Recap:

How many types of interactions in the movie Avatar could you remember?

Mechanical

Touch

Gesture

Motion Tracking

Brain


© 2009 Twentieth Century Fox Film Corporation. All rights reserved

Brain

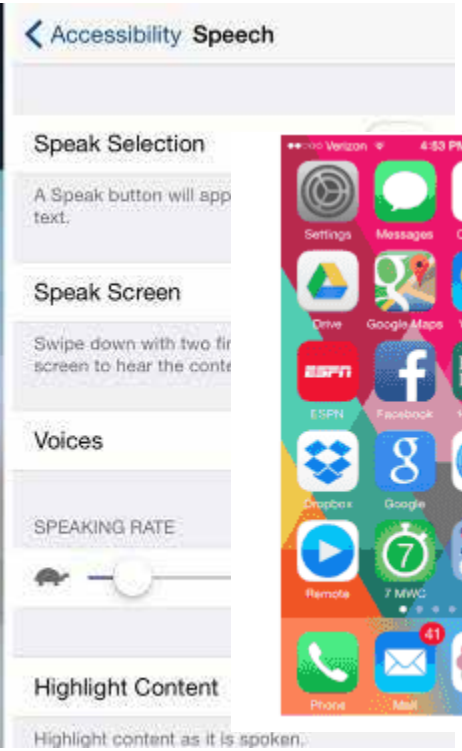

© 2009 Twentieth Century Fox Film Corporation. All rights reserved

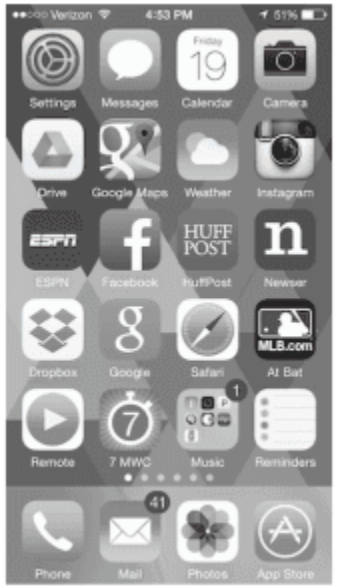
Brain

Assistive Technology: Design for People with Special Needs

Xiaojuan Ma

mxj@cse.ust.hk





http://bdmtech.blogspot.hk/2014/09/apple-releases-ios-8-with-major.html

Assistive Technology & Accessibility

- Any item, software, system, device, service
- For people with
  - Disabilities
  - Difficulties
  - Special needs
- To accomplish tasks that they cannot do otherwise

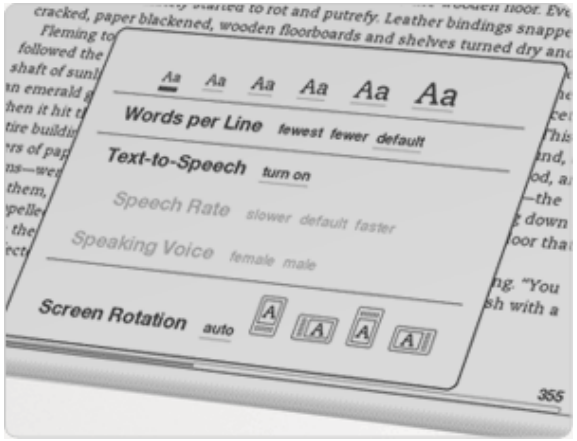
its.dot.gov

Everyday Accessibility (Sensory)

