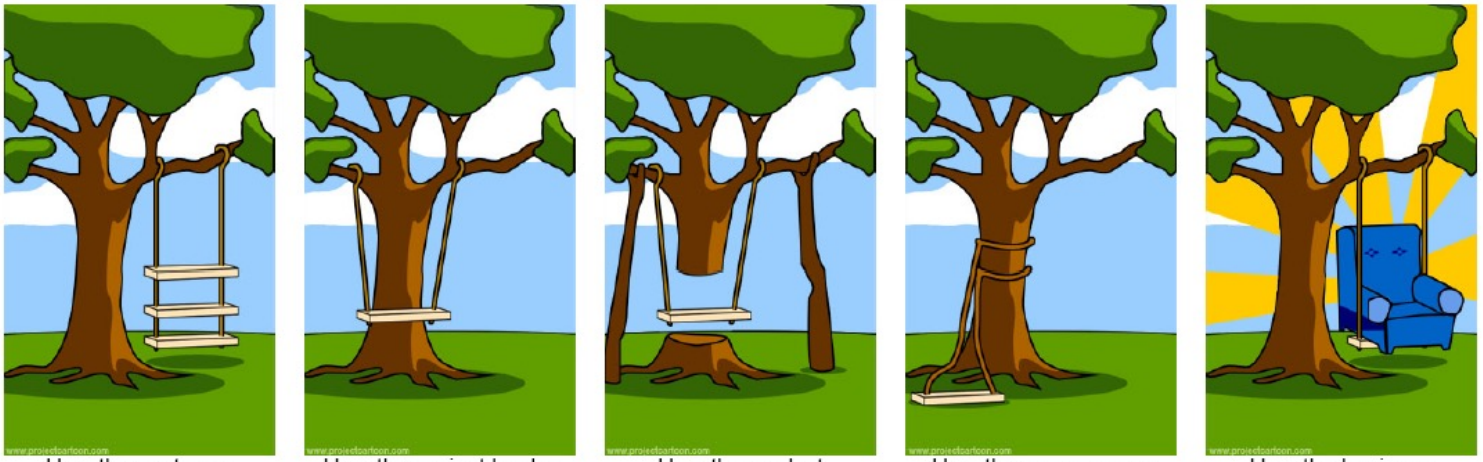
Evaluating Designs

Cognitive Walkthroughs

Evaluating Designs



Why, what, where, when, and how to evaluate

Iterative design & evaluation is a continuous process that examines: Why, what, where and when…

- Why: to check users' requirements and that users can use the product and they like it.
- What: a conceptual model, early prototypes of a new system and later, more complete prototypes.
- Where: in natural and laboratory settings.
- When: throughout design; finished products can be evaluated to collect information to inform new products.
- How: with users or without real users

How to Evaluate

Two ways to evaluate designs

- With real users (usability studies with participants)
- Without real users (experts, analysis, inspections, etc.)

Evaluations with Users	Evaluations without Users
Controlled experiment	Cognitive Walkthroughs
Field studies	Heuristics
Interviews	Key-stroke
Questionnaires/surveys	Simulation
Observation	

Types of evaluation

- Controlled settings involving users, e.g., usability testing & experiments in laboratories
- Natural settings involving users, e.g., field studies to see how the product is used in the real world.
- Any settings not involving users, e.g., consultants' critique; to predict, analyze & model/simulate aspects of the interface analytics.

Inspections

- Experts use their knowledge of users and technology to review usability
- Expert critiques can be formal or informal reports.
- Heuristic evaluation is a review guided by a set of heuristics.
- Walkthroughs involve stepping through a pre-planned scenario noting potential problems.

What's Best??

