

A decorative L-shaped frame composed of thick, dark blue lines. One vertical line runs down the left side, and one horizontal line runs across the top, meeting at a right angle in the top-left corner. Another vertical line runs down the right side, and another horizontal line runs across the bottom, meeting at a right angle in the bottom-right corner.

Human-Computer Interaction: Cognitive Walkthrough

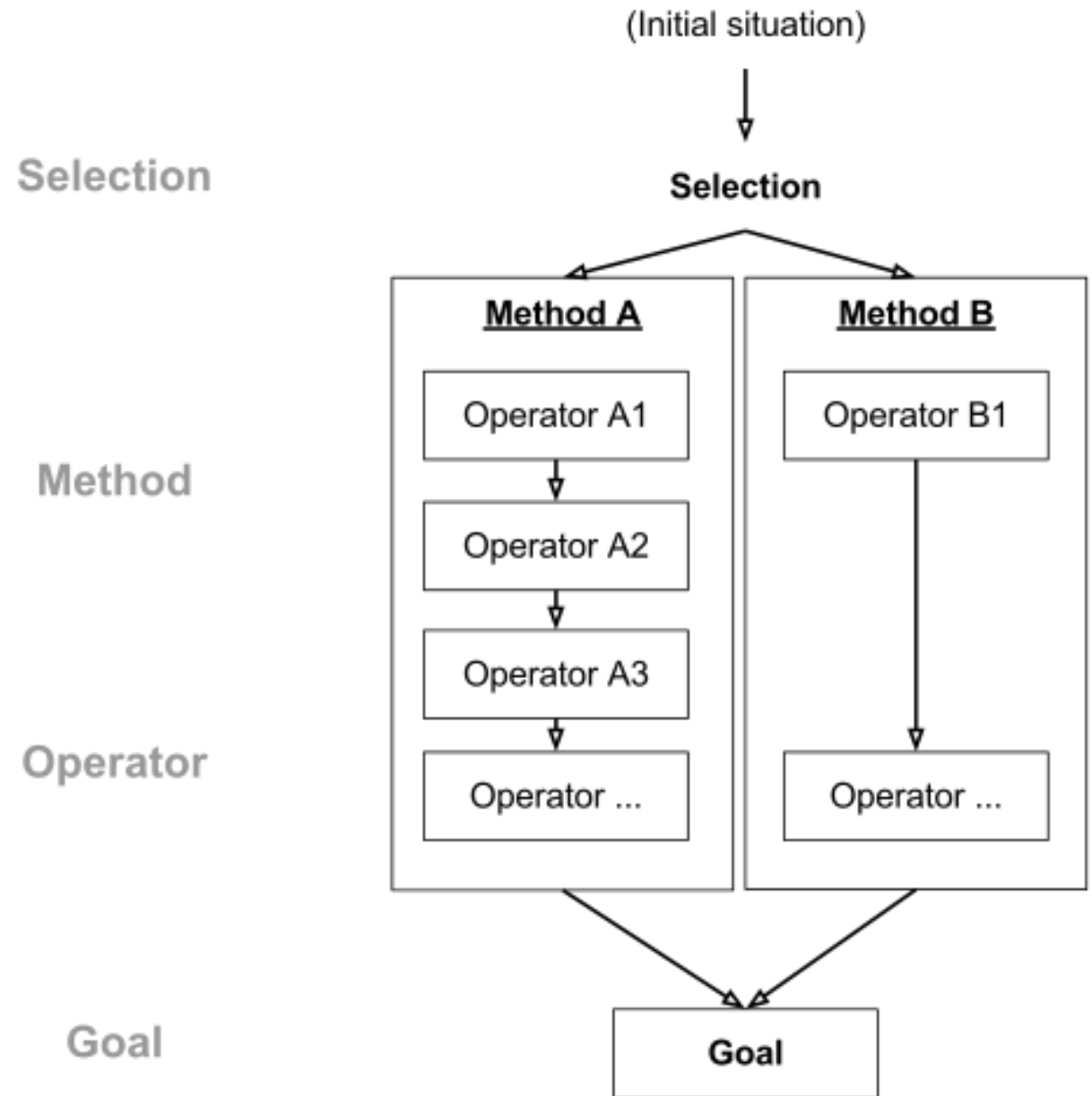
Dr Kami Vaniea

Inspection techniques

- Inspection techniques are a class of methodologies where the evaluation is done by one or more experts without involving participants or potential users.
- Pros:
 - Cheaper and faster to run than studies on users.
 - Leverage the knowledge of experts.
- Cons:
 - Experts are not users and may miss issues a real user would identify.
 - Bias towards more common errors which may be less problematic.
 - Different inspection techniques define “usability” differently.
- Examples:
 - GOMES, expert interviews, body storming, heuristic evaluation, cognitive walkthrough, ergonomic analysis.

