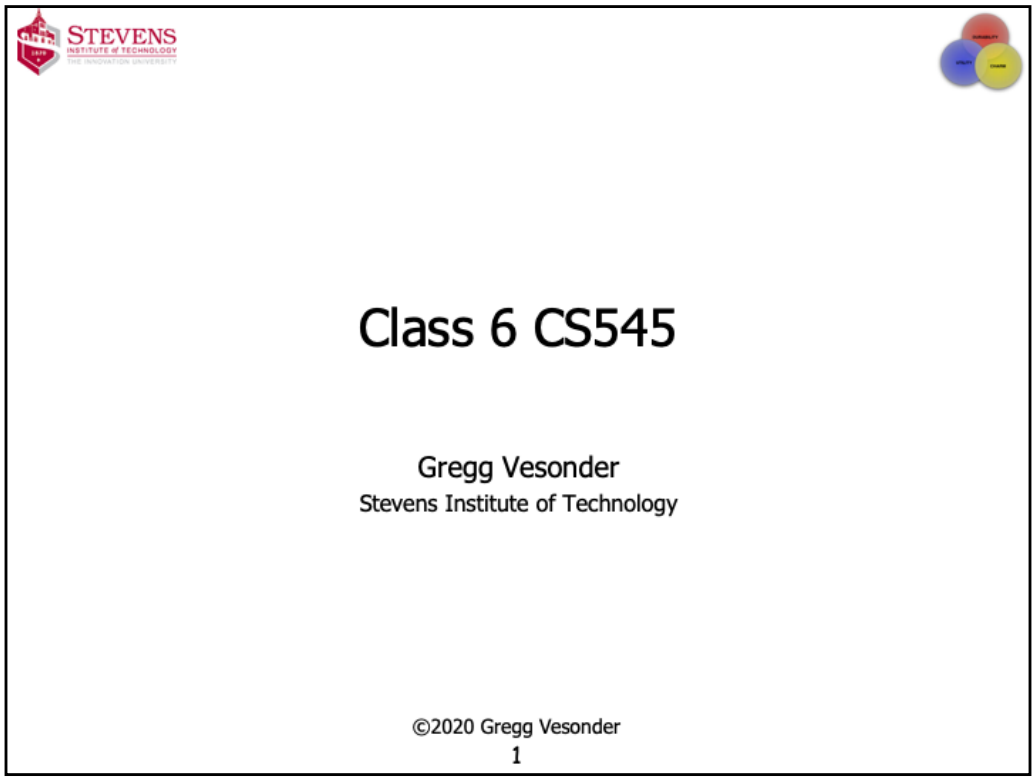
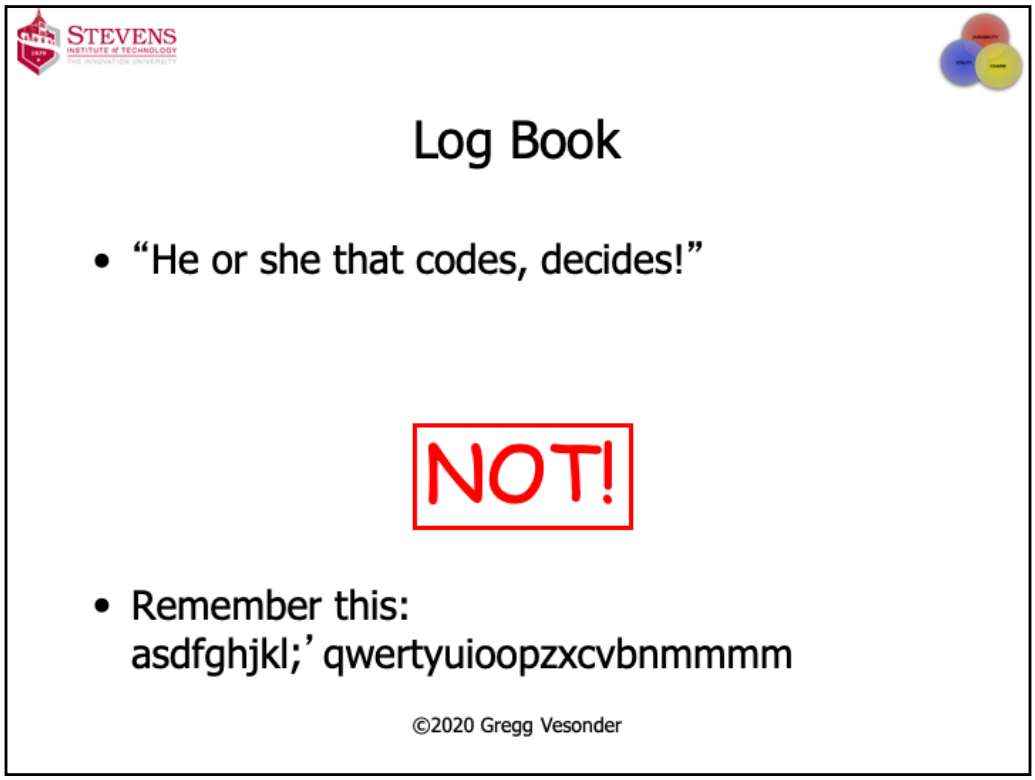


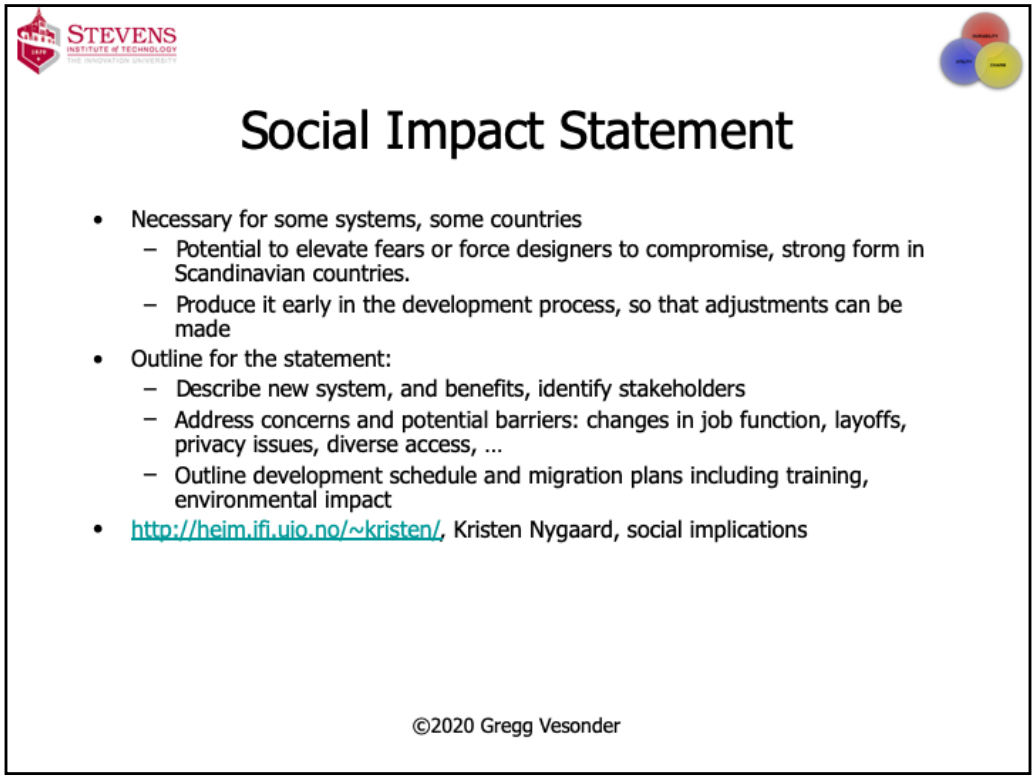
Welcome to Class 6

Roadmap

- Log
- Ethics
- Design
- Interaction Styles
- Readings this class: Stone et.al., Chapters 10-13, Norman Chapters 3 & 6



There is an attitude that is very alive in developer circles that the person who codes makes the final decision on feature aspects including usability. In fact I have had coders bluntly tell me that they decide on the interface. This should NOT be the case (now you could predict that response). Not withstanding the fact that it should not be the usability experts that decide the interaction (why? Hint user driven design). However the usability professional should insure that the coder is staying true to the guidelines, including the "non visible" ones. When I was doing usability work for command line interfaces my first test, which achieved some notoriety, was to rake my hand over the keyboard and hit return. The last line of this slide shows the result of doing this. For the first few weeks the entry would invariably cause the program to crash. What I was checking was making sure that they would do reasonable things during error conditions, accepting illegal input and buffering it while notifying the user that it was an incorrect response and perhaps displaying what the legal responses were.



When doing user design and experimentation we have to understand what is legal and what is required legally and this varies per country. This is important if you want to market internationally– of course, however there are also moral issues involved with human experimentation and design.

