

Lecture 3: Introduction to Usability

CS 181W

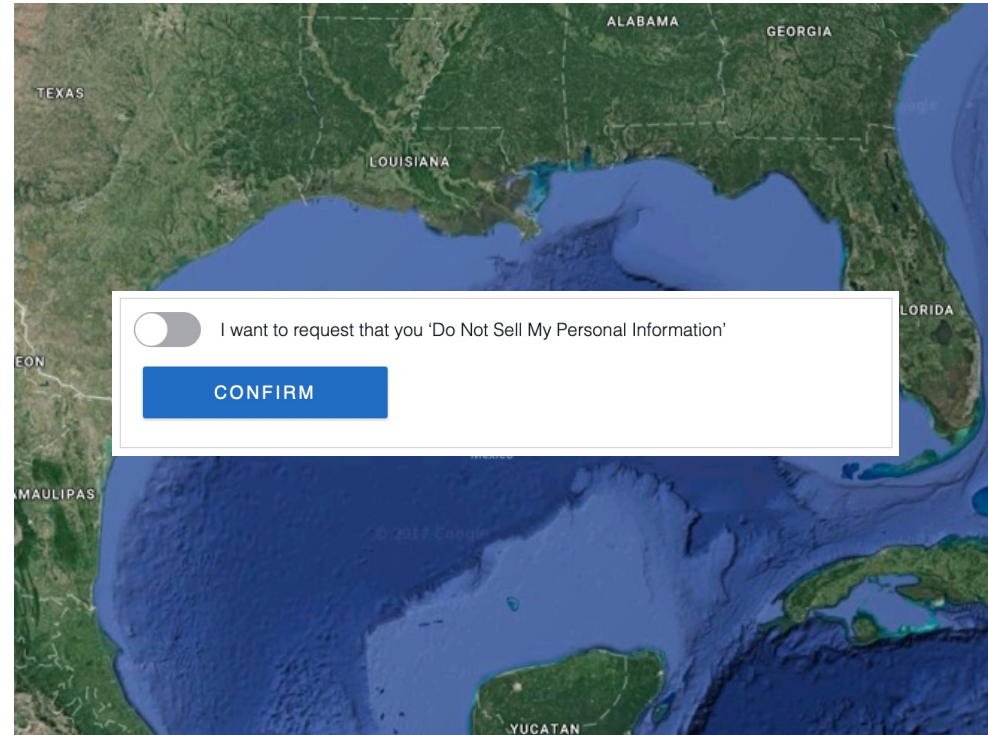
Fall 2022

What is usable?

- Intuitive / obvious
- Learnable
- Memorable
- Efficient
- Few errors
- Enjoyable / Not annoying
- Status transparent
- Meets users needs (utility)

Gulfs lead to errors

- Gulf of **evaluation**
 - Misunderstand state of the system
- Gulf of **execution**
 - Failure to take correct action



EVERYDAY USABILITY AND DESIGN

Discoverability



One time recently...



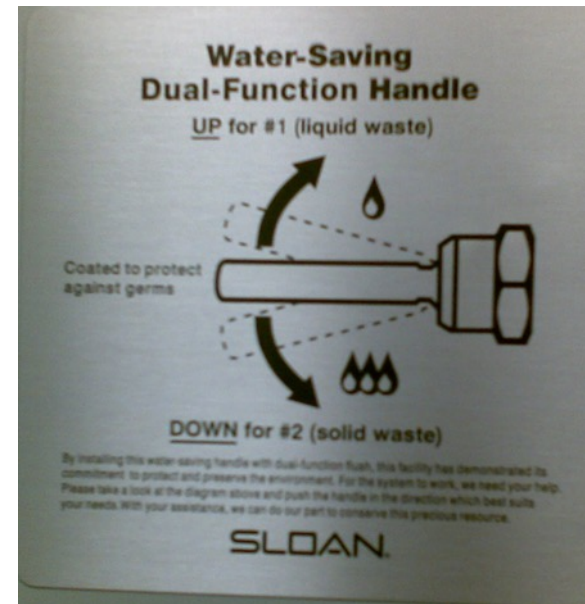




Is the door
locked or
unlocked?