GOMES

- Inspection methodology where expert breaks down subtasks into physical actions like: “type y key” or “move hand to mouse” or “move eyes to look at box”.
- They then calculate how long the actions would take an average person to accomplish.



Compare two designs using GOMES

Design A: drag the file into the trash can ^[29]	Design B: use the short cut “control + T” ^[30]
method encoding (operator sequence) ^[31]	method encoding (operator sequence) ^[32]
<ol style="list-style-type: none"> 1. initiate the deletion (M) 2. find the file icon (M) 3. point to file icon (P) 4. press and hold mouse button (B) 5. drag file icon to trash can icon (P) 6. release mouse button (B) 7. point to original window (P) 	<ol style="list-style-type: none"> 1. initiate the deletion (M) 2. find the icon for the to-be-deleted file (M) 3. point to file icon (P) 4. press mouse button (B) 5. release mouse button (B) 6. move hand to keyboard (H) 7. press control key (K) 8. press T key (K) 9. move hand back to mouse (H)
Total time	Total time
$3P + 2B + 2M = 3 \cdot 1.1 \text{ sec} + 2 \cdot 1 \text{ sec} + 2 \cdot 1.35 \text{ sec} = 6.2 \text{ sec}$	$P + 2B + 2H + 2K + 2M = 1.1 \text{ sec} + 2 \cdot 1 \text{ sec} + 2 \cdot 4 \text{ sec} + 2 \cdot 2 \text{ sec} + 2 \cdot 1.35 \text{ sec} = 5.2 \text{ sec}$

operator	time (sec)
K	total typing test time/total number of non-error keystrokes Guidelines: ^{[11][12]} .08 (135 wpm: best typist) .12 (90 wpm: good typist) .20 (55 wpm: average skilled typist) .28 (40 wpm: average non-secretary typist) .50 (typing random letters) .75 (typing complex codes) 1.20 (worst typist and unfamiliar with the keyboard)
P	1.1 ^{[11][12]}
H	0.4 ^{[11][12]}
D	.9n _D + .16 l _D ^{[11][12]}
M	1.35 ^{[11][12]}
R	system dependent ^{[11][12]}
suggested operators	
B (mouse button press or release)	0.1 ^[13]
Click a Link/ Button	3.73 ^[14]
Pull-Down List (No Page Load)	3.04 ^[14]
Pull-Down List (Page Load)	3.96 ^[14]
Date-Picker	6.81 ^[14]
Cut & Paste (Keyboard)	4.51 ^[14]
Typing Text in a Text Field	2.32 ^[14]
Scrolling	3.96 ^[14]

https://en.wikipedia.org/wiki/Keystroke-level_model

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Heuristic Evaluation

- Basic idea: Have an expert evaluate an interface based on a common set of criteria (heuristics).
- Experts have a broad knowledge of human behavior as well as subject specific knowledge, so their opinion is valuable.
- Pros
 - Can be done by even a single person.
 - No ethics, recording, or other human-related problems.
 - Minimal expense to find a large number of potentially expensive problems.
- Cons
 - Experts are not the same as end users, they will miss some things.
 - Heuristics are the most common types of problems, but they do not represent all problems.

Home

Find a setting

System

Display

Sound

Notifications & actions

Focus assist

Power & sleep

Battery

Storage

Tablet

Multitasking

Projecting to this PC

Shared experiences

Clipboard

Display

Brightness and color

Change brightness for the built-in display



Change brightness automatically when lighting changes

Night light (on until 7:00 AM)

On

[Night light settings](#)

Color profile

Enhanced

Windows HD Color

Get a brighter and more vibrant picture for videos, games and apps that support HDR.

[Windows HD Color settings](#)

Scale and layout

Change the size of text, apps, and other items

200% (Recommended)

Sleep better

Night light can help you get to sleep by displaying warmer colors at night. Select Night light settings to set things up.

Help from the web

[Setting up multiple monitors](#)

[Changing screen brightness](#)

[Fixing screen flickering](#)

[Adjusting font size](#)

[Get help](#)

[Give feedback](#)

Recall and Recognition both supported (good).

Help and documentation present (good) but not co-located (less good).

Cognitive Walkthrough

- A method that evaluates whether the order of cues and prompts in a system supports the way people process tasks and anticipate the “next steps” of a system.
- When to use it:
 - Initial evaluation of a system
 - Low budget
 - Walk-up-and-use systems or first-use situations
 - Have access to HCI experts
- When to not use it:
 - Formal evaluation of your own system with you as an evaluator.
 - Systems a user will use frequently.