Legal Issues

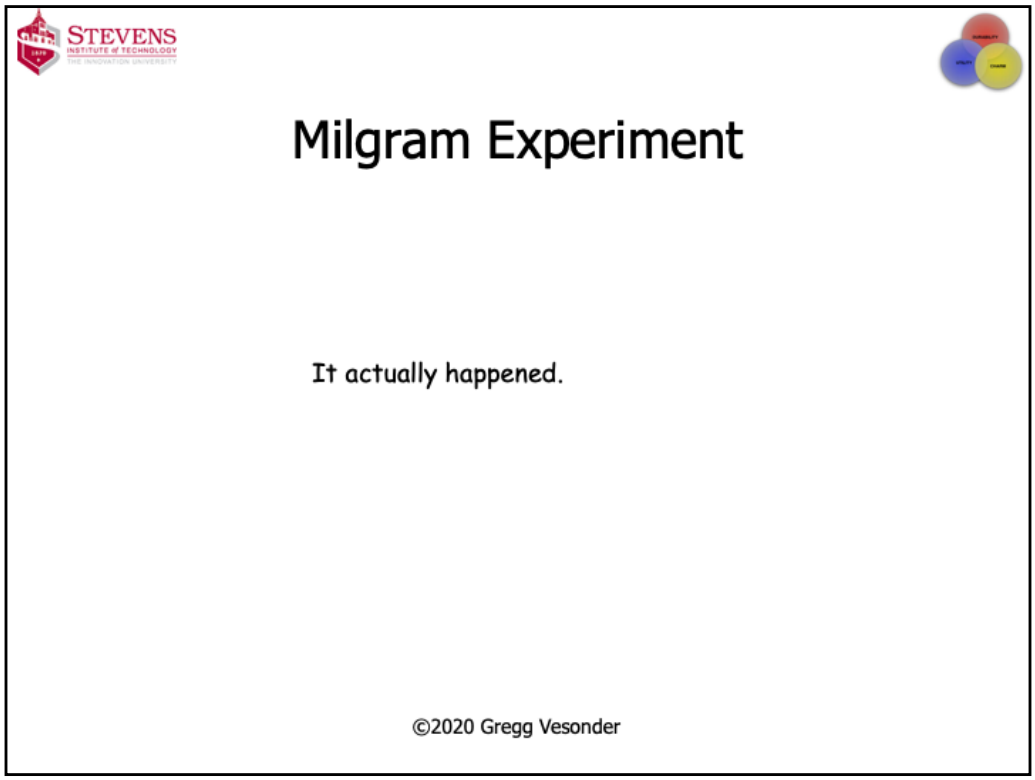
- Privacy
- Safety and Reliability
- Copyright and patent protection for software
- Copyright protection for online information
- Freedom of speech in electronic environments - issues in online communities
- Equal access for disabled issues
- Multi national issues
- Subject rights
  - http://www.apa.org/ethics/code/index.aspx

Public Announcement

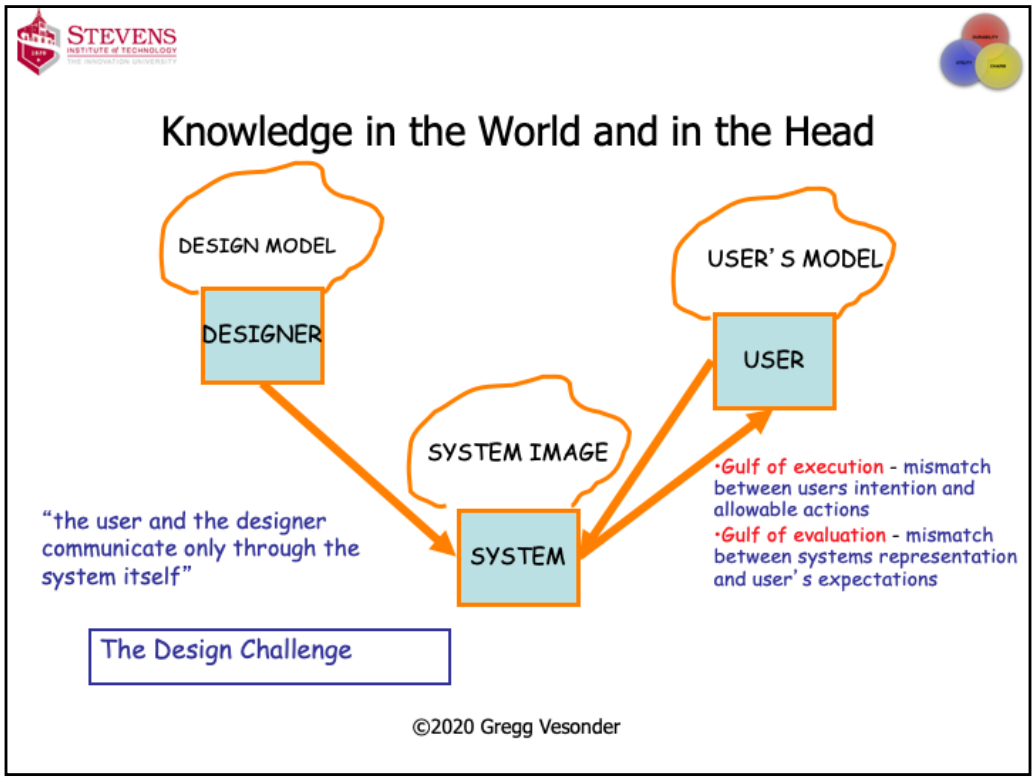
WE WILL PAY YOU $4.00 FOR ONE HOUR OF YOUR TIME

Persons Needed for a Study of Memory

The moral and the legal issues do converge, one would hope that would be the case! Note that folks participating in your prototype "experiments" do have rights – check out the APA (American Psychological Association) text. Putting a finer point on this note the ad in the corner. Then view this youtube video from the BBC http://www.youtube.com/watch?v=BcvSNg0HZwk, this is part 1 of 3 you only need to view part 1.



This occurred in 1963 at Yale. Hopefully it will be an aid to insure that you will be careful to respect your participants rights. Often showing extremes highlights the issues. It has been agreed that all HCI courses should cover ethics and experimentation. You can access the video in canvas.

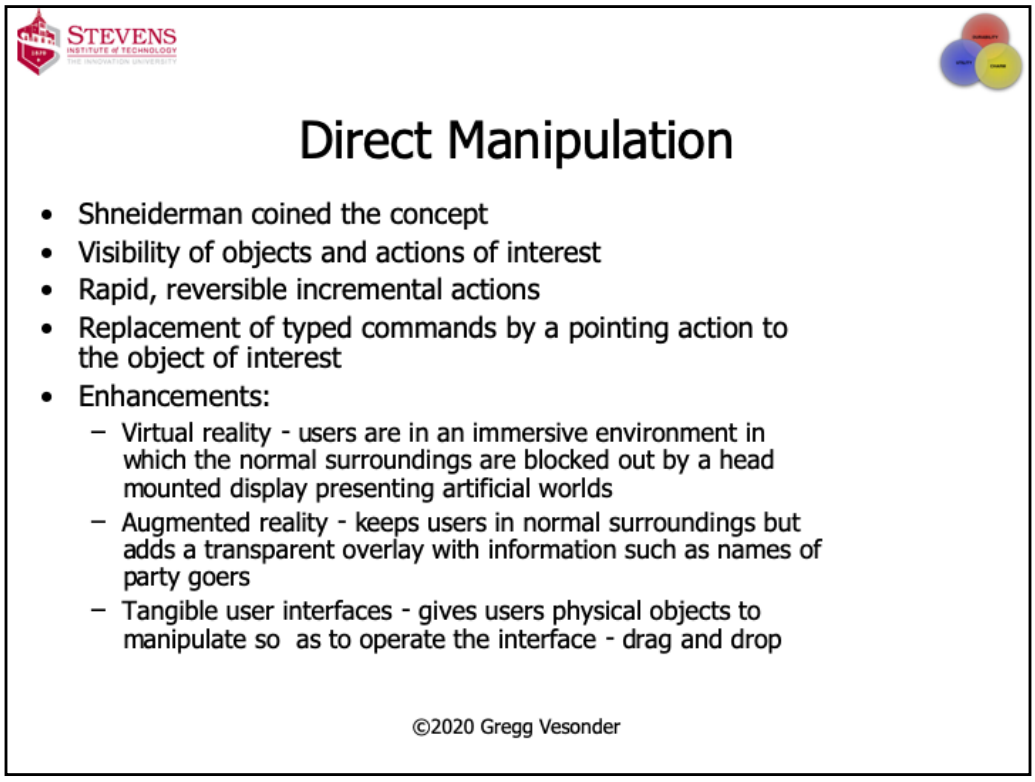


So what devices do we use to convey information from the system to the user and then permit the user to interact with the system.