- Often testing with real users is the best way to evaluate user interfaces/systems.
- **But** it can be difficult to recruit enough real users to test all aspects of design and it has been shown that inspection and other non-user approaches can identify problems with less 'participants'
- Also, if you use non-users first you can detect and correct some problems before the time-consuming process of using users
- Therefore, inspection methods and walk-through techniques are excellent ways to supplement using real users (both work well together)

Design walkthrough

- Early demo for initial reaction and quick feedback on design
- Easy and quick evaluation method
- Especially effective early, before full prototype exists
- Audience can include
  - Design team, UX analysts
  - Subject-matter experts, customer representatives
  - Potential users

Design Walkthrough

- Early stages of a project, where you have only
  - Conceptual design
  - Scenarios, storyboards
  - LF prototype (ie. maybe some screen sketches or wireframes)
- You need "to drive"; not enough to support interaction by customers, users

Cognitive Walkthrough

- A usability inspection method
- Focuses on an aspect of usability, called "exploratory learning" (most users prefer to do things to learn rather than to read a manual or follow a set of instructions).
  - Focuses on how easy the system is to learn.
    - Is it confusing?
    - Is anything missing?
    - What must the user know to make the next correct step?
- The session is usually facilitated by a moderator. A recorder may also be designated.
- Can be performed on an interface at any time during the development process, from the original mock-ups through the final release

Cognitive Walkthroughs

- Good for generating lots of design ideas from different backgrounds and perspectives
- Representative tasks selected for the cognitive walk-through by the moderator
  - Each tasks is broken down into a series of steps along with a description of users, their experience, and prior knowledge (e.g., from a persona)
- *Expert* is told the assumptions about user population (persona/s), context of use (task scenarios), task details (use-cases).
- One or more experts walk through the design prototype with the scenario
- *Experts* are guided by **3 questions**

The Three Questions

1. Will the user know what to do?

Know what to do

   - Will the correct action be sufficiently evident to the user?
   - Will the user know what to do to achieve the task?

2. Will the user see how to do it?

See how to do it

   - Will the user notice that the correct action is available (can users see the button or menu item that they should use for the next action?
   - Is it apparent when needed?
   - E.g., Will users see the button or menu item, for example, that is how the next action is actually achieved by the system? An example of when this question gets a negative response might be if a VCR remote control has a hidden panel of buttons that are not obvious to a new user.

3. Will the user understand the correct action?

   - Will the user associate and interpret the response from the action correctly (will users know from the feedback that they have made a correct or incorrect choice of action?)

Understand correct action/not correct

The Three Questions

In other words, at each step of the task:

1. Will the user know what to do?
2. See how to do it?
3. And understand from feedback whether the action was correct or not?

If problems are found for any of these questions, the experts, then assign severity rating of each problem

Steps for Cognitive Walkthrough

1. First: Design the Prototype
   - identify the characteristics of typical users (persona/s)
   - Identify sample tasks (from a larger scenario)
   - develop the prototype with a clear set of actions needed for the users to complete the task
2. At least one designer and one or more expert evaluators come together to do the walkthrough
3. Evaluators walk through the action sequences for each task, placing it within a typical scenario while answering three questions
4. As the walkthrough is being done, the evaluators record critical info
   - The assumptions about what would cause problems (involves explaining why users would face difficulties) and severity of problem
   - Notes about side issues and design changes are made
   - Potential solutions

Advantages of Cognitive Walkthroughs

- Can be an effective inspection method not just by cognitive scientists and usability specialists but also by novice evaluators
- Helpful in picking out interface problems at an early stage, and works particularly well together with a user-centred design approach and the development of user personas

Disadvantages of Cog Walkthroughs

- Some issues with cognitive walkthroughs:
  - Answering the three questions and discussing the answers can take a long time
  - Designers can be defensive often invoking cognitive theory to explain design
- Another approach – reduce the questions (but more of a learning curve):
  1. Will the user know what to do at this step?
  2. If the users do the right thing, will they know that they did the right thing and are making progress to towards their goal?

