

	Monday (11:30am – 1pm)	Tuesday (4:30 – 6pm)	Thursday (11am – 1pm)
Week 1 (23 Jan)	Introduction/ background	User classification	Project overview, team up
Week 2 (30 Jan)	CNY holiday	UI design concepts	Project - scoping
Week 3 (6 Feb)	UI design concepts	UI design concepts	Project - scoping
Week 4 (13 Feb)	UI design concepts	Understanding Users (Industry)	Project - scoping
Week 5 (20 Feb)	UI concepts / Impact	Evaluation	Project
Week 6 (27 Feb)	Evaluation	Evaluation	Mid-term report/presentation
Week 7 (6 Mar)	Recess Week		
Week 8 (13 Mar)	Project	Project	Project
Week 9 (20 Mar)	Project	Project	Project
Week 10 (27 Mar)	Prof Young Special Lec 1	Prof Young Special Lec 2	Project
Week 11 (3 Apr)	Prof Young Special Lec 3	Prof Young Special Lec 4	Project
Week 12 (10 Apr)	Project	Project	Project
Week 13 (17 Apr)	Project	Project	End-term report/presentation
Week 14	Final Exam		

Example Project Statements

Given that scroll bars available today were designed/evolved to support conventional desktop UI with a mouse, their affordances and functionalities are not ideal for the use in tablets and smartphones with multi-touch capability.

This project will explore new ways of organising screen elements and interacting with them when the size of a page is longer than the size of the screen, especially taking into account what a multi-touch finger gesture can do to **maximise the visibility and learnability** of its functionality.

Example Project Statements

We get hundreds of e-mails each day and currently there is no easy way to organise, filter, categorise and interact with messages other than tagging, text-searching or manually putting them in folders.

This project will design a UI to organise a large amount of incoming emails so that the user is not overwhelmed by the quantity. With a careful application of **mapping principle**, the new UI will cognitively simplify how old and new e-mails can be accessed.

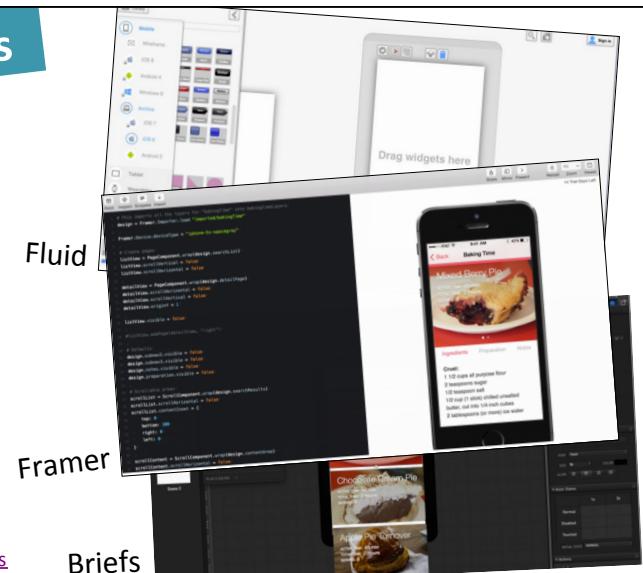
Prototyping Tools

- Axure
 - Form
 - Framer
 - ProtoShare
 - Origami

UX Toolbox

<https://www.cooper.com/prototyping-tools>

Briefs



User feedback after deployment

- Simple and voluntary
 - Dissatisfied users will respond
 - Dedicated users will respond
- Don't just collect them, but:
 - Categorise
 - Determine patterns
 - Find root cause of issues

SUTRI

“Usability Laboratory”

Lab testing



“Usability Laboratory”



Lab testing

- **Expensive to build**
 - Room(s)
 - Equipment (cameras, monitors, software (e.g. Morae)...
- **Expensive to run**
 - Rental of room facility
 - Careful plan
 - Paying the test users