Interaction Styles

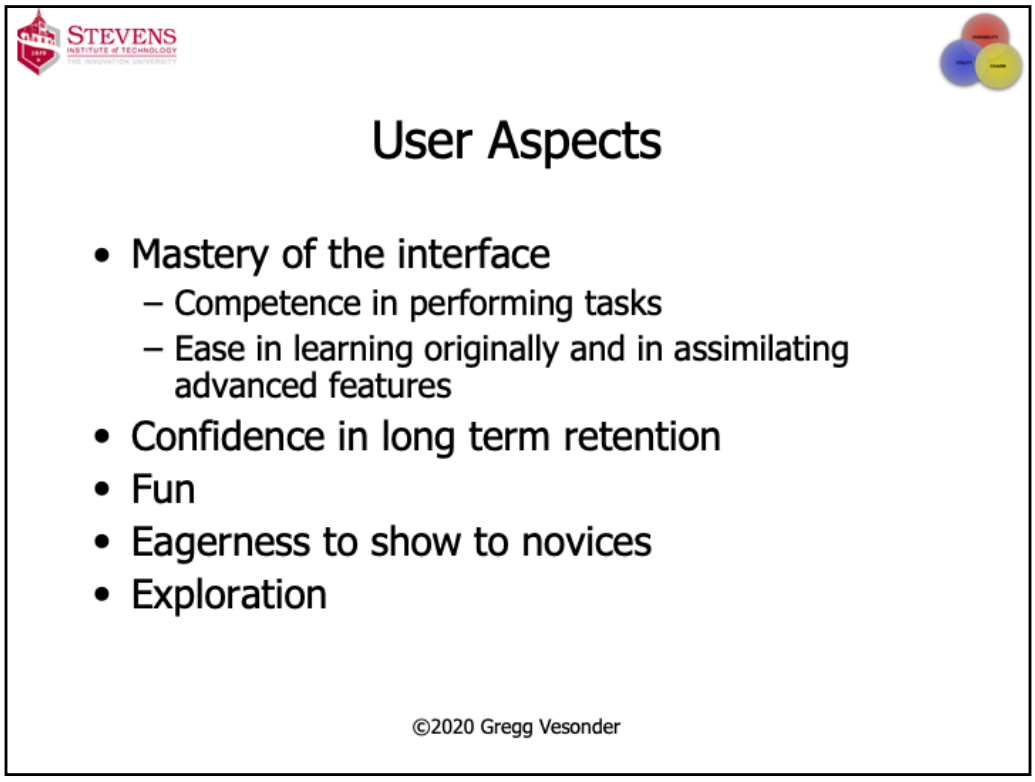
Style	Advantages	Disadvantages
Direct Manipulation	Visually presents task concepts, easy learning, easy retention, avoids errors, encourages exploration, high subjective satisfaction	Hard to develop, requires graphics display & pointing device
Menu Selection	Shortens learning, reduces keystrokes, structures decision making, can use dialog management tools, easy support of error handling	Danger of many menus, slows frequent users, consumes screen space, requires rapid display rate
Form Completion	Simple data entry, modest training, convenient assistance, use of form management tools	Consumes screen space
Command Language	Flexible, power users, user initiative, creation of macros (customizing)	Poor error handling, long training, memorization
Natural Language aka Anthropomorphic	Relieves burden of learning syntax	Clarification dialog, more keystrokes, contest is hard, unpredictable

I presented this table earlier in the year. These are the basic interaction styles in HCI we will review each of them in a bit more depth in this lecture and the next.

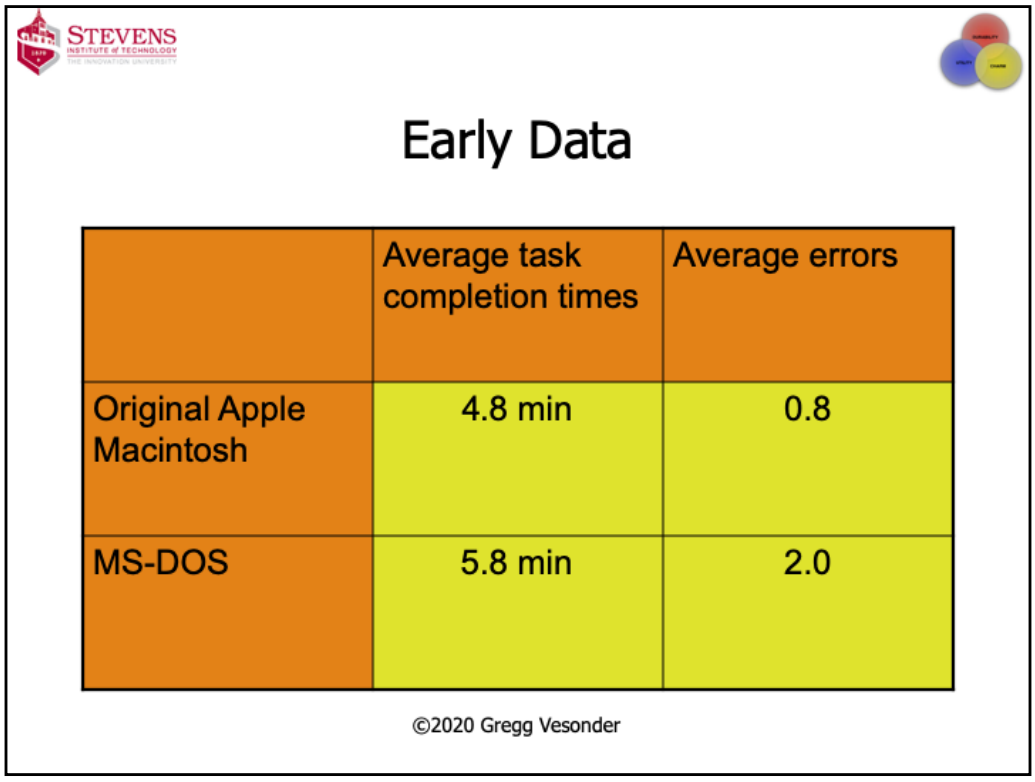


The first we will cover is direct manipulation, which is slowly becoming more prevalent in gaming, in fact almost every gaming console has some means of motion capture..

Second Life is a nice free version of a DM interface and is worth exploring. Note that it can be as nasty as the real world at times, so let the user be cautious. I would like to develop a software engineering space in Second Life or some other virtual reality space when I have time. The virtual reality space continues to morph with no consensus in sight. Oculus Rift certainly has created a stir - http://www.oculusvr.com/



This is fairly clear – it is straightforward to learn the interface because it is “natural.”



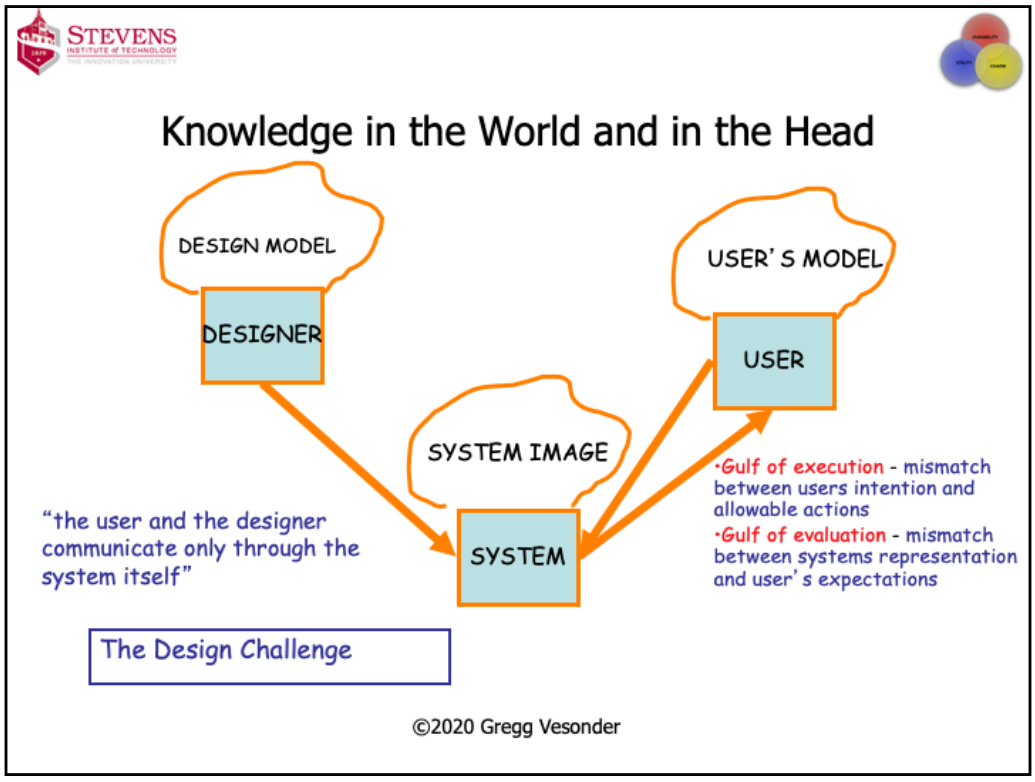
This was an early study of the original Apple Macintosh's direct manipulation interface versus MS-DOS's command line interface, performing tasks such as creating, copying and renaming files. Note that Mac users did it faster and with less errors.