Cognitive Walkthroughs

- Process of the cognitive walkthrough comprises a preparatory phase and an analysis phase
  - Preparatory phase: determine the interface to be used, its likely users, the task, and the actions to be taken during the task.
  - Analysis phase: have the evaluators work through the three questions to evaluate the interface and tasks

Variation of Walkthrough: Pluralistic Walkthrough

- Users, developers and usability experts work together through a task scenario and discuss usability issues
- Each group of experts is asked to assume the role of typical users
- There are variations of this as well (we will use a variation)

Steps for Pluralistic Approach

- Just like the Cognitive Walkthrough – you first develop the persona, tasks and scenarios for 'screens' for the prototype for one course through the interface (a few screens per scenario)
  - E.g., develop use cases that help you design the prototype and then a short task scenario that is used by the team to try the prototype for that use case
- Then the scenarios and tasks are presented to the team, and they write down using the CW sheets how they would move from one screen to another by answering the 3 questions (**they do this individually and not talking to each other)**
  - You need copies of your prototype or wait for each to try the prototype while writing down their steps
- Once the team has all written down their actions, they then discuss the actions making comments on issues and suggestions (**converge on decisions and rating of severity**)
  - Do this at the end (once have finished all tasks)

Adv/Disadv of Pluralistic Approach

- Advantages of Pluralistic approach:
  - Strong focus on users at task detailed levels (e.g.., looking at steps)
  - Group brings variety of opinions (maybe expertise) for interpreting each step of interaction
- Limitations of approach
  - Getting experts together all at once
  - Only limited number of scenarios and paths through the interface can be explored because of time constraints

- For Milestone 2 – use the version of the pluralistic Cognitive Walkthrough (answering the three questions for each step of the tasks according the persona Abby)
- Each group need needs to create the sheets for the experts to record their answers to the 3 questions

For the Cognitive Walkthrough

You need to have five things:

1. Your persona: which is a representative of who the main users are (the one you consider to be your main user). You have been provided with Abby (get familiar with Abby).
2. The scenario that describes the types of things user will do using your system. This should small scenarios around the types of general tasks that most users will want to do to support your new features.
3. A complete, written list of the actions needed to complete the task with the given prototype. (use-cases)
4. The prototype that matches the tasks (developed from the use-cases)
5. The sheets for the cognitive walkthroughs that will break-each task down into steps that match your prototype screens.

Then fill in the Cognitive Walkthrough Sheets

- Using the template that you used to record your use cases and prototype images, create your cognitive walkthrough sheets.
- In the next example, it shows how you would fill in the sheets.
- You need to create a set of sheets for EACH task you do (include the use case, scenario, and create the sheets as shown).

INSTRUCTIONS
The first page of the Walkthrough Sheets should have the following information:

- Date and Name of the evaluator
- The Instructions
- A short description of the system
- Typical user – e.g., Abby
- List of typical tasks done with the application

Cognitive Walkthrough Sheets

Date of Evaluation: _____

Name of Evaluator: _____

Instructions:
In pairs, the evaluators will be walkthrough the system for each task. For each step of the use-case the evaluators will answer three questions on their own copy (without talking to each other) – if Abby will know what action to take, how to do the action, and then if Abby can tell if the actions taken is correct (yes, no or maybe with a short reasons). Give any problems (a "No" or "Maybe") a severity rating from 1 to 5 (where 1 is minor and 5 is critical.) After all the steps in each task are complete, both evaluators will meet to discuss issues found in each task (that evaluate a feature) to come up with 2-3 Must changes (change your severity rating to M in the table) for each task.

Description of System:
To let users set up the fish feeder to automatically feed their fish

Typical Users: Abby and other fish owners [*include the personas that you created]*

Typical Tasks:

- It must support the following features and constraints:
- Users can specify when to feed the fish (specific times of the day or days of the week) and how many times per day or week to feed them (up to 3 times per day).
- Users can specify how much food to feed the fish at once (in grams).
- Users can specify feeding schedules and amounts for up to two types of food.
- Users can specify when long the automated program should run (start and end dates, including no end).
- The device will warn the user before confirming if there is not going to be enough food for the entire period.