→ When measuring or comparing quantity is important

SUTRI

Quantity \textcircled{vS} Quality

Quantitative inquiry \textcircled{vS} Qualitative inquiry

“Usability Laboratory”

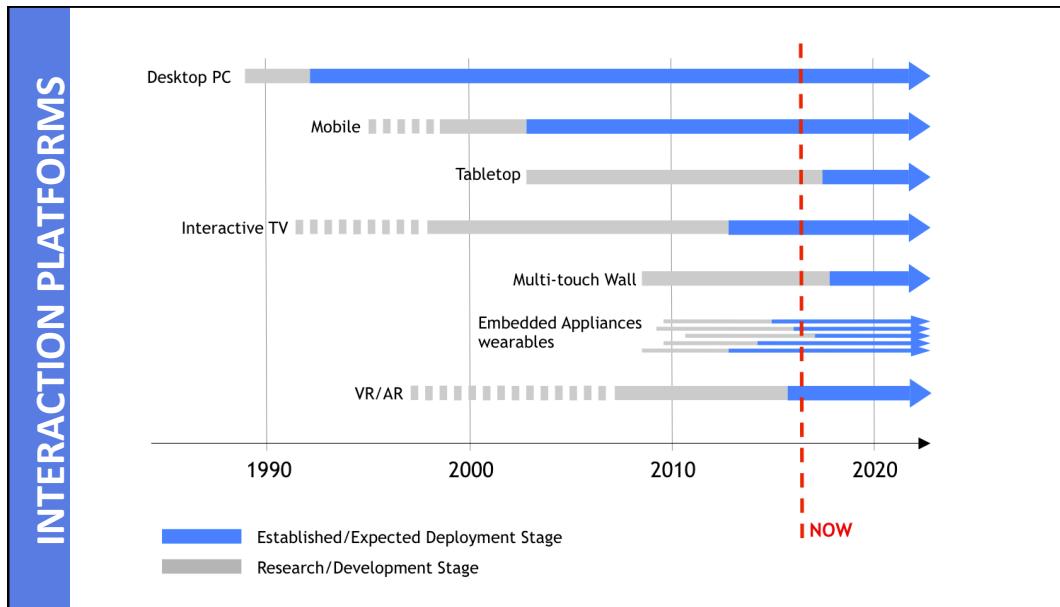
... but what about mobile or home applications?
Usability Lab seems to imply a **limited vision**, because...

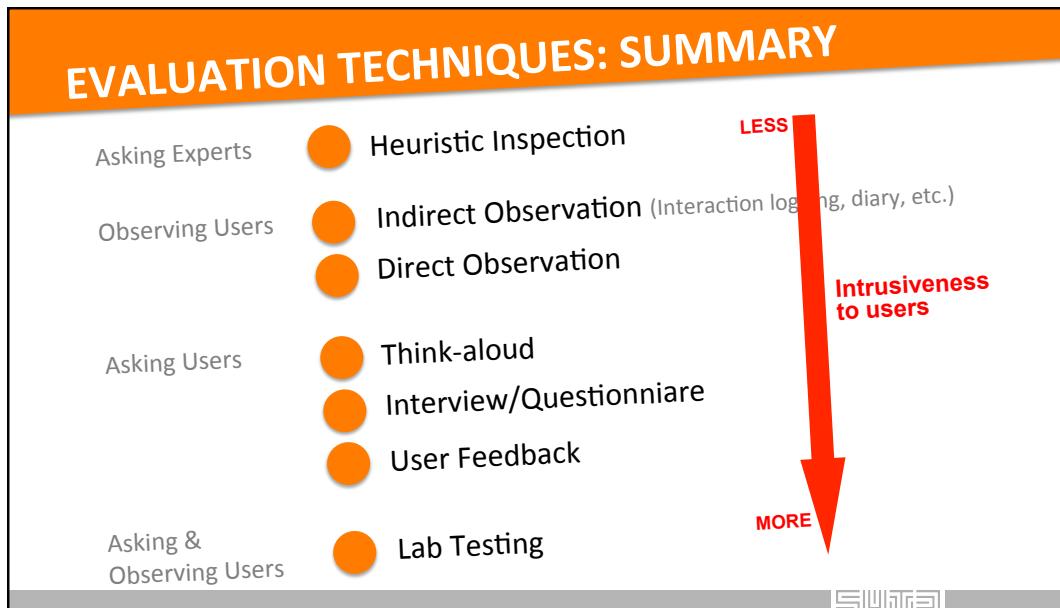
Interacting with computer ≠ using a desktop PC