Principles

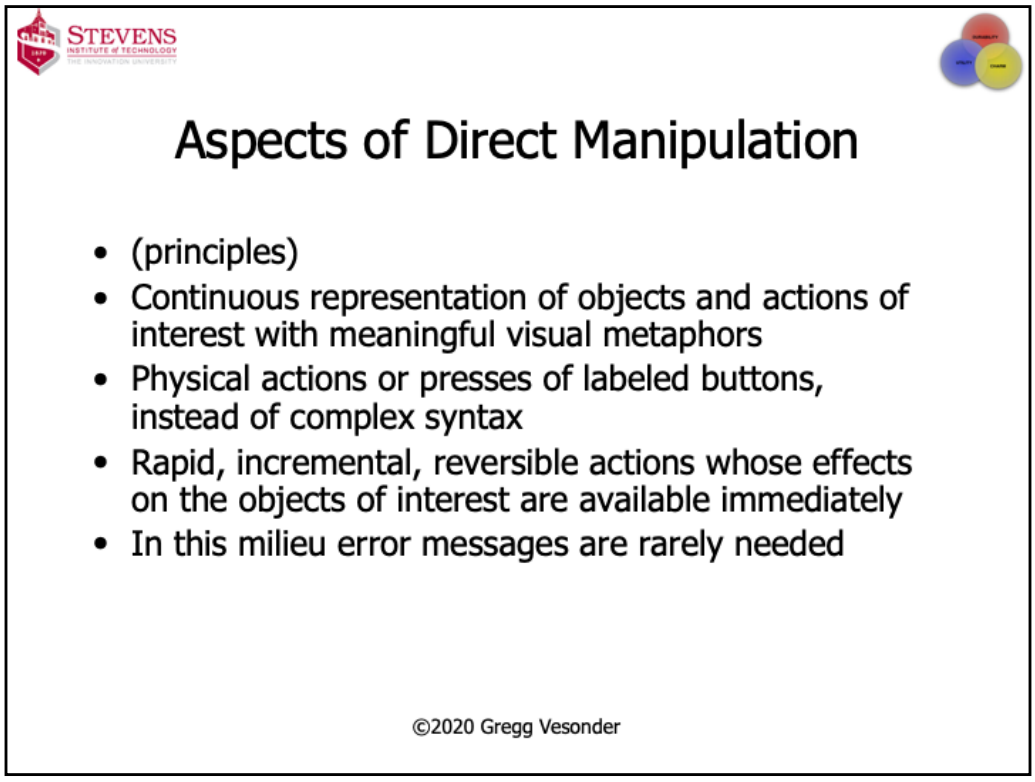
- Principle of virtuality - a representation of reality that can be manipulated
- Principle of transparency - the user is able to apply intellect directly to the task, the tool effectively disappears
- Bridges gulfs of execution and evaluation
- Gets even more interesting with Augmented Reality

Peak.ar

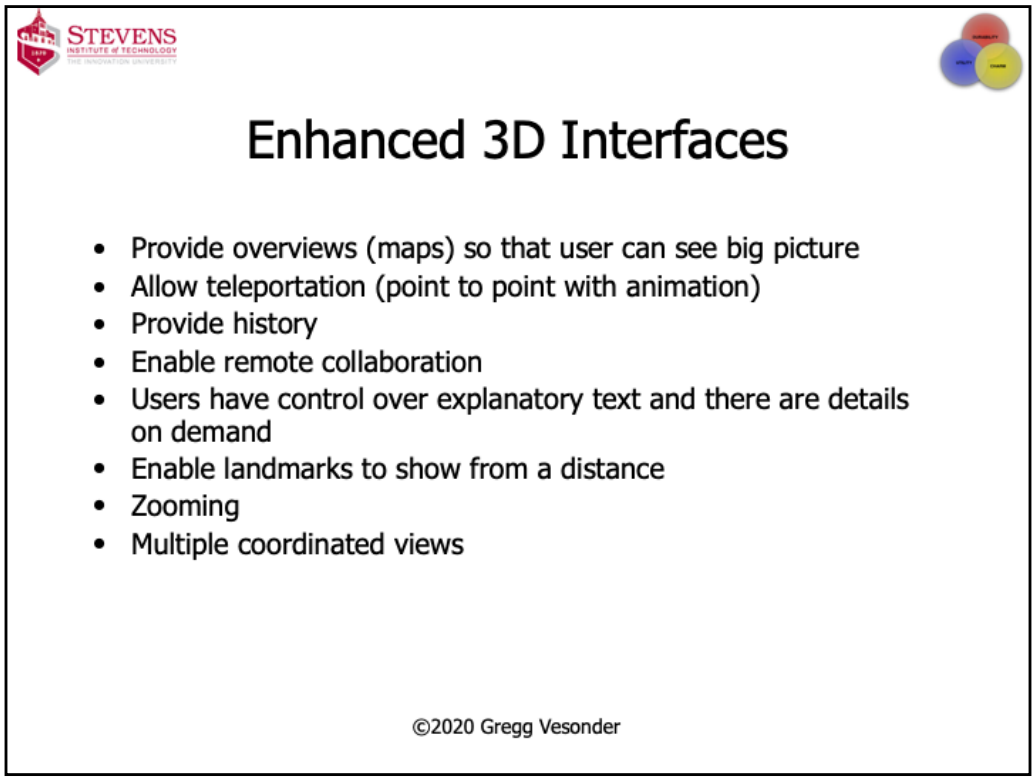
Some principles for using direct manipulation. It should be as natural as manipulating objects in the real world. It gets even more interesting with augmented reality interfaces where this direct manipulation intrudes with the real world.



Just to remind you ☺



Fairly straightforward – the last point is worth comment. With direct manipulation errors are evident – you drop or "break" objects or go down the wrong path. Error messages however can be used even in this milieu.



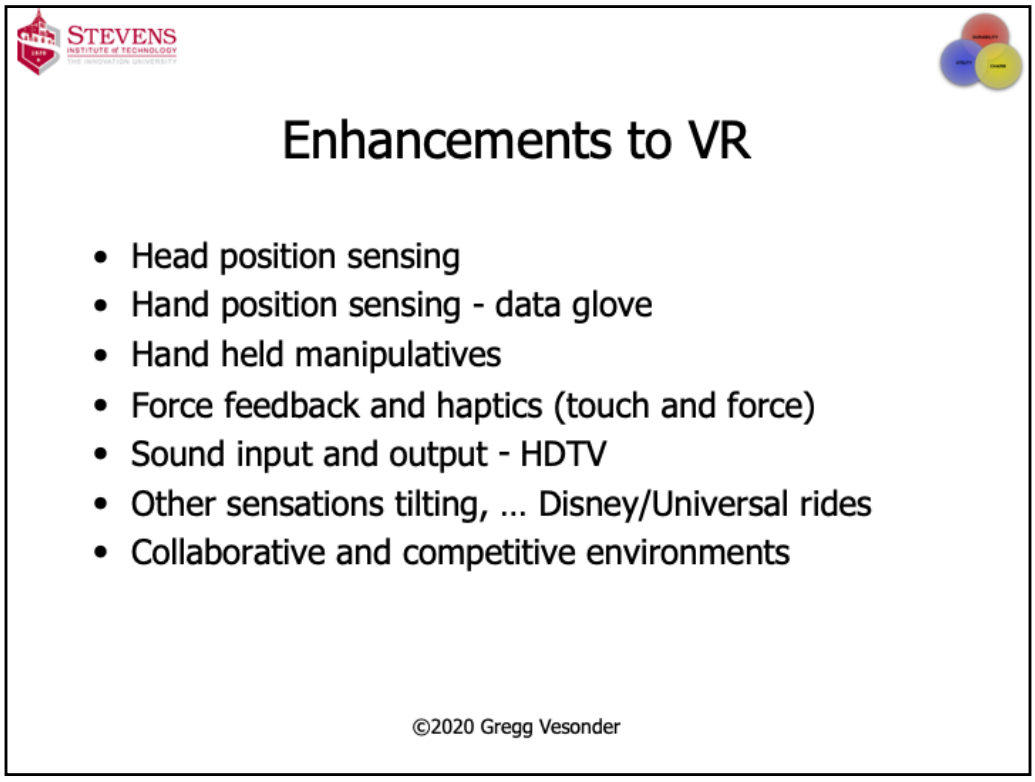
More design points of such interfaces. You should have views that scale to the complete world. Again Second Life has done a great job of grappling with these issues and finding acceptable user interface solutions.

Teleoperation

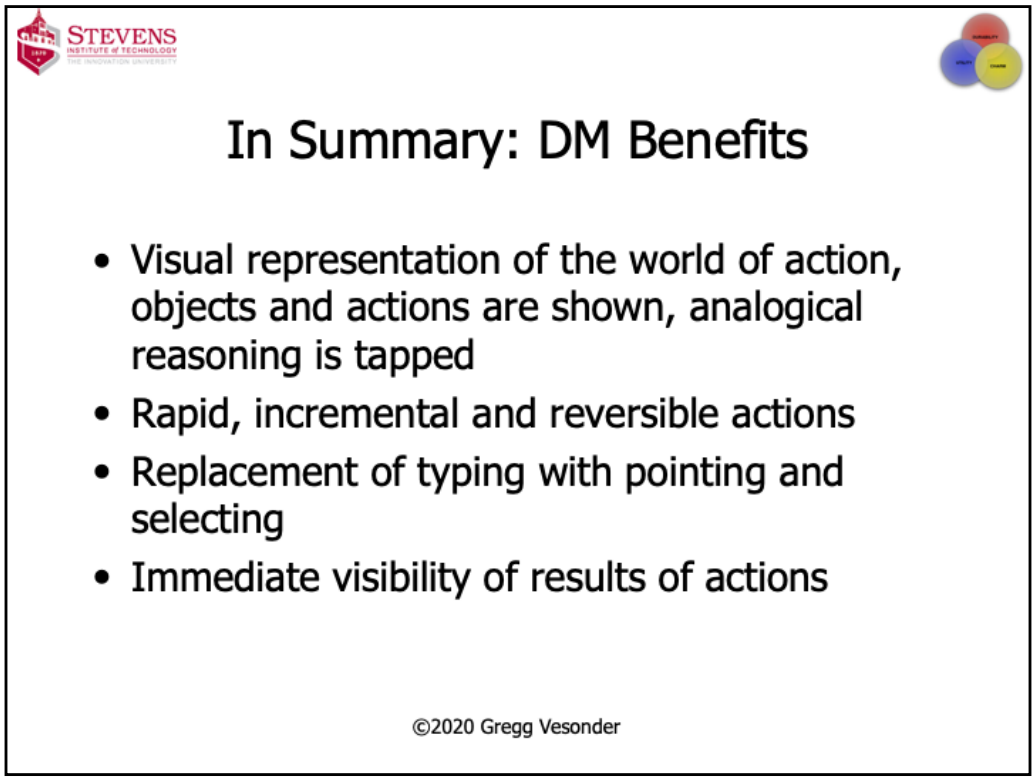
- Direct manipulation in personal computers + process control (operator control physical processes in complex environments).
- Example is telemedicine
- Several issues:
  - Time delay
  - Operation delay
  - Incomplete feedback (haptic issues)
  - Unanticipated interferences (do not control all of the remote "stage")

