

# Week 2-3 Design Principles: Part 1

SFWRENG 4HC3/6HC3 Human Computer Interfaces

*\* Slides adapted from previous instructors of COMPSCI/SFWRENG 4HC3/6HC3*

# List of Usability & UX Goals

## Usability

- Effectiveness
- Efficiency
- Safety
- Utility
- Learnability
- Memorability

## UX Goals

- Satisfying
- Motivating
- Enjoyable
- Fun
- Entertaining
- Rewarding
- Helpful
- Emotionally fulfilling
- Aesthetically pleasing
- Supportive of creativity
- .....

# Week 2 Goals Overview

- **Monday**
  - Interface and Interaction
- **Wednesday**
  - Usability and UX
- **Friday**
  - Design Principles: Part 1

# WHY?

Why us as software engineers need to know HCD (in practice)?

- Sometimes you need to play the role of UX/UI designers
  - Small companies/teams don't have enough resources
  - Advocate for user-centered products
- Know the bigger picture about what problem you are solving
  - Helps you better solve the problem
  - Helps when you transition to more senior roles (knowing the bigger picture)

# Fundamental Design Principles

- **Discoverability (Visibility)**
- **Feedback**
- Conceptual Model
- Affordances
- Signifier
- **Mappings**
- **Constraints**

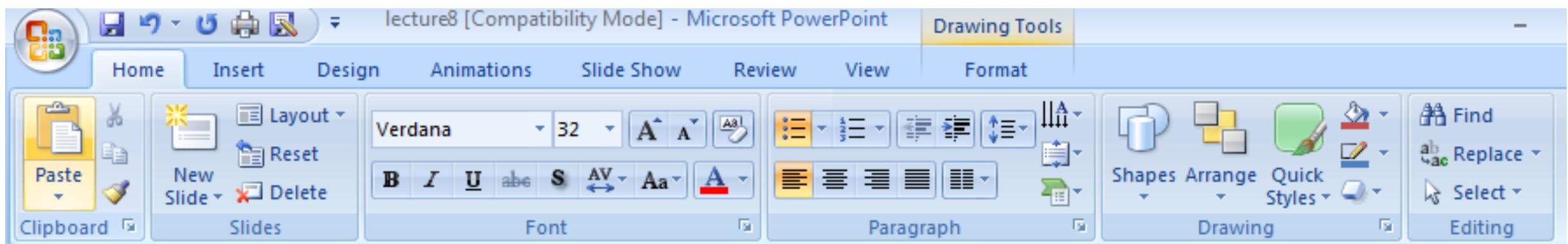
*Seven Fundamental Design Principles* by Don Norman from “The Design of Everyday Things”

# Design Principles: Discoverability

## **Discoverability (Visibility) of system capability**

- Make core user functions **clearly apparent**
  - (e.g., toolbars vs. menus)
- **Hide** secondary user functions
- **Visible properties guide users** as to what to do next
- **Structure** enhances discoverability

# Discoverability: Example #1



# Discoverability: Example #2

## Structure Can Enhance Discoverability

Op.	Flights	Depart	Arrive	Aircraft	Duration	Connections	Tango	Flex	Latitude	Business Class (lowest)	Business Class (flexible)
<b>Direct Flights</b>											
CA	AC256	05:45	09:09	320	2hr24		● \$189	● \$326	● \$795	● \$858	● \$994
CA	AC260	07:50	11:14	321	2hr24		● \$189	● \$326	● \$795	● \$858	● \$994
CA	AC264	10:45	14:09	E90	2hr24		-	► ● \$348	● \$795	-	► ● \$994
CA	AC266	12:30	15:54	320	2hr24		► ● \$289	► ● \$326	● \$795	● \$858	● \$994
CA	AC276	14:45	18:09	319	2hr24		► ● \$189	● \$326	● \$795	► ● \$858	● \$994
CA	AC270	16:20	19:42	E90	2hr22		► ● \$289	● \$326	● \$795	● \$858	● \$994
CA	AC272	18:45	22:09	320	2hr24		● \$189	● \$326	● \$795	● \$858	● \$994
CA	AC262	21:00	00:24 + 1 day	319	2hr24		● \$189	● \$326	● \$795	● \$858	● \$994
<b>Connecting Flights</b>											
CA 1	AC8596	07:05	10:37	CRA	5hr19	Montreal (YUL)	-	► ● \$725	● \$1334	► ● \$1376	► ● \$1649
CA	AC411	12:00	13:24	320							
CA 1	AC8596	07:05	10:37	CRA	7hr19	Montreal (YUL)	-	► ● \$595	● \$1334	● \$1376	● \$1649
CA	AC415	14:00	15:24	333							