Vision

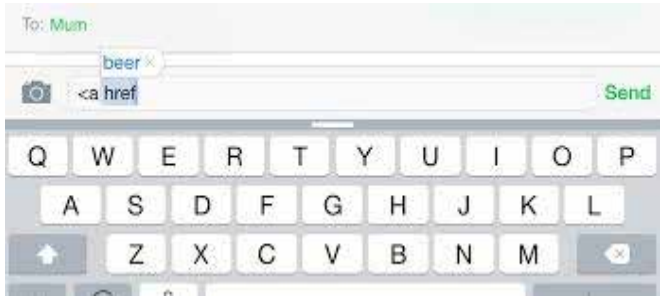
Hearing

Motor Skills

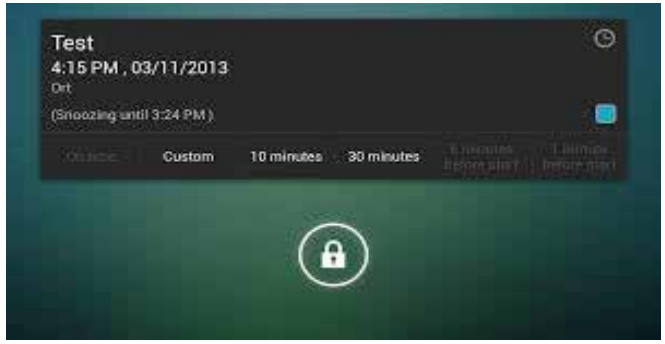


Everyday Accessibility (Cognitive)

Language



Memory



Emotion

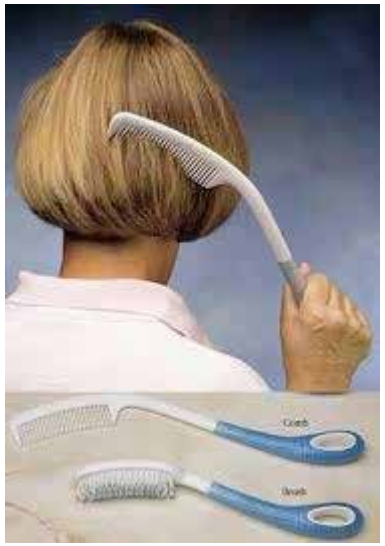
Benefits of Assistive Technology

- Enhanced independence
- Integrated participation
- Expanded social acceptance
- Improved quality of life