Intuitive is relative





A more intuitive approach?





Normally
you pull
handles





The shower is off.
Yet the pointer
opposite the handle
points to on.

The on/off labels do
not represent state –
they are instructions
for which direction
to turn the handle.

The cold/hot labels
do represent state.



Similar idea, but with posted instructions



Again, handle serves as pointer, and words are written out (but in a difficult-to read font)

Understanding



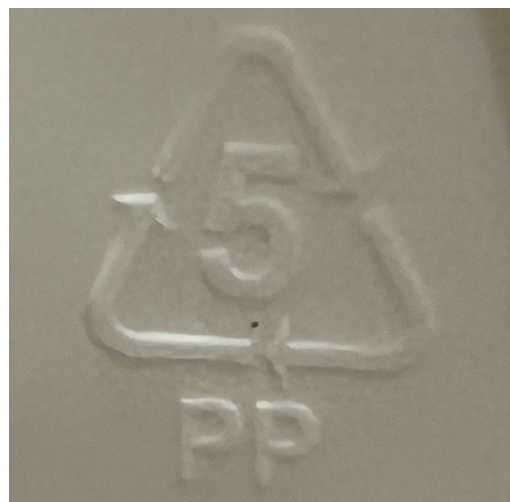
People were confused until they posted instructions



What state is this system in?



Are these symbols more intuitive?



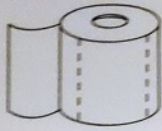
Icons and Instructions





These icons explain what you will find in the bathroom but words are needed to convey “all gender”

DESIGN MATTERS



TOILET PAPER ONLY!

THIS TOILET PREVENTS FLUSHING OF WIPES

(SÓLO PAPEL HIGIÉNICO) ESTE EXCUSADO EVITA QUE SE DESCARGUEN TOALLITAS

CAUTION



DO NOT PUT HAND IN TOILET!

IT CONTAINS A SHARP DEVICE THAT CAN CAUSE INJURY

(NO META LA MANO EN EL EXCUSADO) CONTIENE UN DISPOSITIVO AFILADO QUE PUEDE OCASIONAR LESIONES



**IF TOILET BECOMES CLOGGED,
ALERT HOSPITAL STAFF IMMEDIATELY**

STAFF ONLY:

REMOVE WIPES WITH THE TRAPTEX™ WIPE RETRIEVER

SI SE OBSTRUYE EL EXCUSADO, ALERTE INMEDIATAMENTE AL PERSONAL DEL HOSPITAL
SÓLO PARA EL PERSONAL: QUITE LAS TOALLITAS CON EL RECUPERADOR DE TOALLITAS TRAPTEX™



Traptex
Plumbing Protection System

NO WIPES IN THE PIPES™!

SAGE
PRODUCTS

1-800-323-2220 www.sageproducts.com

There are three important messages here for toilet users and a fourth for staff. The icons help support the words (which are essential) but this design could use some cleanup.

PERSPECTIVE MATTERS



Which is
which?

From which direction will users be viewing the instructions?





What?!

GOOD DESIGN



Which bed gets to see the clock at night?



Everybody wins!



Locking and
unlocking door
automatically
changes color
of lock
indicator



Cover up bathroom sounds without wasting water

Easy to distinguish
shampoo and
conditioner by
number and color





Hand dryer is attached to faucet

Restroom Need Attention?

Send a text to: **43766**
Include the room code below
along with any comments:
“**7334 needs soap!**”

All feedback is completely anonymous. Your name and phone
number are never disclosed.

 **PITTSBURGH
INTERNATIONAL AIRPORT**

RestroomAlert.com
Message and data rates may apply. Send STOP to opt-out.

Room Code **7334**

Example

Phone #
43766

Message
**7334 needs
soap!**

Good
instructions with
an example

INCONVENIENT DESIGNS

Door slams



Please hold
the door when
closing.
Thanks!