Cognitive Walkthrough Process

- Briefing session to tell experts what to do.
- Evaluation period of 1-2 hours where:
 - Each expert works separately.
 - Take one pass to get a feel for the product.
 - Take a second pass to focus on specific features.
- Debrief session in which experts work together to prioritize problems.
 - Use most important problems to design a study to test if the identified problems are ones that hinder end users.
 - Write a report for the client explaining the problems found and the relative importance of each problem.

Number of evaluators & problems

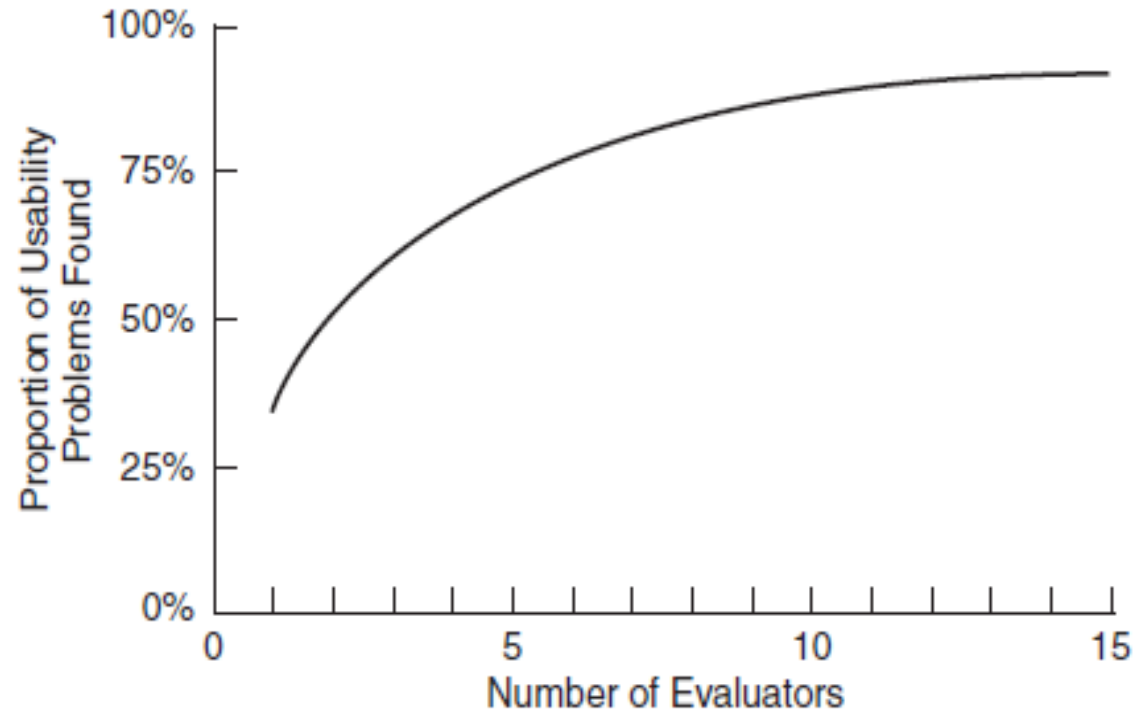


Figure 15.1 Curve showing the proportion of usability problems in an interface found by heuristic evaluation using various numbers of evaluators. The curve represents the average of six case studies of heuristic evaluation

Source: Usability Inspection Methods, J. Nielsen & R.L. Mack ©1994. Reproduced with permission of John Wiley & Sons Inc.

Each evaluator:

Materials needed

- Persona
- Task persona is trying to accomplish
- List of “correct” steps
- Way to record answers to the 4 questions
- Way to record issues found
- Optionally: List of the heuristics

Process

- For each “correct” step:
 - Answer the four questions
 - Record any identified problems (poor aspects)
 - Record any notable good things (good aspects)
- After completing all steps, review the aspects recorded by other evaluators.
- Discuss most serious issues.

The four questions

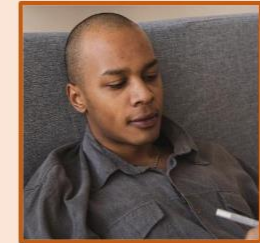
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Task: Open the Tasks lecture slides in DrawboardPDF.

Persona 5: Francis Sanchez

Background and Study Choice

- Mature Master Student from Cusco, Peru
- Studies for a MSc in Artificial Intelligence
- Has been working at Company X before their degree and must go back to Company X after graduation since they pay for their tuition.
- Moved here with their partner and two children and live a bit outside of the city centre.
- Was surprised at the amount of student participation in lectures since at their previous university it was uncommon to have tutorials or labs.