anybots.com

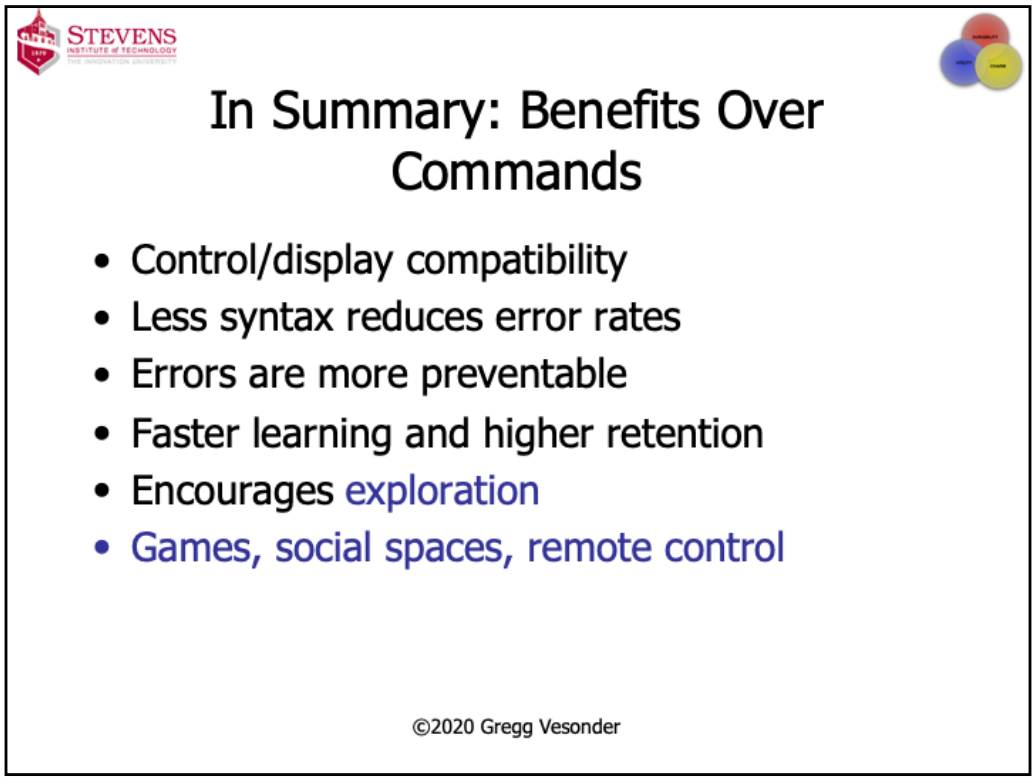
Another form of direct manipulation is directly manipulating devices through the computer. This is already done in medicine, astronomy and for the spirit and opportunity rovers on Mars. Of course there was the Sheldon bot, http://www.youtube.com/watch?v=_bIoeBpSeU4 . Ignore the sub-titles



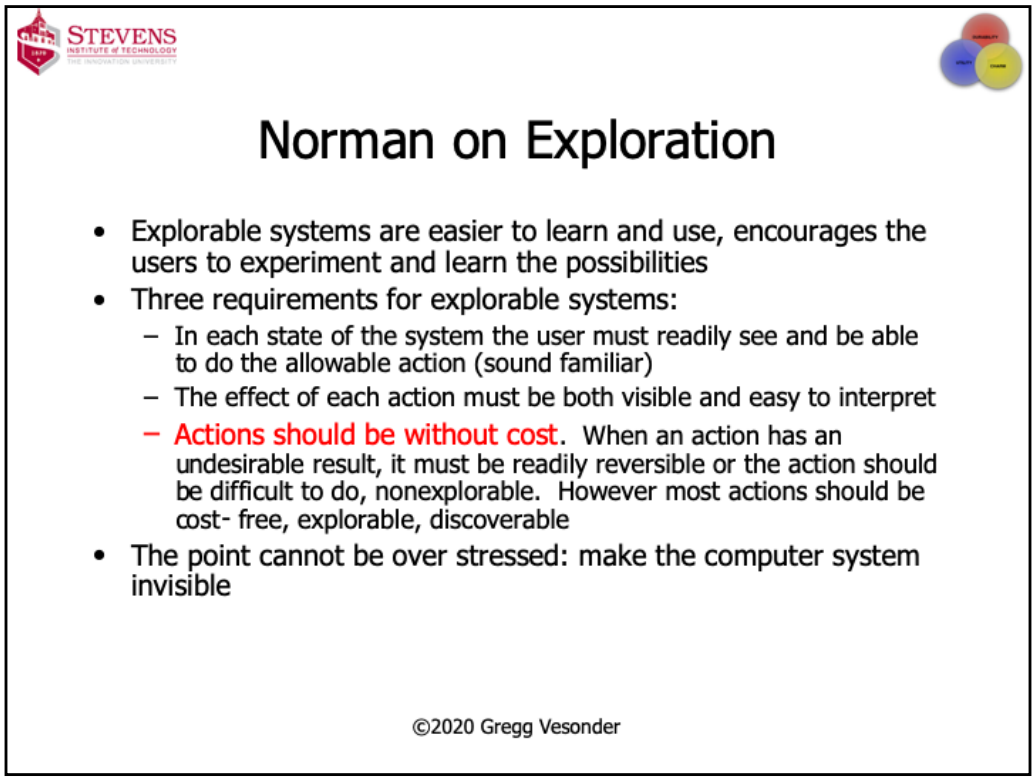
The title explains it all – of course 3D also has a place.