drexel.edu

Low-Tech

- With simple or no electronic parts
  - Such as magnifying glasses



http://mat803smolinsky.weebly.com/assistive-technology.html

beyondisability.org

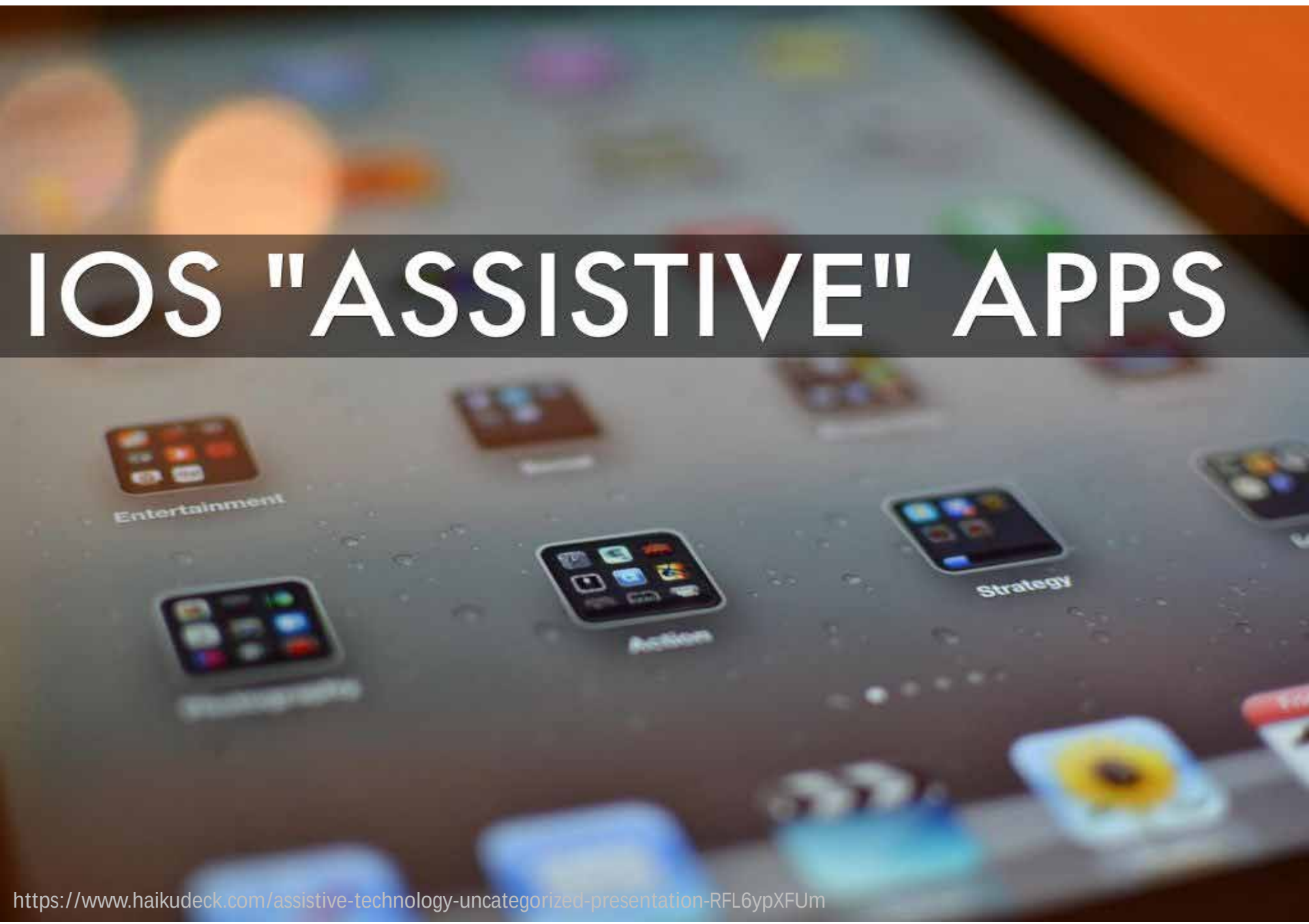
Medium-to-High-Tech

- Medium-Tech:
  - Simple to use, battery/simple electronics operated
    - Such as tape recorder and calculator

- High-Tech:
  - Electronic, computerized and sophisticated
  - Improve efficiency, speed and accessibility
    - such as powered wheelchairs and dynamic display communication devices

https://p2a.co/fByiNYo

IOS "ASSISTIVE" APPS



https://www.haikudeck.com/assistive-technology-uncategorized-presentation-RFL6ypXFUm