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→ When measuring or comparing quantities is important



Ethics of User Testing

“Users” are **human beings**

Human subjects have been seriously abused in the past...

- Nazi concentration camps (1940-1945)
- Tuskegee Institute syphilis study (1932-1972)
- MIT Fernald School study (1940s – 1950s)
- Milgram experiment at Yale (1960s)

Ethics of User Testing

“Users” are **human**

Human subjects
are seriously

- Nazi concentration camps
- Tuskegee study
- MIT Fernandes study
- Milgram

Belmont Report (1979)

<http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html>

Respect for persons

- Voluntary participation
- Informed consent
- Protection of vulnerable population (children, people with disabilities, etc.)

Beneficence

- Do no harm
- Risk vs. benefit

Justice

Ethics of User Testing

Institutional Review Board

- **SUTD-IRB**
- All research involving human subjects requires approval from SUTD-IRB

Ethics of User Testing

Institutional Review

Pressure on the user

- Performance anxiety
 - Comparing self to other subjects
 - Feeling stupid in front of the observer
 - Competing with other subjects



Ethics of User Testing

Treat users with respect

- Don't waste their time
 - Make the user comfortable
 - Inform the user as fully as possible
 - Preserve the user's privacy
 - The user can stop at any time

Ethics of User Testing

Treat users with respect

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"Keep in mind that we are testing the UI, we're not testing you"

"The system is likely to have some problems that makes it difficult to use. We need your help to find these problems"

"Your test result will be completely confidential"

"You have the right to stop and leave at any point"

Evaluation Metrics

For example, evaluate a new mobile game app

Measure: level of user satisfaction

Technique: Questionnaire

• **Measures** - what

• **Techniques** - how

Methodology on
how to capture
the Measures

Usability Requirements

Captures goals and associated measures for a UI

Make a list:

- (i) Usability goals
- (ii) User experience goals

Then prioritise them



Usability Requirements

(i) Usability goals

5 Usability Criteria

- Efficiency
- Learnability
- Memorability
- Error rate
- Satisfaction

- Speed of performance = Efficiency
- Time taken to learn = Learnability
- Retention over time = Memorability
- Rate of errors by user = Error rate
- Subjective satisfaction = Satisfaction

“Usability goals”
“Usability criteria”
“Usability factors”
:



Usability Requirements

(ii) UX goals

- Satisfying
- Enjoyable
- Motivating
- Fun
- Aesthetically pleasing
- Emotionally fulfilling
- Reflectively appropriate
- Satisfaction

⋮



SUMTRA

So...