Departs	Arrives	Flight Info	Econo	Flex	Plus
Winnipeg (YWG) Mon Oct 24 5:00 AM	Toronto (YYZ) Mon Oct 24 8:25 AM	WS 518 YWG to YYZ Nonstop   Duration 2h 25m Operated by WESTJET	N/A	● \$357.13 1 seat(s) left	● \$552.43
Winnipeg (YWG) Mon Oct 24 8:30 AM	Toronto (YYZ) Mon Oct 24 11:55 AM	WS 522 YWG to YYZ Nonstop   Duration 2h 25m Operated by WESTJET	N/A	● \$357.13 2 seat(s) left	● \$552.43
Winnipeg (YWG) Mon Oct 24 4:05 PM	Toronto (YYZ) Mon Oct 24 7:29 PM	WS 476 YWG to YYZ Nonstop   Duration 2h 24m Operated by WESTJET	N/A	● \$284.68	● \$552.43
Winnipeg (YWG) Mon Oct 24 7:45 PM	Toronto (YYZ) Mon Oct 24 11:10 PM	WS 536 YWG to YYZ Nonstop   Duration 2h 25m Operated by WESTJET	● \$189.13 6 seat(s) left	● \$357.13	● \$463.18 4 seat(s) left
Winnipeg (YWG) Mon Oct 24 9:30 AM	Toronto (YYZ) Mon Oct 24 6:53 PM	WS 3418 YWG to YQT Duration 1h 22m Operated by WESTJET ENCORE	● \$239.66 1 seat(s) left	● \$490.61	● \$730.01 2 seat(s) left
		WS 3122 YQT to YYZ Duration 1h 53m Operated by WESTJET ENCORE			
		1 stop Total duration 8h 23m			
Winnipeg (YWG) Mon Oct 24 9:47 AM	Toronto (YYZ) Mon Oct 24 2:53 PM	WS 318 YWG to YOW Duration 2h 25m Operated by WESTJET	N/A	● \$425.51	● \$559.91 4 seat(s) left
		WS 3465 YOW to YYZ Duration 1h 8m Operated by WESTJET ENCORE			
		1 stop Total duration 4h 4m			

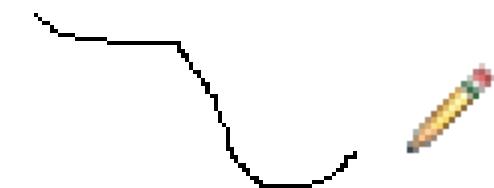
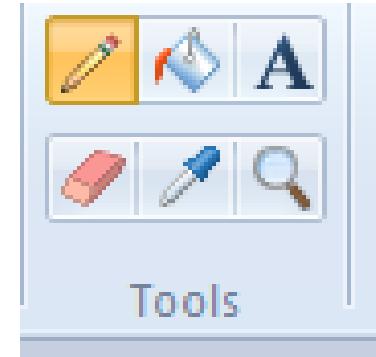
# Design Principles: Feedback

Feedback for the user

- **Continuously inform** the user about what the system is doing
- How **the system** is **interpreting the user's input**
- User should at all times be aware of what is going on

# Feedback: Example #1

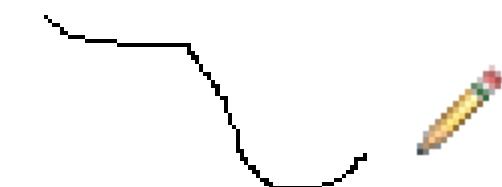
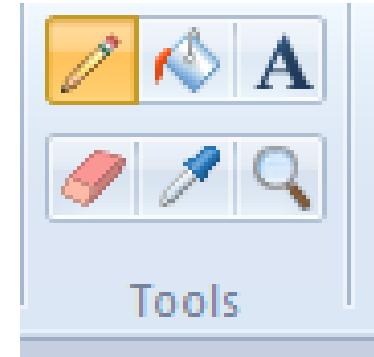
**What type of feedback is being provided here?**