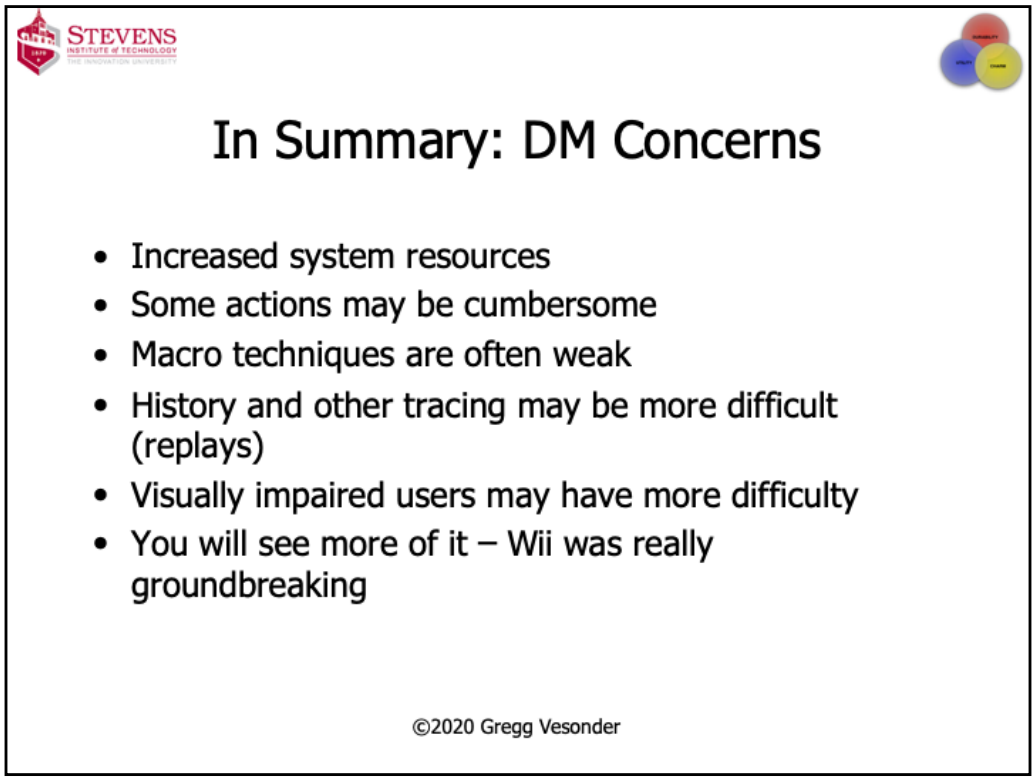
Some benefits of Direct Manipulation



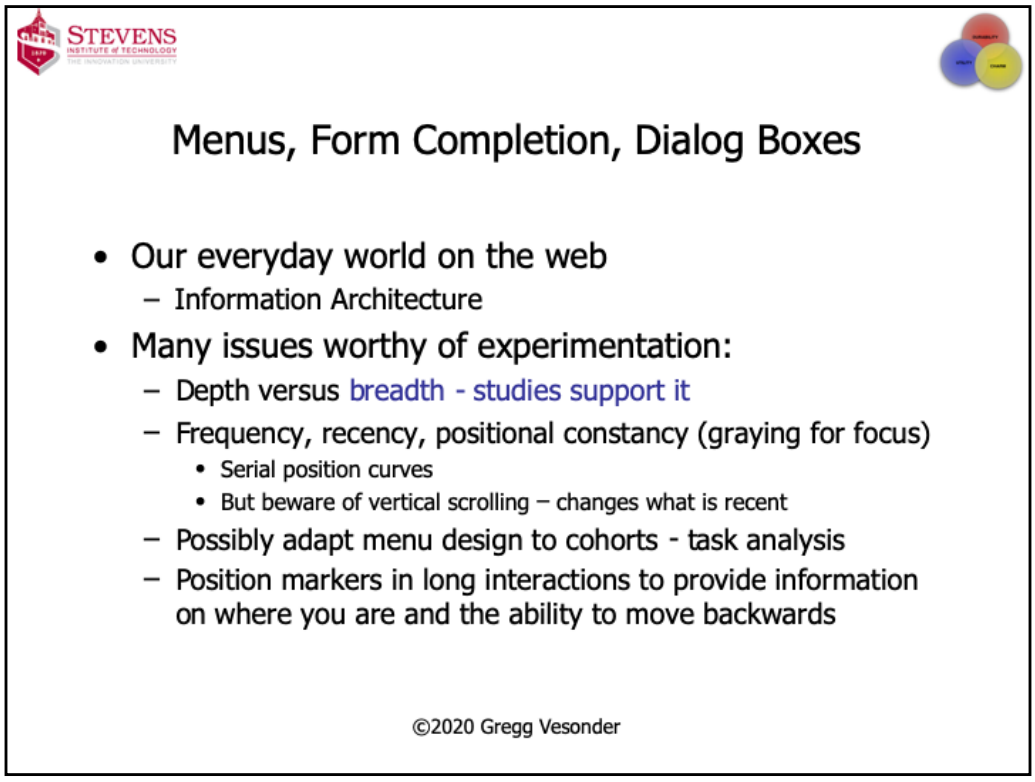
More specifically in relation to command language interfaces. One negative is that they are often more verbose, take longer than command language equivalents.



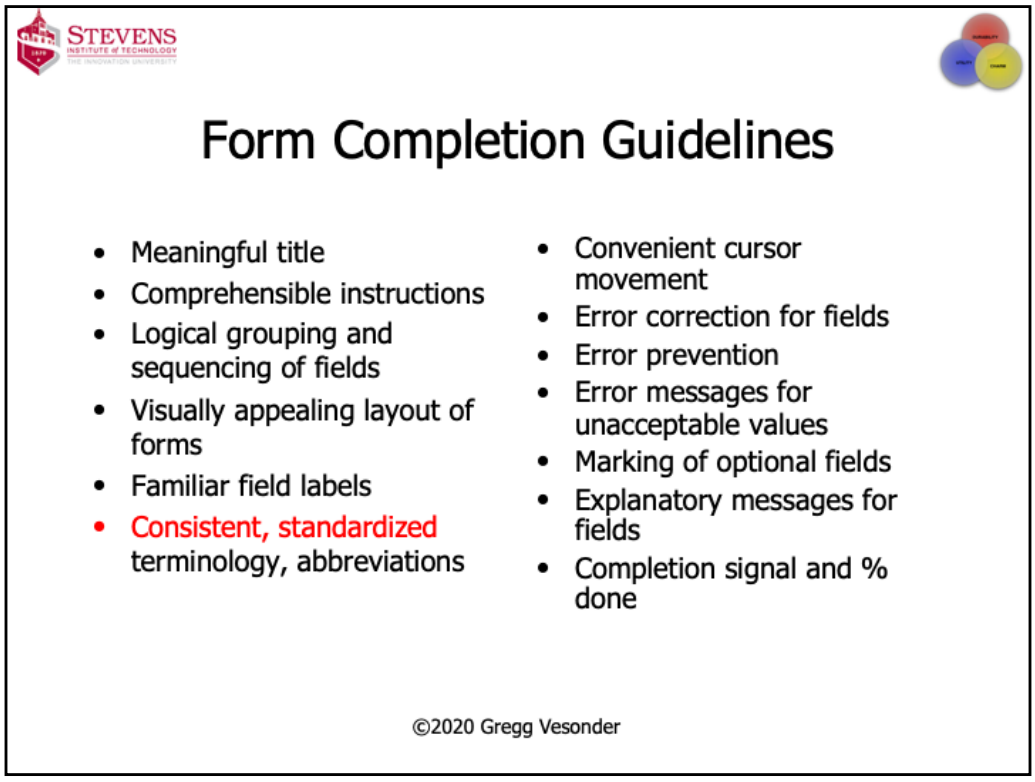
As you might suspect, Norman has a few opinions on these interfaces. Indeed the last point is that the systems should be immersive – in effect you are actually "in world."



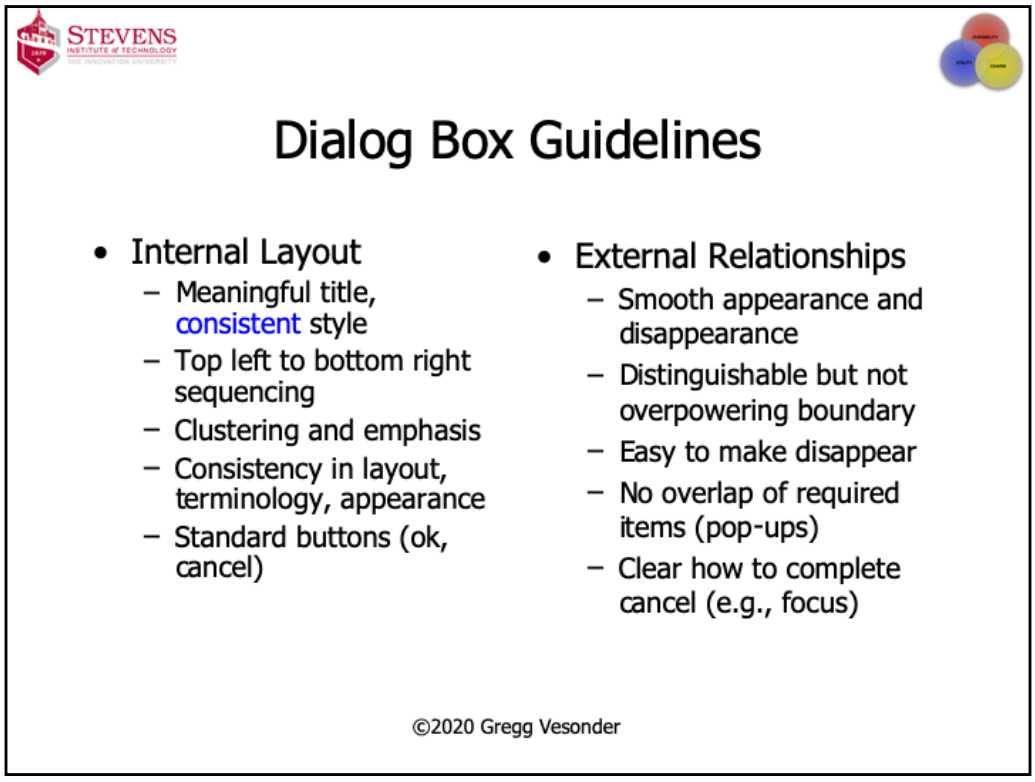
Of course there are issues with DM. Mostly the benefits outweigh the issues and you will see much more of it in the future.



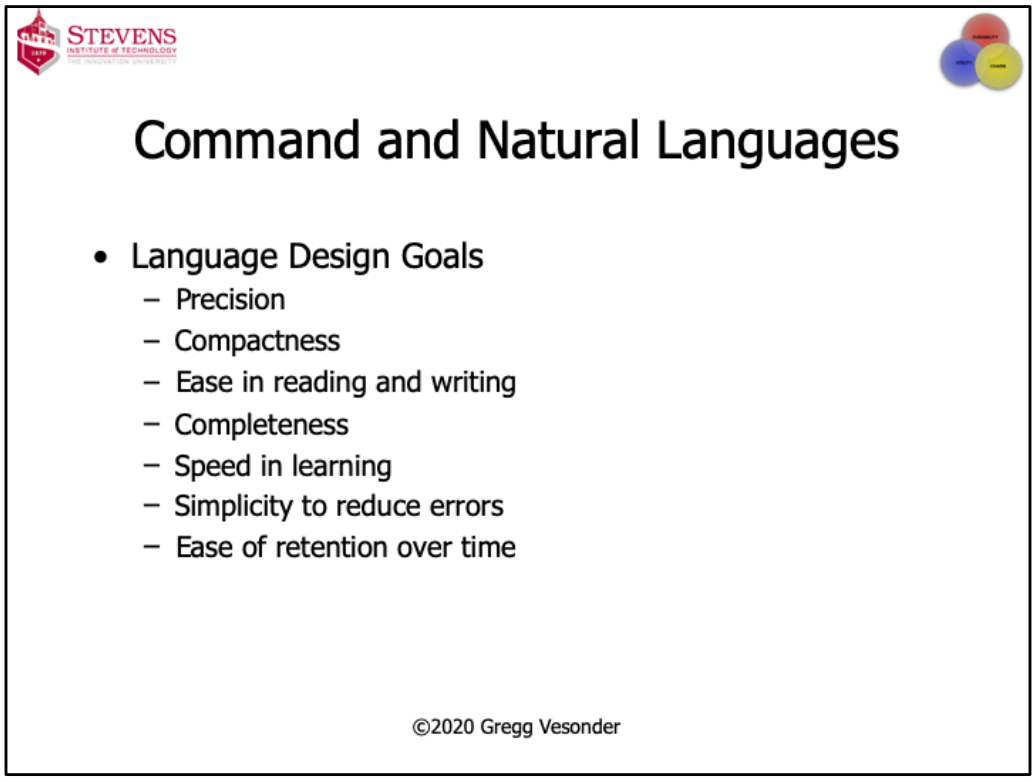
These interaction styles are the staple of the web. Note that there is still considerable design issues regarding placement and focus. Always be cognizant of what is "above and below the page fold." Newspaper terms for what is on the first half of the front page – above the page fold – and what is on the second half. (New York Post is a whole other issue ;-).