DESIGN FOR THE ELDERLY

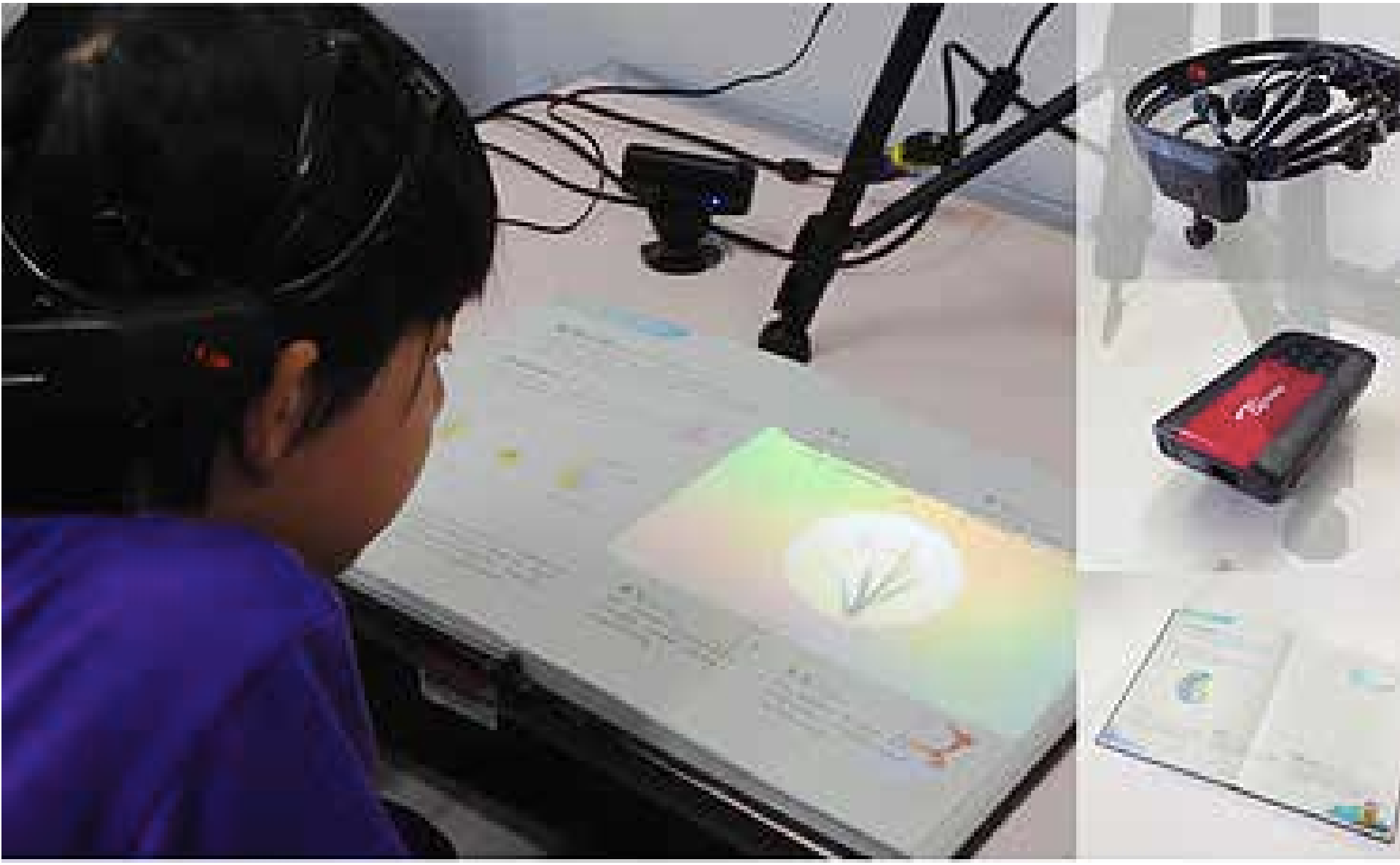
https://www.youtube.com/watch?v=tFX1nQLZUVM