Cognitive Walkthrough Sheet – TASK 1 – Page 1

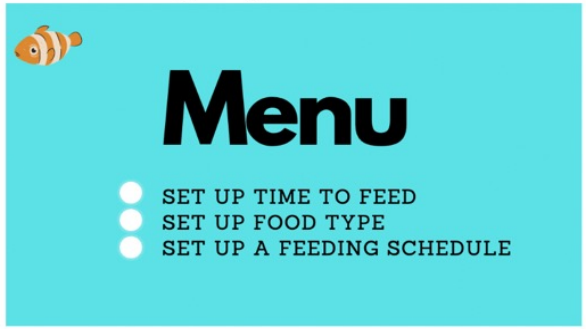
INSTRUCTIONS
Add a heading at the top of each page that identifies the task #, and which page/step of the task so that the evaluator can follow along easier. You can colour code each task by highlighting to help the evaluator keep track of which task they are doing (e.g., highlight all steps for Task 1 in yellow, all steps for Task 2 in pink, etc.)

Task Title: *Feed fish for set time on a schedule – feed fish using the scheduler*

Task Scenario (using Abby):

Abby is a Dal 4th year student who has a small aquarium with several fish. Abby is going home to Bridgewater over the winter break. She sets up her automated fish feeder to feed the fish twice per day for those 2 weeks, with flake food every morning at 9 am and pellet food every evening 6:00pm.

Task 1 - Prototype Page 1



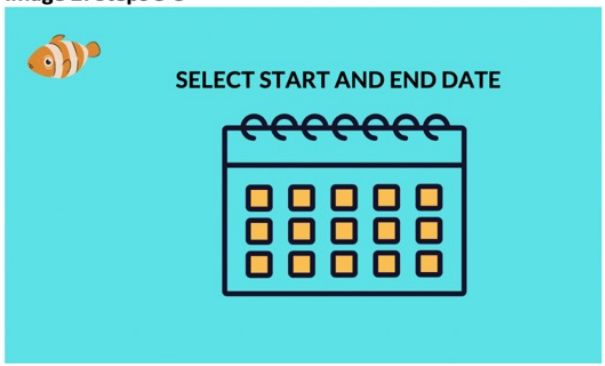
INSTRUCTIONS
- On the first page of the new task, include the task title, and the scenario for that task
- Each step and table with 3 questions should be on a new page.
- Number the steps with instruction that Abby would do, and also include which use-case steps these match (evaluators can easily refer to the use-case if necessary, to check)
- Include a screen shot of the prototype page for this step either before the Step/Table or after (but both should be on one page).

Step 1: Abby selects the option to set up a feeding schedule on the main menu. [use-case steps 1-2]

Question	Yes (reason/s)	No (reason/s)	Maybe (reason/s)	Severity Rating (1-5)
Will the correct action be sufficiently evident to Abby? ("Know what to do?" -Will the Abby know what to do to achieve the task?)				
Will the Abby notice that the correct action is available? ("See how to do it" - Can users see the button or menu item that they should use for the next action? Is it apparent when needed?)				
Will the Abby associate and interpret the response from the action correctly ("Understand correct action/not correction" - will users know from the feedback that they have made a correct or incorrect choice of action?)				

Cognitive Walkthrough Sheet – TASK 1 – Page 2

Prototype Page 2



Make sure you include the numbers for your Use Case as well as the steps. This way the expert can look at the use case as well to ensure they can answer all 3 questions

Step 2: Abby fills in the start and end date to set up the dates for the feeding schedule. [UC steps 3-5]

Question	Yes (reason/s)	No (reason/s)	Maybe (reason/s)	Severity Rating (1-5)
Will the correct action be sufficiently evident to Abby? ("Know what to do?" -Will the Abby know what to do to achieve the task?)				
Will the Abby notice that the correct action is available? ("See how to do it" - Can users see the button or menu item that they should use for the next action? Is it apparent when needed?)				
Will the Abby associate and interpret the response from the action correctly ("Understand correct action/not correction" - will users know from the feedback that they have made a correct or incorrect choice of action?)				