A better
solution
would be to
add a spring
so the door
won't slam



It saves space,
but kind of an
awkward way to
wash your hands

Not so private



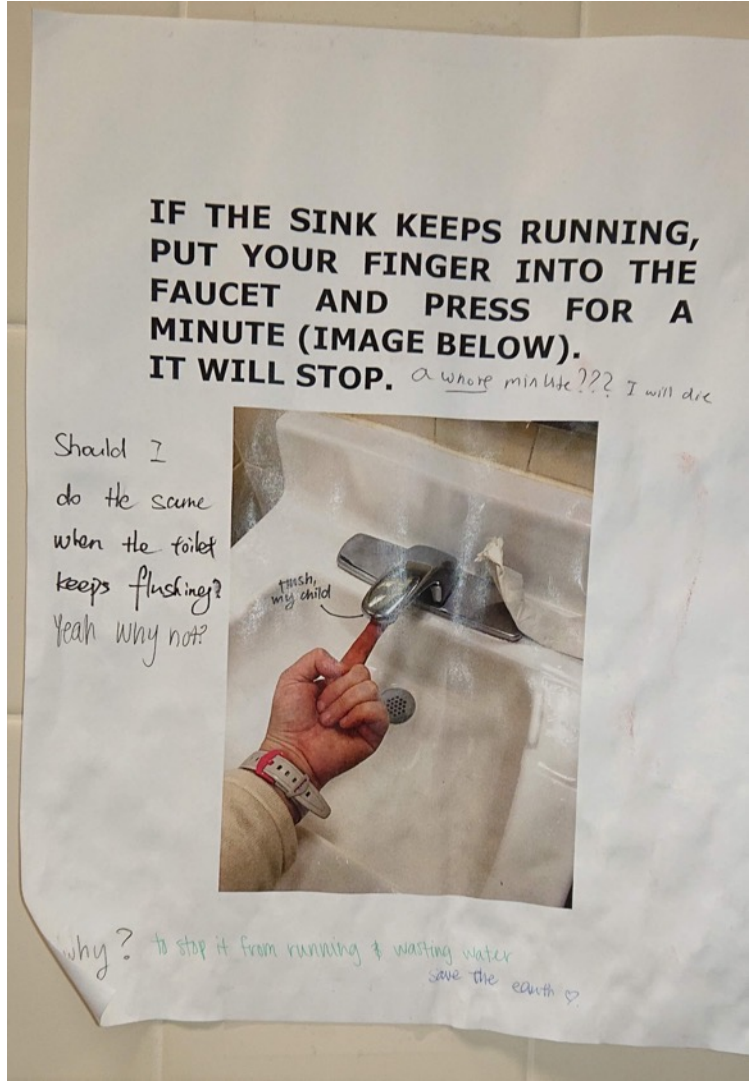


Is this a convenient place to plug in an Ethernet cable?





This inconvenience was only temporary



Hopefully this is only the temporary solution...

OTHER ISSUES

Designing for cultural differences





Anticipating all use cases

Conflicts with Usability

- System performance
- Cost or implementation time constraints
- Required standards
- Legal requirements
- Satisfying needs of many types of users, systems, or platforms
- Security and privacy

NEWS MAR 21 2017, 7:58 AM ET

China Fights Toilet Paper Theft With Facial-Recognition Technology

by ERIC BACULINAO

SHARE BEIJING — A busy public restroom in China has begun deploying high-tech facial recognition technology to wipe out the problem of toilet paper theft.



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“There are two things we worry about when entering a public restroom, especially those located at a park. The first is cleanliness, and the second is whether anyone is inside. Using the latest technology, the exterior glass turns opaque when locked. This allows users to check the cleanliness and whether anyone is using the toilet from the outside. At night, the facility lights up the park like a beautiful lantern.” – Shigeru Ban, Architect

“Scared it might suddenly become transparent when we’re inside if there are any technical changes.” – Twitter user

What is usable security/privacy?