# Feedback: Example #1

**What type of feedback is being provided here?**

1. What item was selected
2. What mode the user is in now
3. How the system is interpreting the users actions



# Design Principles: Feedback

Lack of feedback **relates directly** to one of Don Norman's gulfs

**Which one is it and why?**

# Design Principles: Feedback

Lack of feedback relates directly to one of Don Norman's gulfs

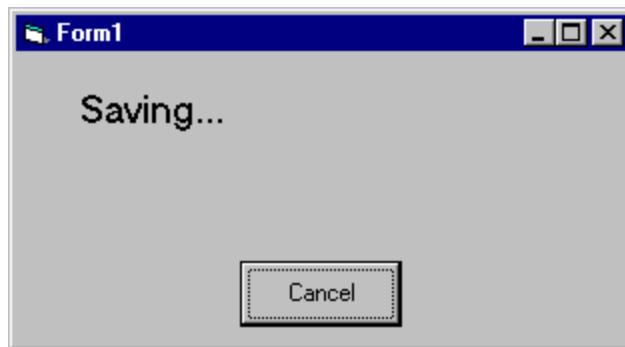
Which one is it and why?

## Gulf of evaluation

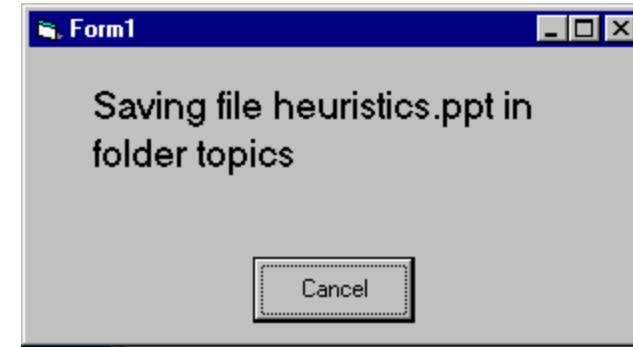
- User does not receive **enough information** from the system to construct an understanding
- User has trouble **interpreting system output** in light of their goals

# Design Principles: Feedback

Feedback should be **as specific as possible** based on **user input**



**vs.**



# Design Principles: Feedback

And ideally provided **in the context** of the user's action

research and for identifying and meeting with potential  
partner institutions. In my budget I have included funds to support:



# Feedback: Example #2

Screenshot of a web browser displaying an Oracle Employee Self-Service application for expense reports.

The browser window title is "View" and the URL is "https://www.efs.ucalgary.ca:8445/psp/fspred/EMPLOYEE/ERP/s/WEBLIB\_TE\_NAV.WEBLIB\_FUNCTION.FieldFormula.iScript\_V".

The page header includes links for myUofC, View, Home, Worklist, Add to Favorites, and Sign out.

The main navigation bar shows Favorites, Main Menu > Employee Self-Service.

A "New Window" button with a sunburst icon is visible.

### Expense Report

Enter any information you have and click Search. Leave fields blank for a list of all values.

**Find an Existing Value**

Maximum number of rows to return (up to 300):

Search by:  begins with

[Advanced Search](#)

### Search Results

View All

First  1-34 of 34  Last

Report ID	Report Description	Name	Empl ID	Report Status	Creation Date
0000207073	Hosting Guests from SMART	Tang,Anthony Hoi Tin	04213948	Pending	2012/10/13

# Example #2: where did I click?

The screenshot shows a web browser window with the following details:

- Address Bar:** https://www.efs.ucalgary.ca:8445/psp/fspred/EMPLOYEE/ERP/s/WEBLIB\_TE\_NAV.WEBLIB\_FUNCTION.FieldFormula.iScript\_V
- Toolbar:** Includes standard browser icons like back, forward, and search.
- Menu Bar:** View, Apple, Yahoo!, Google Maps, YouTube, Wikipedia, News, Popular.
- Session Bar:** myUofC, View.
- Header:** ORACLE, Home, Worklist, Add to Favorites, Sign out.
- Breadcrumbs:** Favorites > Main Menu > Employee Self-Service.
- Buttons:** New Window, Refresh.
- Section:** Expense Report.
- Text:** Enter any information you have and click Search. Leave fields blank for a list of all values.
- Form:** Find an Existing Value. Maximum number of rows to return (up to 300): 300. Search by: Report ID begins with: [empty input field].
- Buttons:** Search, Advanced Search.
- Section:** Search Results.
- Text:** View All, First 1-34 of 34 Last.
- Table:** Displays search results with columns: Report ID, Report Description, Name, Empl ID, Report Status, Creation Date. One row is visible: Report ID 0000207073, Report Description Hosting Guests from SMART, Name Tang, Anthony Hoi Tin, Empl ID 04213948, Report Status Pending, Creation Date 2012/10/13.