Cognitive Walkthrough Sheet – TASK 1 – Page 3

Step 3: Abby fills in the number of times to feed the fish each day. [UC steps 6-7]

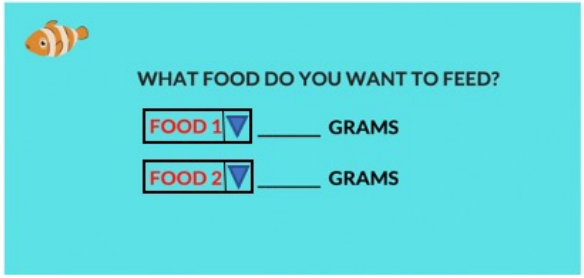
Question	Yes (reason/s)	No (reason/s)	Maybe (reason/s)	Severity Rating (1-5)
Will the correct action be sufficiently evident to Abby? ("Know what to do?" -Will the Abby know what to do to achieve the task?)				
Will the Abby notice that the correct action is available? ("See how to do it" - Can users see the button or menu item that they should use for the next action? Is it apparent when needed?)				
Will the Abby associate and interpret the response from the action correctly ("Understand correct action/not correction" - will users know from the feedback that they have made a correct or incorrect choice of action?)				

Cognitive Walkthrough Sheet – TASK 1 – Page 4

Step 4: Abby fills in the two times to feed the fish [UC steps 8-9]

Question	Yes (reason/s)	No (reason/s)	Maybe (reason/s)	Severity Rating (1-5)
Will the correct action be sufficiently evident to Abby? ("Know what to do?" -Will the Abby know what to do to achieve the task?)				
Will the Abby notice that the correct action is available? ("See how to do it" - Can users see the button or menu item that they should use for the next action? Is it apparent when needed?)				
Will the Abby associate and interpret the response from the action correctly ("Understand correct action/not correction" - will users know from the feedback that they have made a correct or incorrect choice of action?)				

Cognitive Walkthrough Sheet – TASK 1 – Page 5



Step 5: Abby fills in the type of food to use and the amount in grams [UC steps 12-15]

Question	Yes (reason/s)	No (reason/s)	Maybe (reason/s)	Severity Rating (1-5)
Will the correct action be sufficiently evident to Abby? ("Know what to do?" -Will the Abby know what to do to achieve the task?)				
Will the Abby notice that the correct action is available? ("See how to do it" - Can users see the button or menu item that they should use for the next action? Is it apparent when needed?)				
Will the Abby associate and interpret the response from the action correctly ("Understand correct action/not correction" - will users know from the feedback that they have made a correct or incorrect choice of action?)				

Etc.

Example of how the CW sheets may look like filled in.

- Each expert will fill these in.

Cognitive Walkthrough Sheet – TASK 1 – Page 1

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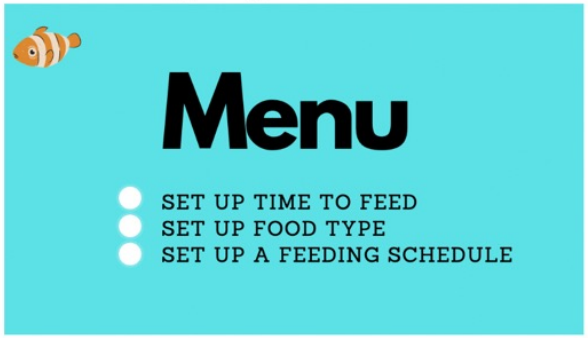
Task 1 - Prototype Page 1



INSTRUCTIONS
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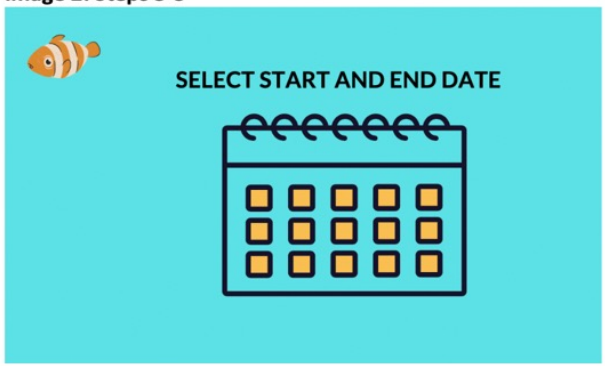
Step 1: Abby selects the option to set up a feeding schedule on the main menu. [use-case steps 1-2]