(i) Usability goals

- Efficiency
- **Learnability**
- Memorability
- Error rate
- Satisfaction



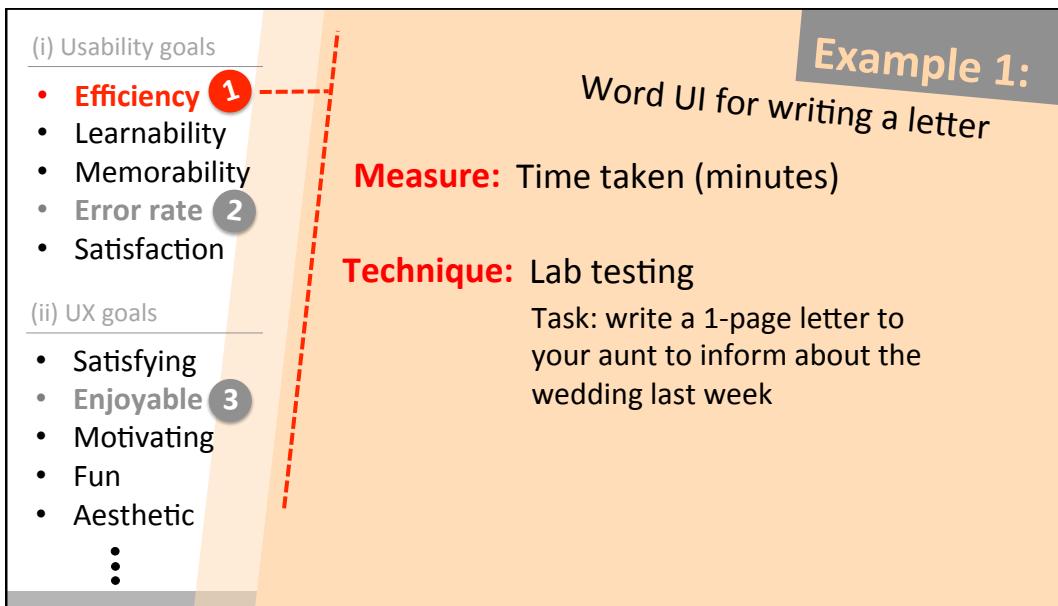
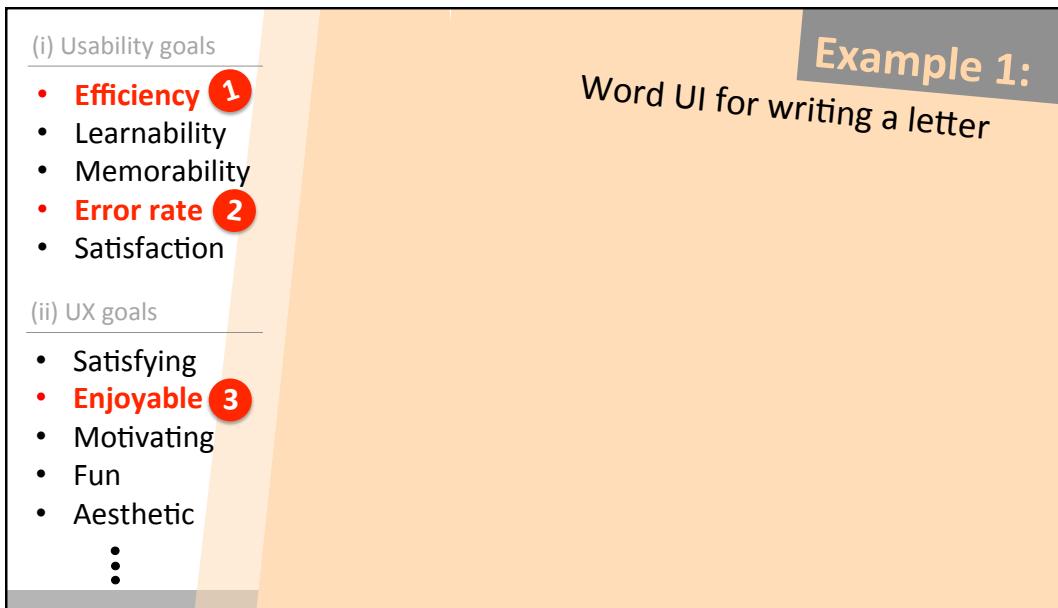
(ii) UX goals

