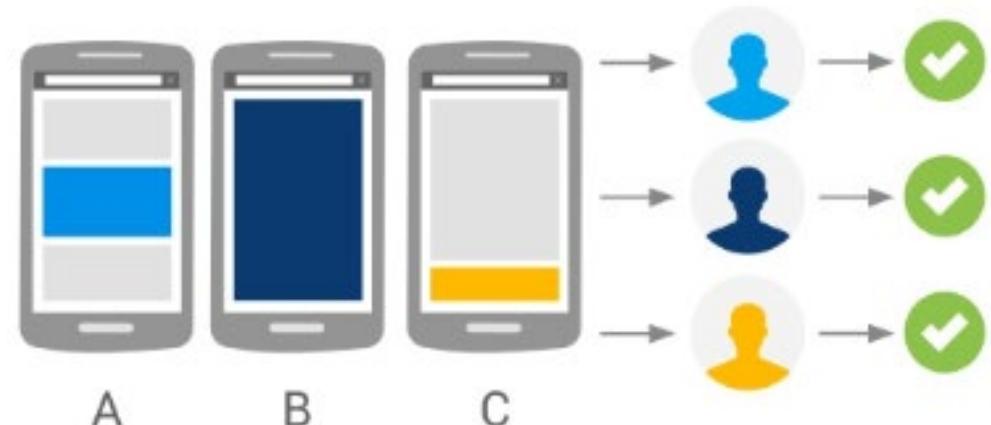
W3C initiative

Mobile Web Best Practices (MWBP)

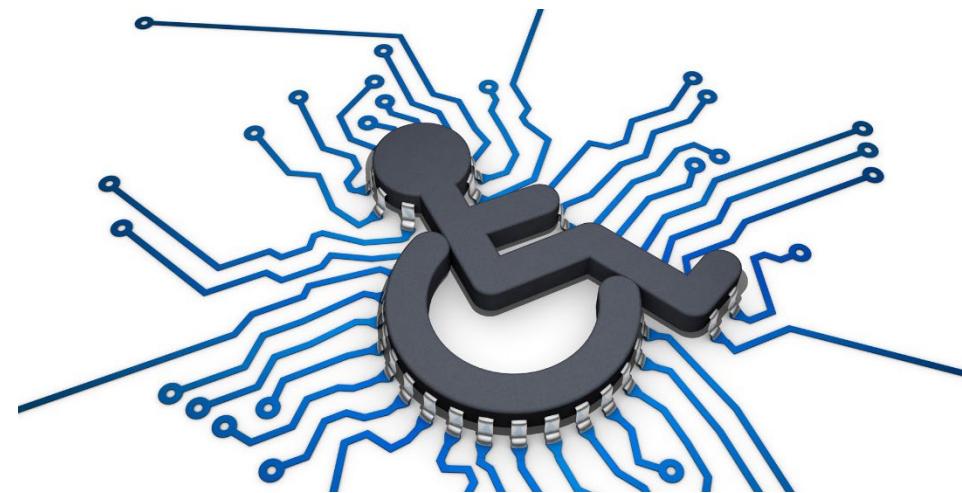
- guide for making websites usable from a mobile device

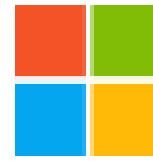


Mobile Web Best
Practices Working Group



What is Assistive Technology (A.T.)?





Microsoft

Accessibility



Jane Velkovski: The life-changing power
of assistive technologies | TED

(Video)

Innovating technology for the needs and health of elders

https://youtu.be/poAoO3pt_8c

Going cashless and the elderly: Mdm Lai Yoke Oi

<https://youtu.be/GAwOj7evsdk>

8 Old Folks Learn To Take On Social Media For St John's Home |

Don't Forget Me | CNA Insider

<https://youtu.be/JcU50xYQXOs>

Best Apps for Older Adults in 2022

<https://www.seniorliving.org/cell-phone/apps/>

Types of Assistive Technology

No-Tech

Low Tech

High Tech

The end