Senior Citizen Home Safety

www.schsa.org.hk

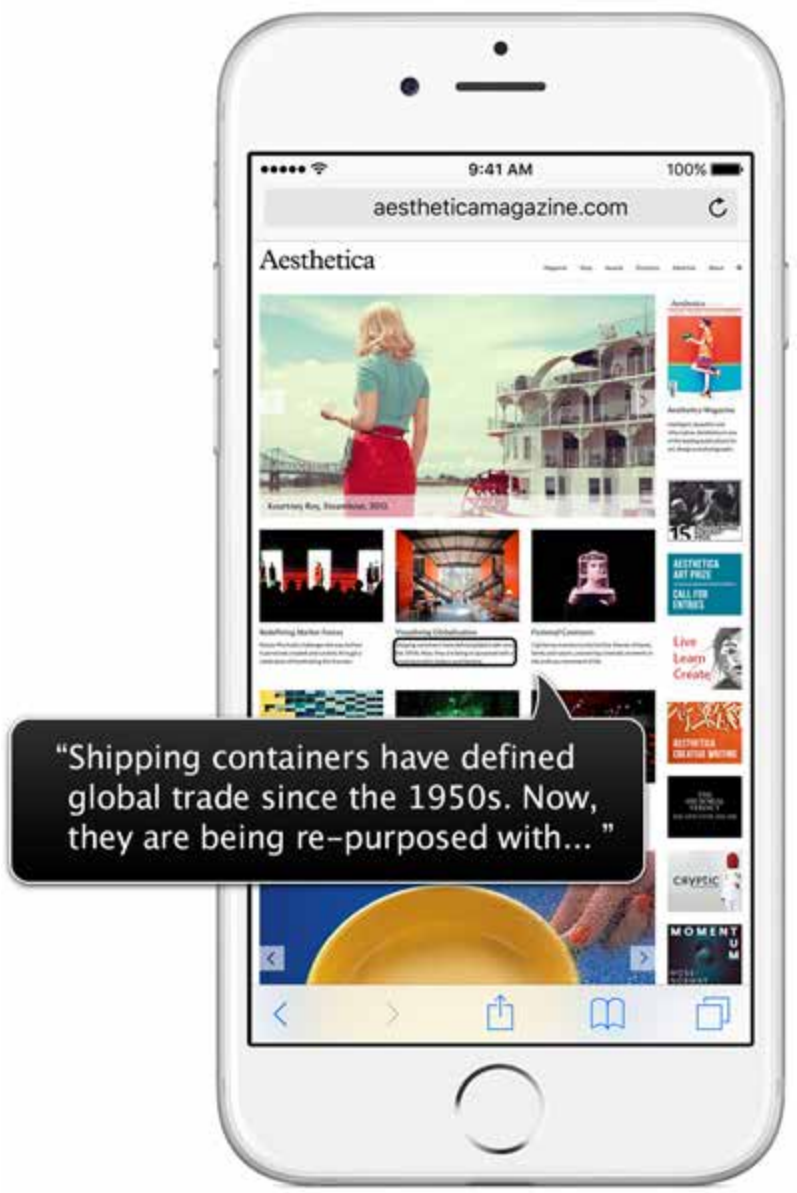
www.schsa.org.hk

DESIGN FOR CHILDREN



Huang et al., “FOCUS: enhancing children's engagement in reading by using contextual BCI training sessions”

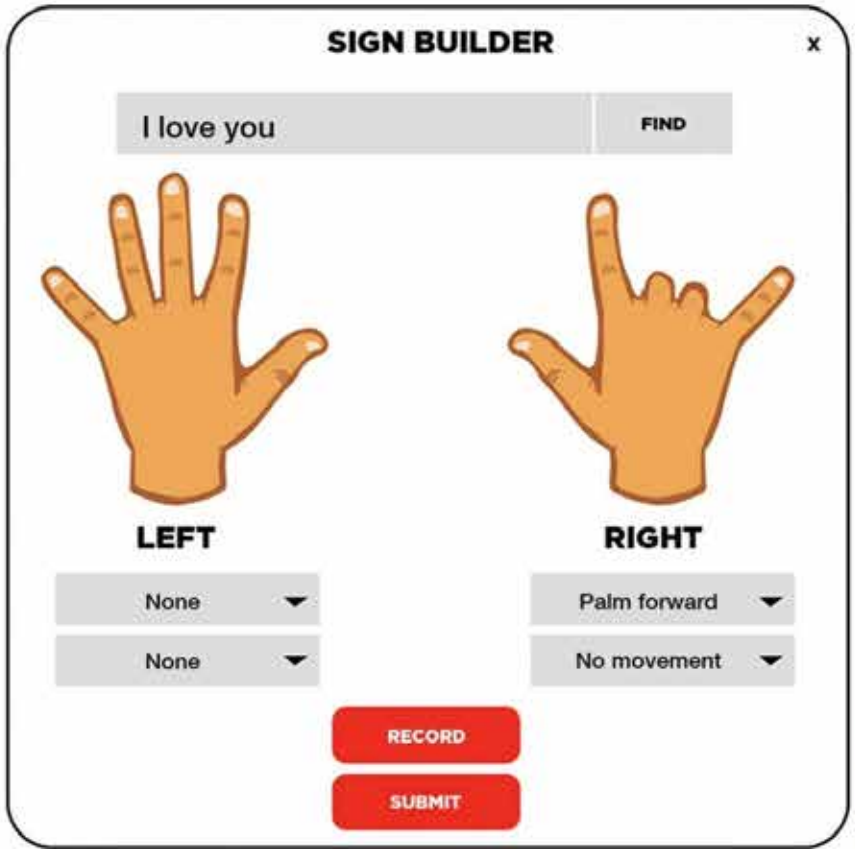
DESIGN FOR THE VISION IMPAIRED



http://www.apple.com/accessibility/ios/

http://iq.intel.com/augmented-reality-can-help-blind-see/

DESIGN FOR THE HEARING IMPAIRED



http://www.forbes.com/sites/amymorin/2015/08/21/how-to-deal-with-a-workplace-bully-advice-for-victims-bosses-and-co-workers/

http://www.digitaltrends.com/cars/new-bmw-idrive-features-touchscreen-and-gesture-recognition/