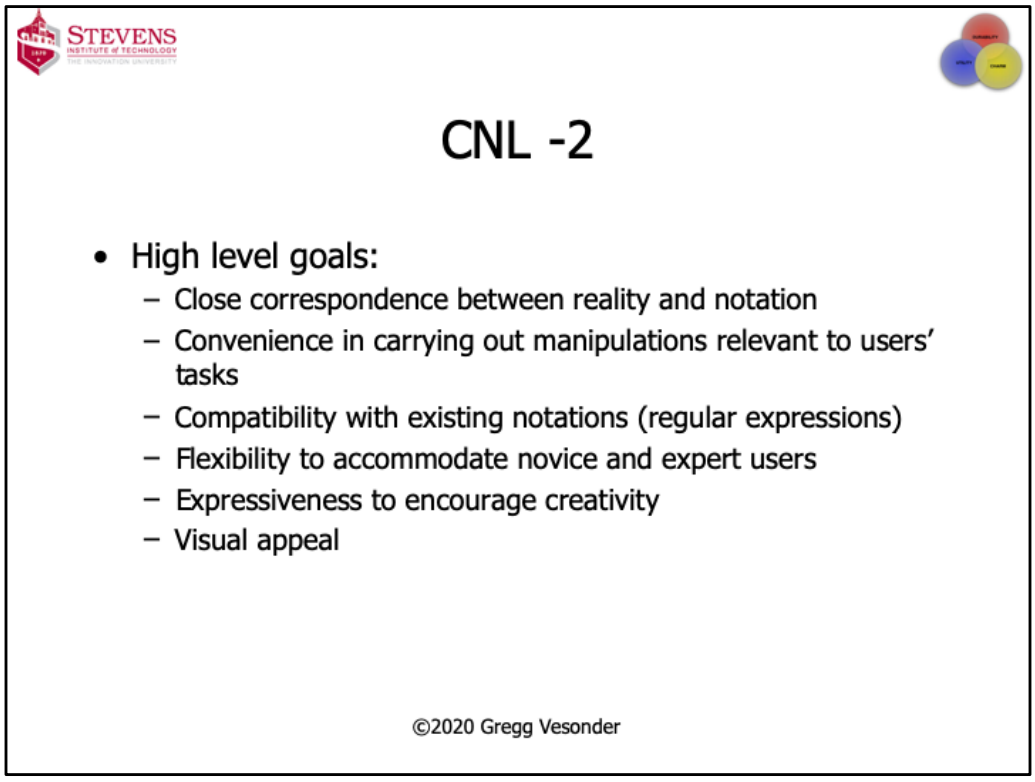
Fairly self explanatory – basically there is a lot of work to do this stuff well. HTML5 has made it easer with more extensive error correction. We will see more guidelines on completion signals and percent done later in the course.



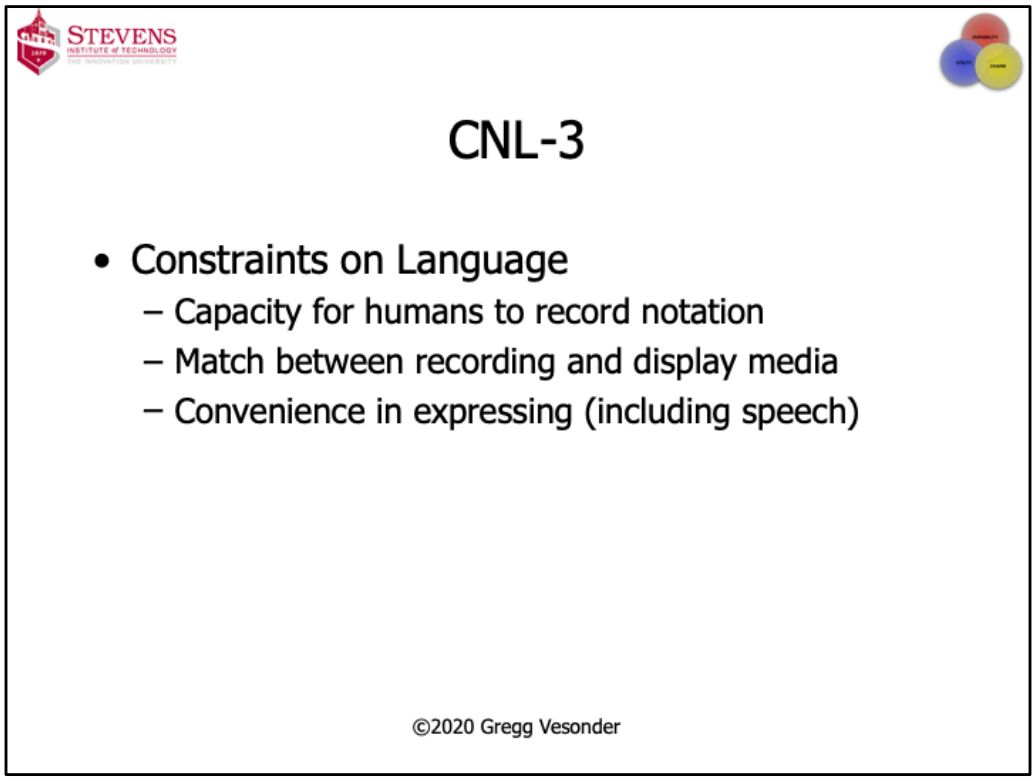
Again straight forward



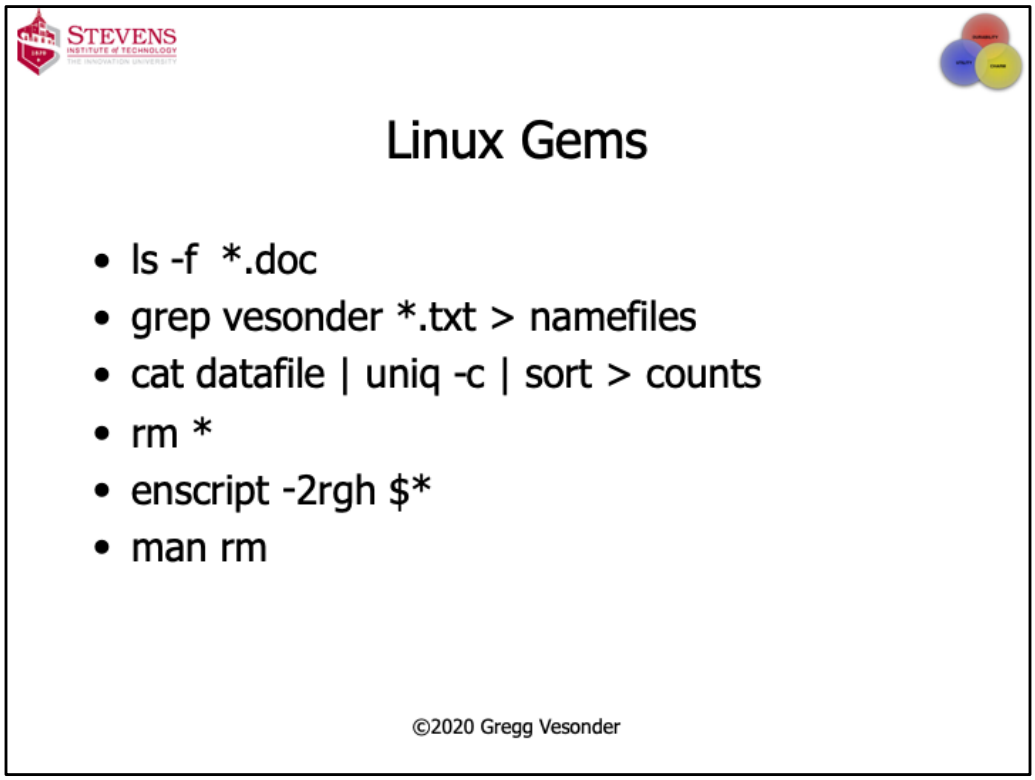
Using command languages, think Linux or MS-DOS command line, we are looking in the command language case for precision and compactness (many linux shell commands are short because their creators wanted to limit typing). While using Natural language should increase the speed of learning



