

Lecture 2A User Considerations - Human Limitations

Humans have many limitations

It is important to consider when designing software.

- We can only read so fast, run so far, or play video games for so long.
 - » There are many human characteristics that can limit what a user can do with a product.
- Good software products accommodate their target audience.

Some examples of human limitations are

- perceptual limitations,
- physical limitations,
- cognitive limitations,
- and cultural limitations.

Perceptual limitations 1/2

Many perceptual limitations can affect how people interact with technology.

- The restrictions upon our five senses impact how well we perceive our surroundings.
- Therefore, our perceptual limitations are those that are restricted by our senses.
 - » Perceptual limitations are sometimes referred to as sensory limitations.

A common example of a perceptual limitation – colorblindness.

- Approximately 4.5% of the entire human population suffers from colorblindness.
- Around 8% of males are colorblind, compared to only 0.5% of females.

A colorblind person has difficulty telling certain colors apart.

- » So, colored images can appear differently to them.

Perceptual limitations 2/2

continue on colorblindness

From a development aspect, the best way to account for color blindness is to **increase the contrast** of your product.

- Using light colored backgrounds with dark texts, or vice versa,
» accommodates not only color blindness, but most visual limitations.
- You could also test a color scheme through different forms of color blindness, to see whether it is acceptable.
- There are **UI libraries**, and **graphic design tools** that support this.

[Optional] Homework on how to design for perceptual limitations.

Examples include, using visual cues, or vibrations to accommodate for auditory limitations.

Physical limitations

Physical limitations

Anything that affects how a user physically interacts with the product.

example, children are not the same as adults.

Products specifically created for children, should account for their

- lower dexterity,
- shorter height,
- and smaller hands.

They need big buttons and controls they can reach and grasp.

Physical limitations

left and right handedness

You can make your product more user friendly, by having a left handed option.

- Many interfaces are designed to be easy to use by right handed people.
- They'll have most of the buttons, and menus on the right hand side. Which is easier to click with the right thumb.

You could design a product to be easy to use by a left handed user, by having an option that places buttons and menus on the left hand side of the screen.

- Hal developed a game to be played on a mobile device.
- The game involves users clicking colorful circles before they disappear.
- The music in the game would speed up when circles are about to disappear.
- The phone would vibrate when a circle was clicked.

Hal was reading the feedback that he received about his game. Most of the feedback was positive, however, there were a couple of complaints about usability.

Which of the following complaints represent a physical limitation?

- A. I can't see some of the circles, because the circle, and the background colors are too similar.
- B. I have limited hearing, and I feel like I'm at a disadvantage, because I can't hear the music well.
- C. I hate that the phone vibrates when I press a bubble. It's really annoying.
- D. I can only play the game for so long before my hand gets tired.

Which of the following complaints represent a physical limitation?

- ✗ A. can't see some of the circles, because the circle, and the background colors are too similar.
- ✗ B. have limited hearing, and I feel like I'm at a disadvantage, because I can't hear the music well.
- ✗ C. hate that the phone vibrates when I press a bubble. It's really annoying.
- ✓ D. can only play the game for so long before my hand gets tired.

Cognitive limitations

Cognitive limitations are commonly based on memory limitations.

user interfaces should have visible elements that are familiar / suggestive to promote recognition

» it is often easier to recognize something than it is to recall from memory

Magical Number Seven, proposed by Harvard psychologist, George A Miller

the average human has a short term memory with enough capacity to hold seven items, plus or minus two

Software & Keep this limitation in mind during development.

- The working human memory can hold five to nine items at a time.
- This gets worse with distractions.

you don't want to have the end user carry a bunch of arbitrary items in their memory from one screen to the next in your product

Cultural limitations / differences

Colors - what colors mean in different cultures

- In Western culture the color white is used in weddings, and represents peace.
- However, in many other cultures, the color white is representative of death and mourning.
- Also, the color pink is considered a feminine color in many cultures, but not all.

other aspects of design aside from color that can change from culture to culture

- language translation,
- symbols and icons,
- layout,
- and multimedia,

could all differ between cultures.

Cultural limitations

The use of X's in checkboxes. X can have a very ambiguous meaning.

Think of election ballots, where you mark your choice of candidate with an X beside their name.

- In Japan, they use an O mark, called a Marujirushi to denote selection.
- They use an X mark to represent rejection.
- Modern user interfaces now use a check mark in check boxes to mark a choice.

[Optional] Homework

More information on cultural limitations and software development.