DESIGN FOR THE MOTION IMPAIRED

https://www.media.mit.edu/research/groups/biomechatronics

https://www.youtube.com/watch?v=OOPB5sWtZ1c

DESIGN FOR THE LANGUAGE IMPAIRED

https://c4.staticflickr.com/4/3527/3463755240_324e303c02_b.jpg

Intel just open sourced Stephen Hawking's speech system and it's a .NET 4.5 WinForms app that you can try for yourself

Mansib Rahman 14 Aug 2015 7:00 AM | 18

Disclaimer: This post does not constitute an endorsement of any Microsoft service, technology or product by Stephen Hawking. The purpose of this post is to discuss Intel's communication platform for individuals with disabilities and it's technical details. Pictures are used purely for informational and demonstrational purposes.

I'm typing this sentence with my face. And no, I didn't somehow smash my face onto a keyboard with laser-like precision. I used Intel's **ACAT**, or **Assistive Context-Aware Toolkit**, an open source platform developed in C# using .NET 4.5 and Visual Studio 2012 at Intel Labs to allow people with disabilities to communicate with ease, even in very constrained situations, like Stephen Hawking's,

http://blogs.msdn.com/b/cdndevs/archive/2015/08/14/intel-just-open-sourced-stephen-hawking-s-speech-system-and-it-s-a-net-4-5-winforms-app.aspx

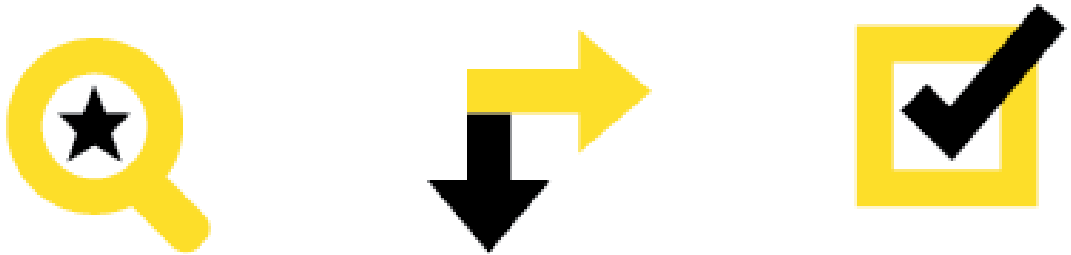
http://techmaza.org/wp-content/uploads/2014/01/who-are-you-siri-25.jpg

Challenges Assistive Technology

- Usability and learnability
- Individual differences
  - Problem
  - Need
  - Context
- Social norms
- Financial concerns
  - Price
  - Insurance
  - Service

Challenges Assistive Technology

- Design for people with difficulties
- Designed by people without these difficulties

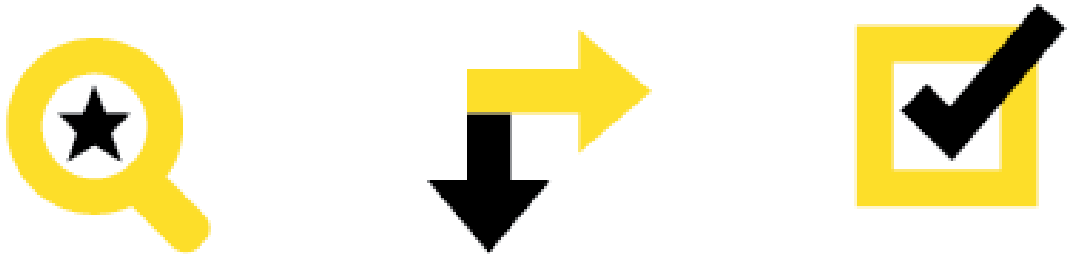


https://generalassemb.ly/education/user-experience-design

THE “20 QUESTIONS” GAME

Challenges Assistive Technology

- Design for people with difficulties
- Designed by people without these difficulties