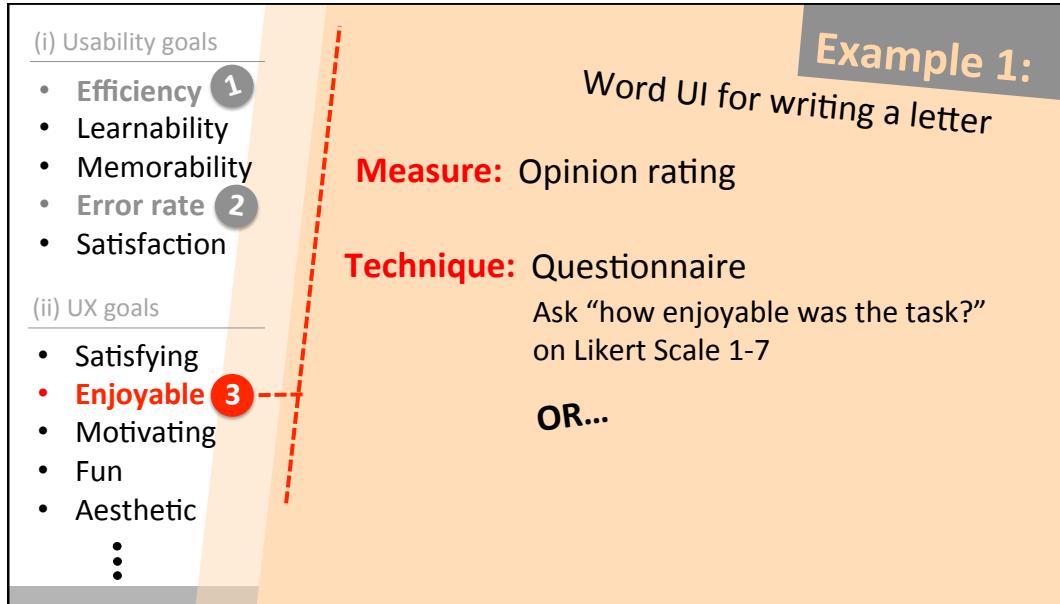
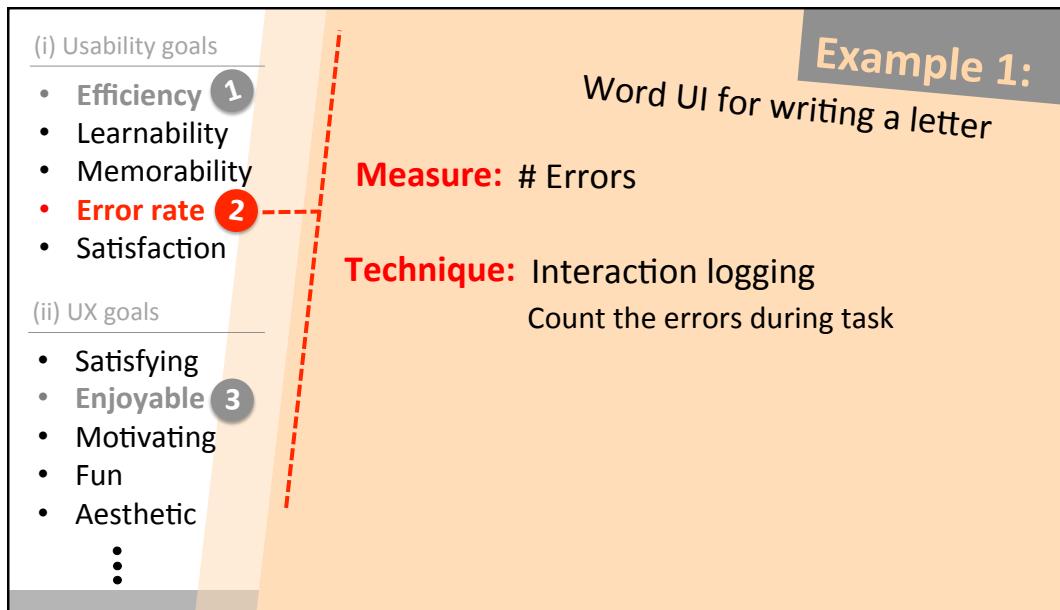
- Satisfying
- Enjoyable
- **Motivating**
- Fun
- Aesthetically pleasing

⋮



SUMTRA





Example 1:

(i) Usability goals

- Efficiency 1
- Learnability
- Memorability
- Error rate 2
- Satisfaction

(ii) UX goals

- Satisfying
- Enjoyable 3
- Motivating
- Fun
- Aesthetic
- ⋮

Example 2:

ATM machine UI

(i) Usability goals

- Efficiency 2
- Learnability 1
- Memorability
- Error rate
- Satisfaction

(ii) UX goals

- Satisfying
- Enjoyable
- Motivating
- Fun
- Aesthetic
- ⋮

Example 2: ATM machine UI

Measure: Time to learn (seconds)

Technique: Observation/Lab testing

Task: check your balance then withdraw \$30

*Time to figure out, time to explore, time to execute... need to be (almost) same

(i) Usability goals	
<ul style="list-style-type: none"> • Efficiency 2 • Learnability 1 • Memorability • Error rate • Satisfaction 	
(ii) UX goals	
<ul style="list-style-type: none"> • Satisfying • Enjoyable • Motivating • Fun • Aesthetic 	
	⋮

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	⋮

Example 3

Educational website UI

Will students learn better, retain longer and apply better if the UI is well-designed?

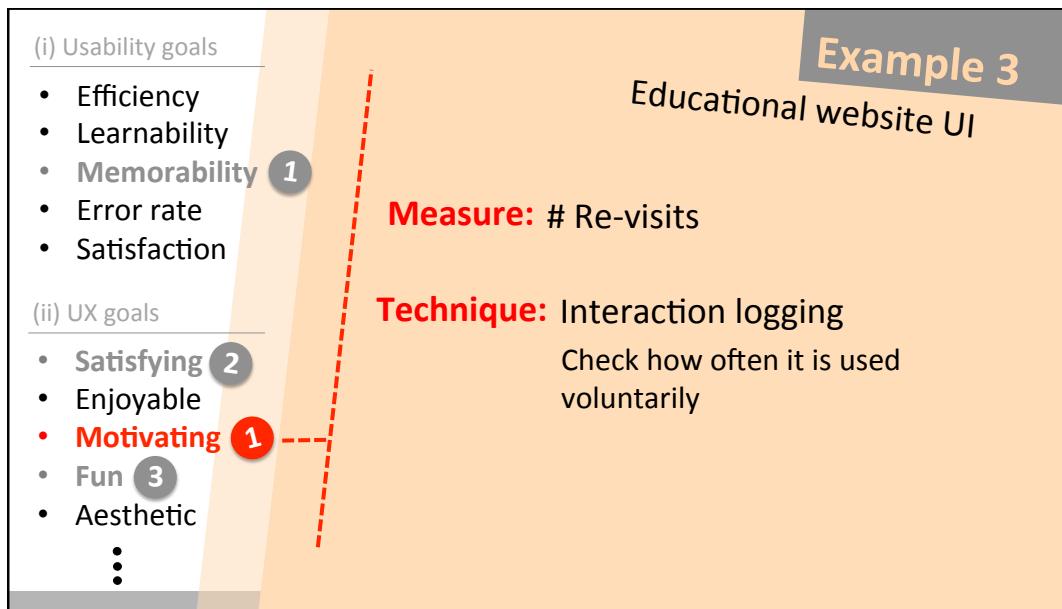
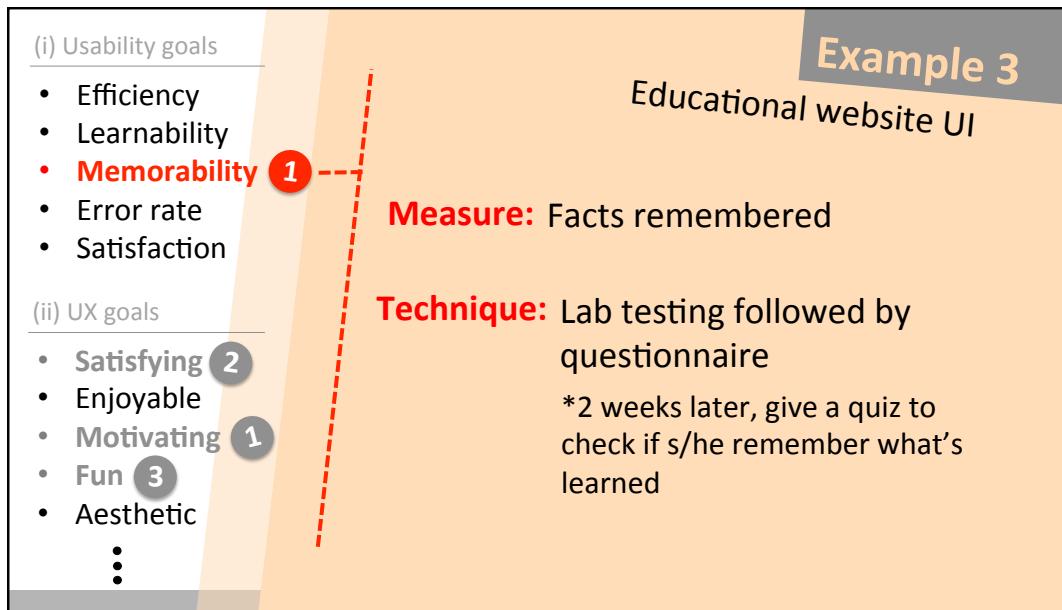
YES!