Question	Yes (reason/s)	No (reason/s)	Maybe (reason/s)	Severity Rating (1-5)
Will the correct action be sufficiently evident to Abby? ("Know what to do?" -Will the Abby know what to do to achieve the task?)	Abby will see the option in the menu			
Will the Abby notice that the correct action is available? ("See how to do it" - Can users see the button or menu item that they should use for the next action? Is it apparent when needed?)	Abby will see the radio button on the menu			
Will the Abby associate and interpret the response from the action correctly ("Understand correct action/not correction" - will users know from the feedback that they have made a correct or incorrect choice of action?)	The next screen brings up the calendar to add schedule			

Cognitive Walkthrough Sheet – TASK 1 – Page 2

Prototype Page 2



Severity Rating where 1 is lowest and 5 is highest

Step 2: Abby fills in the start and end date to set up the dates for the feeding schedule. [UC steps 3-5]

Question	Yes (reason/s)	No (reason/s)	Maybe (reason/s)	Severity Rating (1-5)
Will the correct action be sufficiently evident to Abby? ("Know what to do?" -Will the Abby know what to do to achieve the task?)			Abby might not know that the calendar is to add days to feed fish. Could add a title beyond the simple instructions.	1
Will the Abby notice that the correct action is available? ("See how to do it" - Can users see the button or menu item that they should use for the next action? Is it apparent when needed?)			Abby might not know how to add dates. Could add better instructions under calendar of have a ? Icon for help.	3
Will the Abby associate and interpret the response from the action correctly ("Understand correct action/not correction" - will users know from the feedback that they have made a correct or incorrect choice of action?)		The next screen is very basic. The user may not know if they properly selected the correct dates. Perhaps join the 2 screens into one, ask frequency while keeping range of dates highlighted on calendar		4

Evaluators will go through each step and ask themselves 3 questions. If "Abby" doesn't have problems you can note this in "Yes" cell or if you think Abby may or will have problems at any point, note it in the appropriate cell:

- what would cause problems (involves explaining why users would face difficulties)
- notes about issues and design changes can be proposed as well as any other potential solutions
- severity of problem(1 to 5 – 5 being most critical)

Today

- Get in your groups
- Use your storyboards from lab this week and build on these
  - For each storyboard
    1. Create a use-case (user-system with normal and alternative cases)
    2. Then use the use-case to build a LFP that has screens/wireframes that match the use cases (while thinking about Abby).

    Note: this should be a LFP only. You can sketch your interface, or you can use software BUT it must still have a look and feel of LFP (i.e., a paper prototype) Remember users won't focus on what we want them to if the prototype is too high level!!

Identified feature:

Feature1:
Task Name:
Task Scenario:
Use-Case
Normal Case
Alternative Case

For each feature:

Prototype Images (you may have more or fewer images than rows – add and delete as necessary)
Image 1: Steps _____
Image 2: Steps _____
Image 3: Steps _____
Image 4: Steps _____
Image 5: Steps _____
Image 6: Steps _____

Include the use-case steps that this one prototype image covers (one screen may include 3 or 4 steps like we saw in the examples)

- http://ics.colorado.edu/techpubs/pdf/92-17.pdf
- http://www.allbusiness.com/media-telecommunications/internet-www/10629523-1.html
- http://www.cc.gatech.edu/classes/cs3302/documents/cog.walk.html
- http://www.ukoln.ac.uk/qa-focus/documents/briefings/briefing-87/html/#ref-01
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- Sharp, H., Rogers, Y., Preece, J. (2007). Interaction Design: beyond human-computer interaction.(2nd Edition). England: John Wiley &Sons, Ltd.
- http://www.bugbash.net/comic/7.html
- http://widemile.wordpress.com/category/why-test/
- http://www.userinsight.com/solutions/usability-testing/