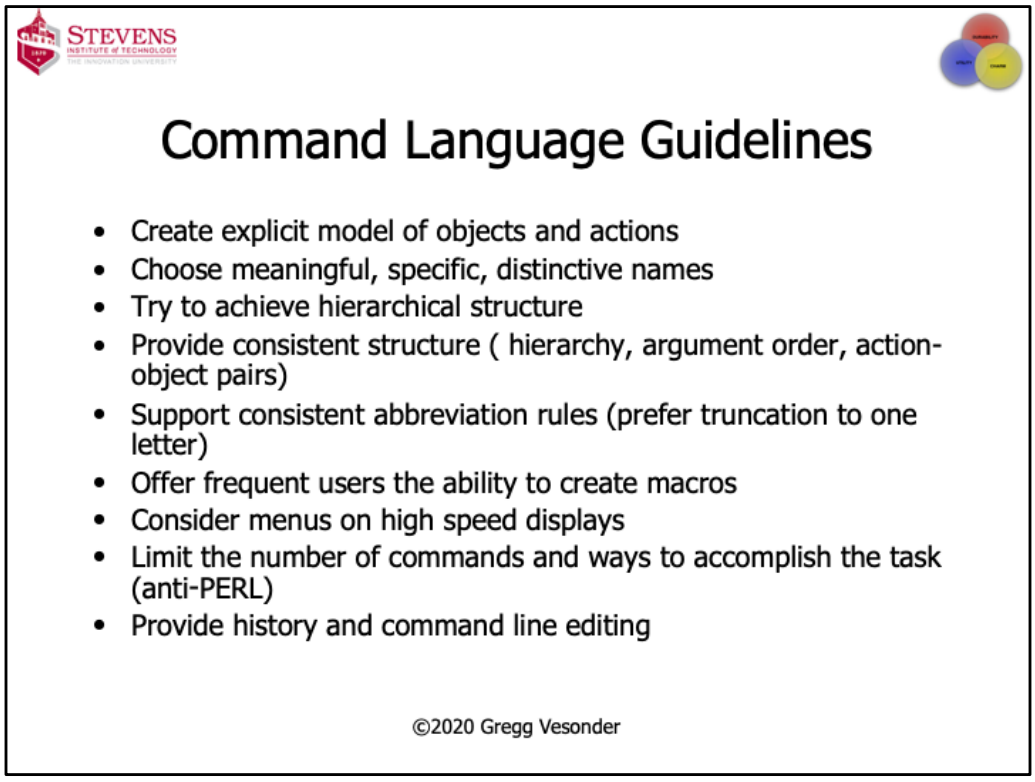
Some additional goals, and for command languages, it eases the burden on the cpu – we often do not consider it, but a valuable UI characteristic is responsiveness.



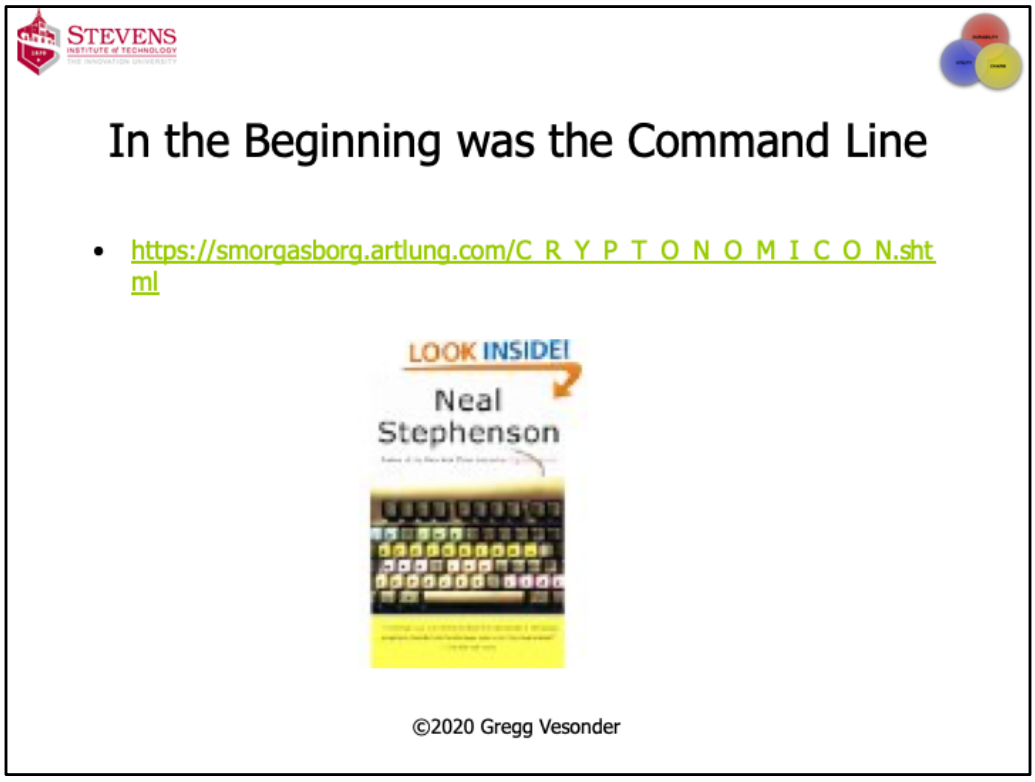
Most command language options should be easy to say, even if that means spelling it ("L S" for example when saying linux's directory command, ls).



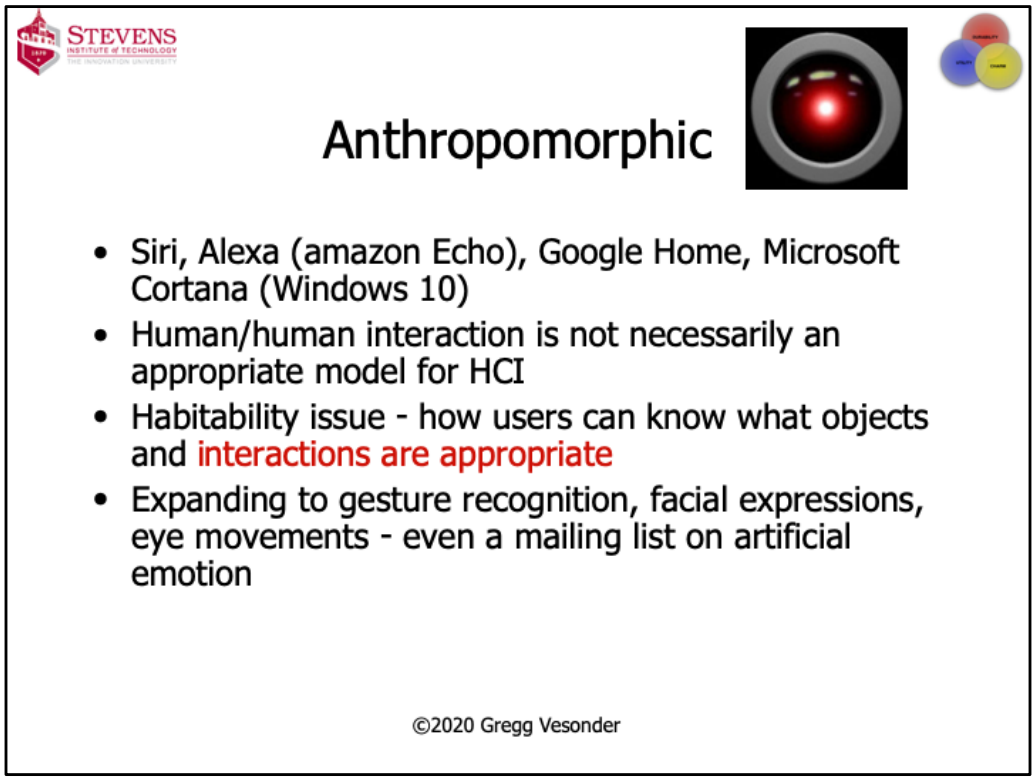
Speaking of ls, here are some linux command line commands! Often linux commands are an attempt to abbreviate the description of their function: ls for list, rm for remove, man for manual, … . Indeed cat is for concatenate. As raspberry pis and other single board, system on a chip computers become available it will be useful to understand command line languages.



Back in the day, there were conferences devoted to command languages. In my opinion command languages are used too infrequently these days. In many instances they would make an ideal high efficiency user interface. Scripting languages are interesting. I would suggest that JavaScript and Python are essential if you want to be a developer.



A great personal history of the command line by a fantastic author, Neal Stephenson. You can get the entire text of the book at the url I provided. Snow Crash was **the** book for game developer's in the 90's and I think it is still one of his best works. In general he writes great (and lately long) series of novels, that have geek elements. For the computer security aficionados in the audience I recommend Cryptonomicon. Awesome.



I generally was not a fan of Natural Language interfaces, even though I worked extensively with them, actually with aspects of them – speech recognition and text to speech. Siri and Alexa changed all that. Siri and Alexa provids one of the first opportunities to use this technology effectively. One of the newer research efforts is machine perception and machine presentation of emotion. I would not be pleased if my robot got too angry with me – I do keep a hammer nearby in case my Roomba turns on me! The picture in the corner is of HAL from the film, 2001:A Space Odyssey – a can't miss film. To listen to some of HAL's more memorable excerpts, check out these audio clips: http://www.ee.ryerson.ca/~elf/aso/. If you have an iPhone and Siri try asking her to "Open the pod bay doors Hal." Do the same with Alexa if you know someone who has an amazon echo.

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