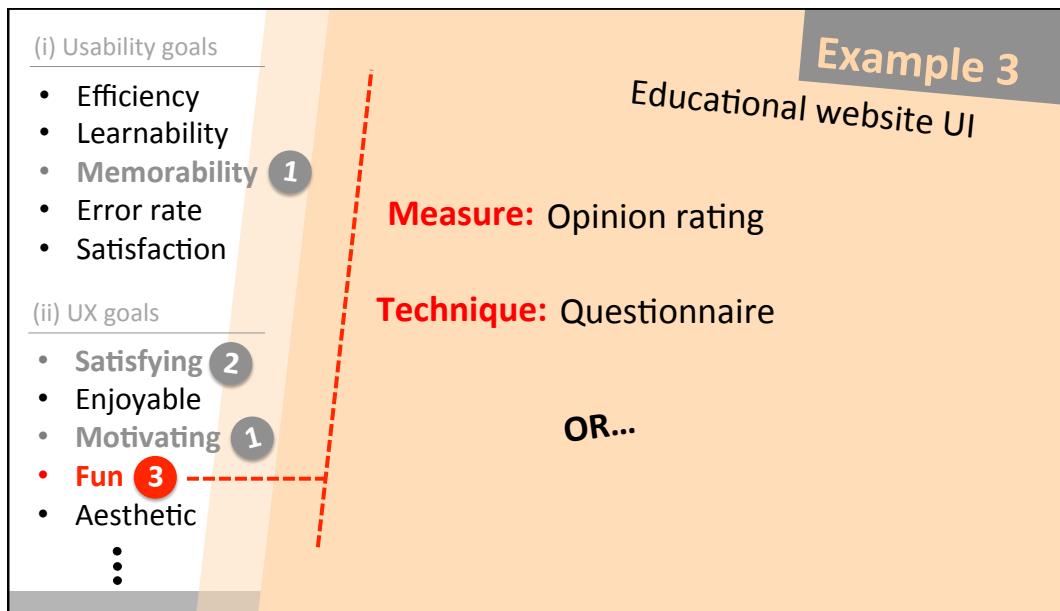
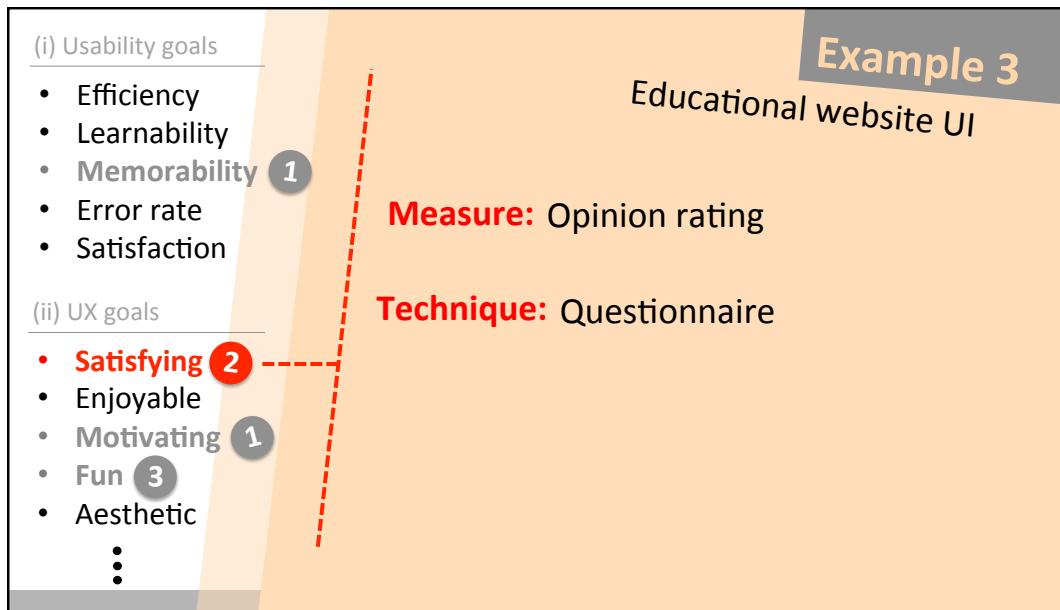
(i) Usability goals	<ul style="list-style-type: none"> • Efficiency • Learnability • Memorability • Error rate • Satisfaction
(ii) UX goals	<ul style="list-style-type: none"> • Satisfying • Enjoyable • Motivating • Fun • Aesthetic <p>⋮</p>

