Think-aloud protocol: lesson plan

Human Computer Interaction (HCI)

UC
UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Lesson:
Think-aloud protocol

Ages: 8 to 14

Learning outcomes

Students will be able to:

- Use the think-aloud protocol to gain an appreciation for it
- Use the protocol to assess the usability of computer interfaces

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Lesson starter: introduction

The interface is the only part of a program that the user sees (that's the definition of an interface!), so if the interface doesn't work for them, then the program doesn't work.

A very important consideration when designing or evaluating an interface is who the users are likely to be. For example, the typical age of an user can be significant: very young children may have difficulty reading some words and prefer images and animations, while someone in a commercial setting who uses an interface frequently will want it to be very fast to use, perhaps using keyboard shortcuts only.

Lesson starter: Who are the users?

Have a brainstorm session with the students to come up with as many different types of users as they can and the limitations that they face. Here is a list of some of the possible answers.

- People with color blindness
- People with impaired vision (needing glasses)
- People with hearing impairment
- People using a phone or tablet
- People with limited physical mobility (e.g. has arthritis)
- People with limited language skills, (e.g. new to the language or limited cognitive ability to comprehend text requiring image/graphics)
- People driving a car or riding a bike
- People operating equipment in an emergency vehicle on a bumpy ride

Lesson starter: user considerations

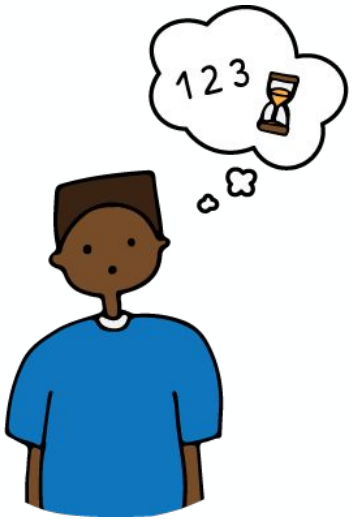
Have a brainstorm session with the students to identify the kinds of considerations they would have to make for the following user groups.

- Senior citizens
- Gamers
- Casual users
- Foreign visitors

Some possible answers: Don't reveal until you've thought about it!

- Senior citizens: use large print, have few features to learn, don't rely so much on memory, allow for poor eyesight and less agility (e.g. large buttons help), don't assume previous experience with computers
- Gamers: use previous experience with typical game interfaces, expecting challenges, possibly running on a high-end machine
- Casual users: interface needs to be very easy to learn, perhaps based on widely used systems, needs clear guidance
- Foreign visitors: use simple language and meaningful images/icons

Lesson activity: think-aloud protocol introduction



In a think aloud protocol, you observe someone else using the interface that you want to evaluate, and encourage them to explain what they're thinking at each step. You'll take notes on what they say, and you can reflect on that afterwards to evaluate the interface (it can be helpful to record the session if possible.)

This protocol* gives insights into what might be confusing in an interface, and why.

For example, if someone setting an alarm clock says "I'm pressing the up button until I get to 7am – oh bother, it stopped at 7:09, now I have to go right around again", that gives some insight into how the interface might get in the way of the users completing a task efficiently.

**The CS Field Guide has a pop-up note in the Interface usability section with examples of when interface design have gone horribly wrong: CSFG When interface design goes horribly wrong.*

Lesson activity: think-aloud protocol

1. Select a task

- This approach is focussed on observing a user doing a particular *task*, to capture what happens in reality when people use an interface. *Tasks* are often confused with *features*; you use the features of a device to accomplish a task.

  > *For example, a camera might have a feature of taking multiple photos quickly, but a relevant task is more likely to be to "take a photo of an action event, choose the best photo, and share it". This could involve a number of user actions: getting into the multi-photo mode, configuring the camera for the lighting conditions, taking the photos, choosing the best one, connect to a computer, transfer the photo to a website, and share it with friends.*

- In the classroom, tasks you might do on a digital device could be things like setting an alarm, taking and sharing photos, completing a quiz, drawing a diagram, or finding a file. Avoid large tasks that would take too long (like writing a whole report!) Students could also try evaluating programs that each other have written.
- It's very important to think about the whole context when describing a task to practice this protocol.

  > *For example, the actual task around setting an alarm clock might be: It's 9pm, and you have to make sure the alarm on your phone will wake you up by 6am so you can get to a job interview on time.*
  >
  > *Or: You're wondering how long the jug takes to boil. Use your phone to time from when you switch it on to when it has boiled.*

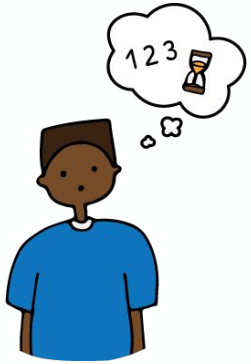
Lesson activity: think-aloud protocol

2. Doing the task

- Have students work in pairs
- Decide which person is to complete the task (the helper) and which one is to scribe or record (the evaluator).
  - The helper is to say aloud what they are thinking while completing the task
  - The evaluator makes a diary of the person's thinking and if needed offers assistance by prompting *(this is an important part, as users often forget to say what they are thinking)* with questions like:
    - *What are you going to do now? Why?*
    - *Why did you choose that button?*
    - *What are you looking for?*
    - *Are you having difficulty? What's the problem?*
    - *Can you see what went wrong?*
    - *How are you feeling about this?*

If they get the hang of "thinking aloud", just keep quiet and take notes on what they say.
It's very important not to criticise or intimidate the helper! If they make a mistake, try to figure out how the interface made them do the wrong thing, rather than blaming them. Any mistakes they make are going to be valuable for your evaluation! If they get everything right, it won't be very interesting. Also, avoid helping them unless they get totally stuck. Your goal is to see if the interface can be used without expert help!

Lesson activity: think-aloud protocol



3. Evaluation

- Once you've noted what happened, go over it, looking for explanations for where the user had difficulty.
- Make notes of possible solutions that would improve the interface usability.

Click on the links for more information about think-aloud protocols on Wikipedia, on Nielsen's website, and notes put together by HCI students for the CS Field Guide.

Lesson activity: think-aloud protocol teaching tips

Teaching tips:

- The project will be more interesting if the person completing the task isn't familiar with the system, or if it's a system that people often find confusing or frustrating. The evaluation discussion could be used to make decisions about improving the system in the future.
- Caution! Having students use the think-aloud protocol for critiquing each other's programs could be an emotionally sensitive issue. Make sure they are aware that the purpose is to help improve the program so that people will love using it.
- ***It's very important*** not to criticise or intimidate the user! If they make a mistake, try to figure out how the interface made them do the wrong thing, rather than blaming them. Any mistakes they make are going to be valuable for your evaluation! If they get everything right, it won't be very interesting.
- It is good to train your students to critique work (constructively!) and to be able to see critique of their own work as something that will help to make their work better, that it isn't something to get upset or defensive about.
- Explain to the students that in this context, if they only ever say what is good about an outcome it can mean that what isn't so good stays not so good.