# Example #2: where is my feedback?

The screenshot shows a web browser window with the URL [https://www.efs.ucalgary.ca:8445/psp/fsprd/EMPLOYEE/ERP/s/WEBLIB\\_TE\\_NAV.WEBLIB\\_FUNCTION.FieldFormula.iScript\\_V](https://www.efs.ucalgary.ca:8445/psp/fsprd/EMPLOYEE/ERP/s/WEBLIB_TE_NAV.WEBLIB_FUNCTION.FieldFormula.iScript_V). The page is titled "Expense Report". It displays a search form with fields for "Report ID" and a search button. Below the form, a table shows search results for an expense report.

View https://www.efs.ucalgary.ca:8445/psp/fsprd/EMPLOYEE/ERP/s/WEBLIB\_TE\_NAV.WEBLIB\_FUNCTION.FieldFormula.iScript\_V Reader

myUofC View

ORACLE Home Worklist Add to Favorites Sign out

Favorites Main Menu > Employee Self-Service New Window

Expense Report

Enter any information you have and click Search. Leave fields blank for a list of all values.

Find an Existing Value

Maximum number of rows to return (up to 300): 300

Search by: Report ID begins with

Search Advanced Search

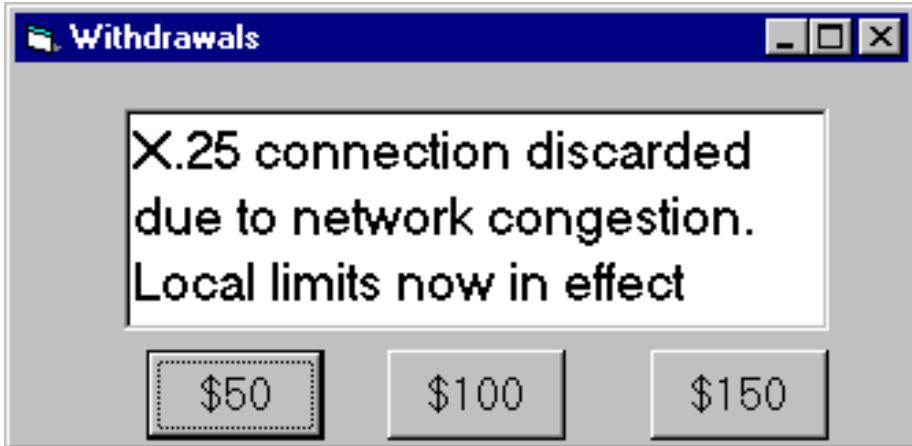
Search Results

View All First 1-34 of 34 Last

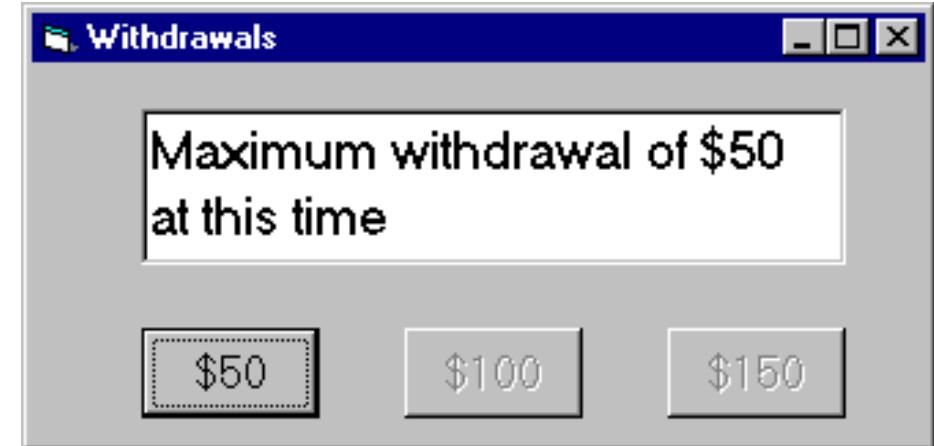
Report ID	Report Description	Name	Empl ID	Report Status	Creation Date
0000207073	Hosting Guests from SMART	Tang,Anthony Hoi Tin	04213948	Pending	2012/10/13

# Design Principles: Feedback

System status feedback should be specific, **in the user's language**



vs.



# Design Principles: Feedback

System status feedback should be specific, **in the user's language**

Could not login. Valid authentication  
credentials were not provided.