Example 3

Educational website UI

(i) Usability goals	<ul style="list-style-type: none"> • Efficiency • Learnability • Memorability 1 • Error rate • Satisfaction
(ii) UX goals	<ul style="list-style-type: none"> • Satisfying 2 • Enjoyable • Motivating 1 • Fun 3 • Aesthetic <p>⋮</p>





Example 3

Educational website UI

Measure: # Smile/laugh

Technique: Web cam recording of face

Then count the number of times the user smiled/laughed

- (i) Usability goals
 - Efficiency
 - Learnability
 - **Memorability** 1
 - Error rate
 - Satisfaction

- (ii) UX goals
 - **Satisfying** 2
 - Enjoyable
 - Motivating 1
 - **Fun** 3
 - Aesthetic
 - ⋮

DISCUSSION

First impression?

In most user evaluations, the user interacts with the UI for the first time, for an hour or so... is this OK?

In a lab testing:

- Captures initial impression
- Not all features covered
- Not realistic (e.g. no distraction)

In real life:

- Phone rings during task
- Multi-tasking
- Lots of distractions
- Use it over time

→ How can we simulate real world in evaluation?

DISCUSSION

First impression?

The extent to which the conclusion of your study can be generalised to the situations that naturally occur
= “Ecological validity”
(e.g. plane crash study)

Trade-off: **Ecological validity** vs. **experimental control**

In real life:

- Phone rings during task
- Multi-tasking
- Lots of distractions
- Use it over time

Evaluate real world in evaluation?



Longitudinal Study

- Long-term user evaluation
- **Indirect observations** required... e.g.
 - Interaction logging
 - Diary keeping



Longitudinal Study

- Long-term user evaluation
- **Indirect observations** required... e.g.
 - Interaction logging
 - Diary keeping

→ Also suitable for mobile UI ?



Conclusion

- UI evaluation adds **understanding of our design** and allows **room for improvement**
- Evaluating by ourselves is not enough
 - **Real users need to be involved**
- Decide what to measure and how
- Longitudinal evaluation is more ecologically valid

End of Slides