Security/privacy software is usable if the people who are expected to use it:

1. are reliably made **aware of the security/privacy tasks** they need to perform;
2. are **able to figure out** how to successfully perform those tasks;
3. **don't make dangerous errors**; and
4. are sufficiently comfortable with the interface to **continue using it**.

Lessons for usable privacy and security

- Try to make function intuitive, or provide instructions
 - Icons are not always intuitive, especially for abstract concepts
 - May need to be taught to users or accompanied by words
 - Provide documentation, but don't rely on people reading it
- Don't hide important features
 - May need to prioritize what is important, use hierarchical menus, or expose features in context
- Make security and privacy convenient and easy (attractive and fun too!)
 - Automate where feasible, provide features and info where people would expect
- Be aware of cultural differences, needs of different user groups

You are not a typical user



Your family are not typical users



Reasons to conduct user studies

Assess needs

What should we build?

Examine tradeoffs

Which features/approaches best fit particular needs?

Evaluate

Are requirements met?
What should be improved?

Find root causes

What underlying problems need to be fixed?

Excuses

~~Reasons~~ to not conduct user studies

- If people weren't so lazy or stupid or careless it would work fine
- I already know what people want
- No time, no money
- I find the system easy to use
- I'm not a usability expert
- It's so easy my parents/kids can use it

User study steps

1. Identify research goals, questions, metrics, use cases
 - What are concrete tasks users should be able to accomplish?
 - What are realistic metrics?
2. Decide on type of study, user population to study
3. Design study protocol

Detailed scripts, surveys, scenarios, incentives, instrumentation, prototypes, recruiting materials, etc.
4. Obtain ethics approval
5. Pilot and iterate on study design
6. Collect data
7. Analyze Results
8. Repeat some or all of these steps as needed

Usable privacy and security studies often examine...

- Preferences, expectations, concerns, mental models
- Awareness and attention
- Discoverability
- Comprehension
- Utility
- User behavior (including in the presence of real or simulated risk)

Broad types of studies

Distler et al. 2021 found
41% experimental,
31% descriptive,
5% relational, 23% mixed

- Descriptive (observational) study – determine characteristics of population, does not provide insights on causal relationships
 - Example: How concerned are people about privacy?
- Relational study – studies relationship between two or more variables
 - Example: Are people who have been victims of identity theft more likely to choose strong passwords than people who have not been victims?
- Experimental study – artificially manipulates study factors or participants to determine effect of a certain treatment, condition, or intervention
 - Example: Are people assigned to use a password meter more likely to choose strong passwords than people assigned to create passwords without a meter?

Study methods and goals

- Learn what people want/think/do
 - Interviews
 - Focus groups
 - Surveys
- Learn what people want/think/do *in context*
 - Diary studies
 - Field observations
 - Log data analysis
- Evaluate usability based on expert opinions
 - Cognitive walkthrough
 - Heuristic evaluation
- Conduct an experiment to examine a relationship, test a hypothesis, compare alternatives
 - Laboratory study
 - Online study
 - A/B testing

Quantitative vs. qualitative

- Quantitative
 - You have numbers (timing data, number of errors, ratings of awesomeness)
- Qualitative
 - You have non-numerical data (thoughts, opinions, types of errors)

Formative vs. summative studies

- Formative or exploratory studies
 - Usually conducted at the beginning of design process
 - Help provide insights into requirements, initial prototypes
 - Mostly qualitative, usually small sample size
- Summative or confirmatory studies
 - Usually conducted at the end of design process
 - Evaluates success of design, tests hypotheses
 - Mostly quantitative, usually large sample size

Course Projects

1. *Understanding Data Minimization*
2. *Generalizability of Public Comments*
3. *Usability of Password Managers*
4. *Cookie categories*
5. *SP Terms*
6. *Privacy Nutrition Label for Mobile Apps*
7. *Biometric Authentication*
8. *Other*

What skills will these projects need?

Forming a group...

- What skills/experience will you bring to a group?
- What projects(s) are you exciting about exploring?
- What methods are you interested in using?
- How challenging do you want your project to be?
- How often/when are you available to meet?