# Design Principles: Feedback

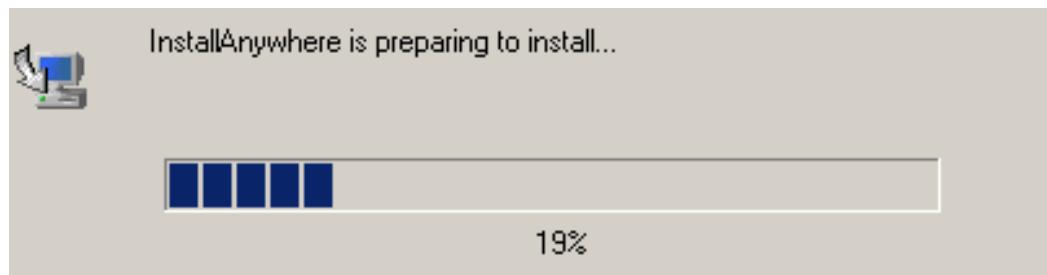
System status feedback should be specific, **in the user's language**

Could not login. Valid authentication  
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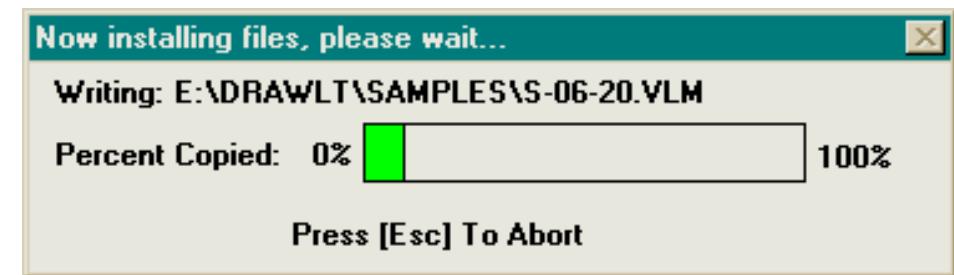
People know the words “**username**” or “**password**.”

# Design Principles: Feedback

With longer jobs, **the more detail** you can **provide on the status**, the better



**VS.**



# Design Principles: Feedback

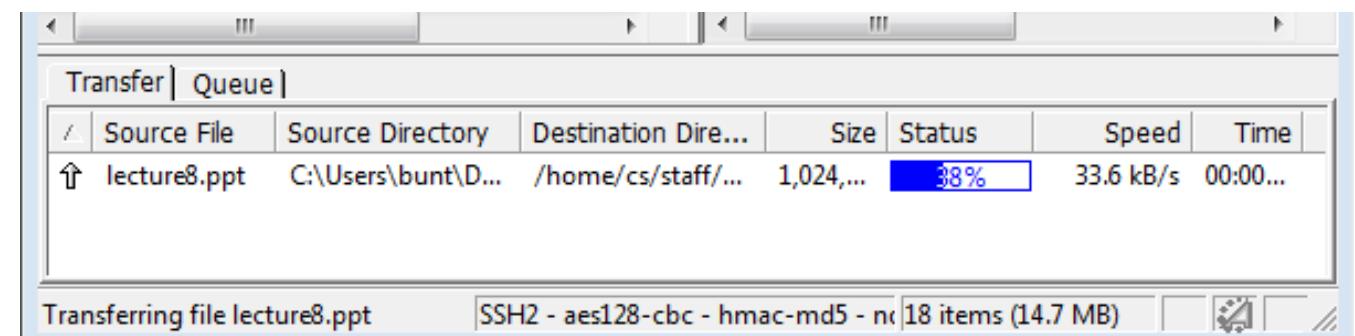
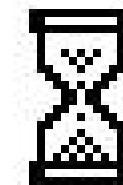
## **How users perceive delays for response time:**

- 0.1 second max: perceived as “instantaneous”
- 1 second max: user’s flow of thought stays uninterrupted, but delay noticed
- 10 seconds: limit for keeping user’s attention focused on the dialog
- > 10 seconds: user will want to perform other tasks while waiting, i.e. get a cup of coffee

# Design Principles: Feedback

Feedback during long delays:

- **Cursors**
  - For short transactions
- **Percent done dialogs**
  - For longer transactions
    - How much left
    - Estimated time
    - What it is doing...



# Feedback: Long Delays

During the long system delays

- Other parts of the interface **should continue working (if possible)** as the long task completes
- Should be possible to pause/cancel long jobs
- How you design your code will impact your ability to do this at the interface level

**But there is value with a "fake progress bar"!**

<https://www.theatlantic.com/technology/archive/2017/02/why-some-apps-use-fake-progress-bars/517233/>

<http://www.cond.org/deception.pdf>

# Week 2 Goals Overview

- **Monday**
  - Interface and Interaction
- **Wednesday**
  - Usability and UX
- **Friday**
  - **Design Principles: Part 1**