- Technological solution
- Methodological solution

https://generalassemb.ly/education/user-experience-design

Adaptable and Adaptive

- Changed by users
- Change for users

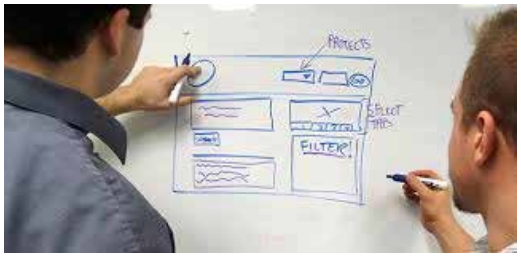
https://play.google.com/store/apps/details?id=com.google.android.inputmethod.japanese

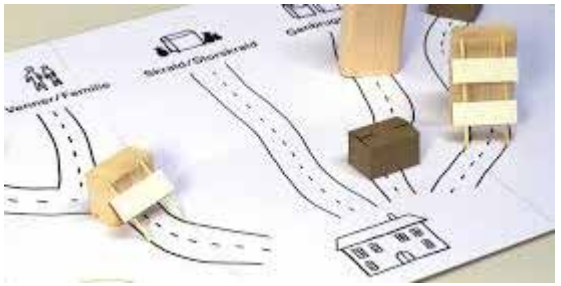
Participatory Design

- **All stakeholders** are actively involved in the processes and procedures of design
- A Scandinavian approach introduced in the 1970s
- Who are the participants if designing teaching devices for a local school for autistic children?

http://participateindesign.org/about/participatory-design/


www.hceye.org
©
$
+@
#
!
%
&
=





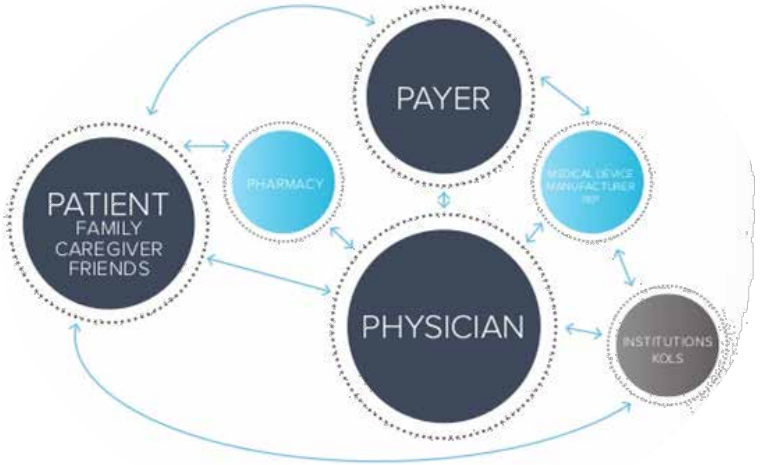
https://pdwithimpairmentschi2014.wordpress.com/

Challenges of Participatory Design

- Access to the target user
- Communication difficulty
- Budget

Participatory Design with Proxy

- With the crowd
- With the community
- With the support network
  - Professional
  - Social
- With those of similar problems
- With those in the same demographics



http://www.slideshare.net/parkerwhite/branding-in-healthcare-slideshare

Accessibility Everywhere

- Home
- School
- Workplace
- Public space

- Environment
- Machine
- Phone
- Web

http://www.sunrisegroup.org/tag/assistive-technology/

multimedia.scmp.com/snowden/

ACM Paper Accessibility Guideline

Specifically, we encourage authors to carry out the following five steps:

In Microsoft Word (Windows Only)

1. Add alternative text to all figures
2. Mark table headers
3. Generate a tagged PDF

In Adobe Acrobat

4. Verify the default language
5. Set the tab order of all pages to "Use Document Structure"

After you have completed these steps, you can use the full version of Adobe Acrobat to check the file for accessibility problems. If you don't have the full version of Adobe Acrobat, you can use a free tool, such as the PDF Accessibility Checker (PAC).

chi2015.acm.org/authors/guide-to-an-accessible-submission/




Thank You J

Xiaojuan Ma

mxj@cse.ust.hk