Challenges and Pains

- Arrived a week late because of Visa issues and missed the first lectures of each class.
- Pressure to achieve an average of 70% to satisfy the requirements of their scholarship
- Has to travel to classes by bus, so any short notice adjustments or cancellations are hard to deal with.
- Having learned mainly American English, adjusting to the local accent is challenging.
- Despite their partner taking care of most things, they still struggle to balance academic work, networking, and parental responsibilities.

Goals

- Wants to make the most out of the courses here and audits quite a few courses as well.
- Wants to give their children the opportunity to see something of Scotland as well. So, they plan a couple of weekend trips.
- Very keen to learn more of the Scottish culture and tries to attend some socials

Devices

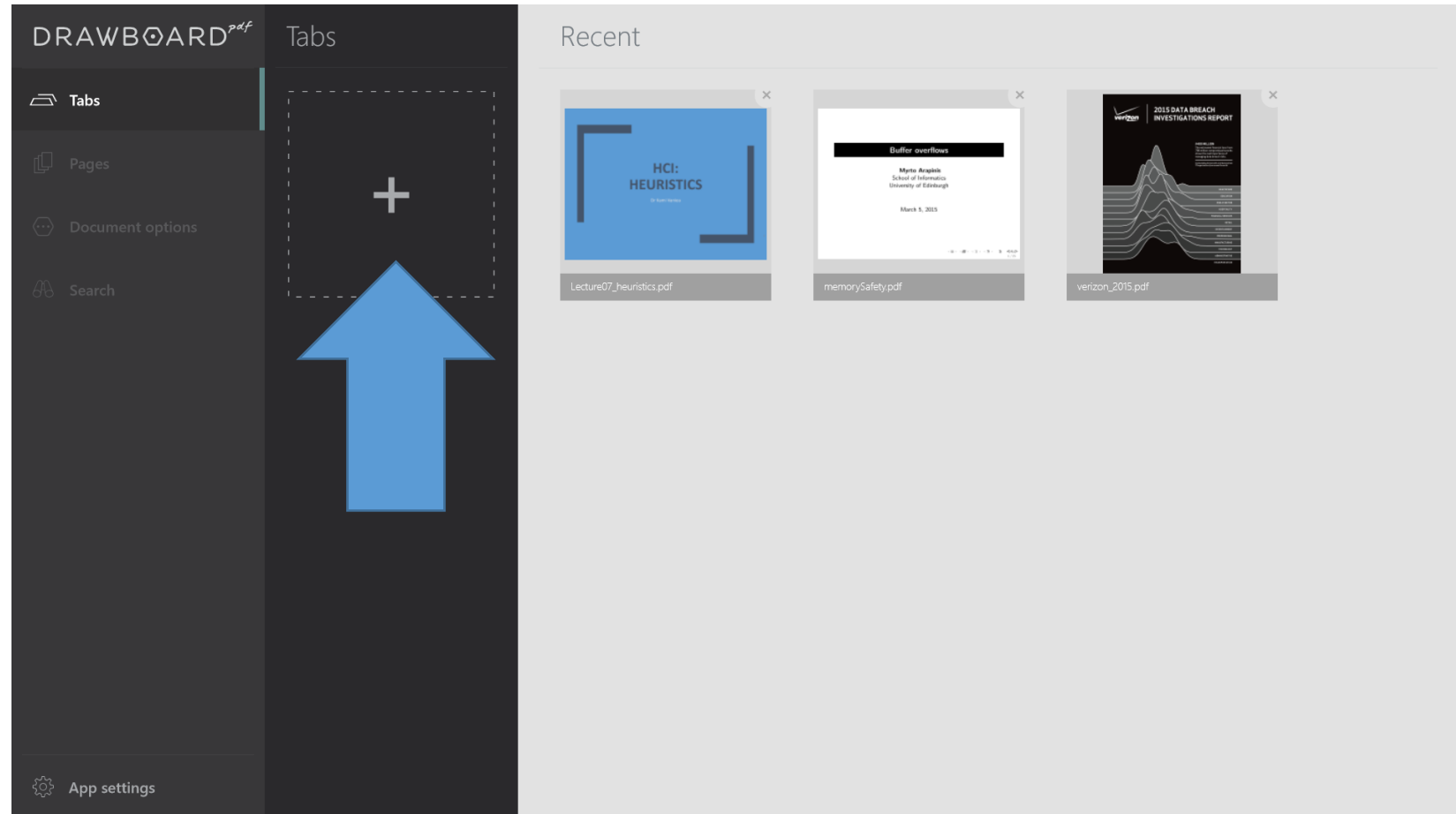
- Uses their company provided Windows laptop for coursework and notes.
- Has an Android smart phone but prefers to use it for calls and messages only.

**Task: Open the Tasks
lecture slides in
DrawboardPDF.**

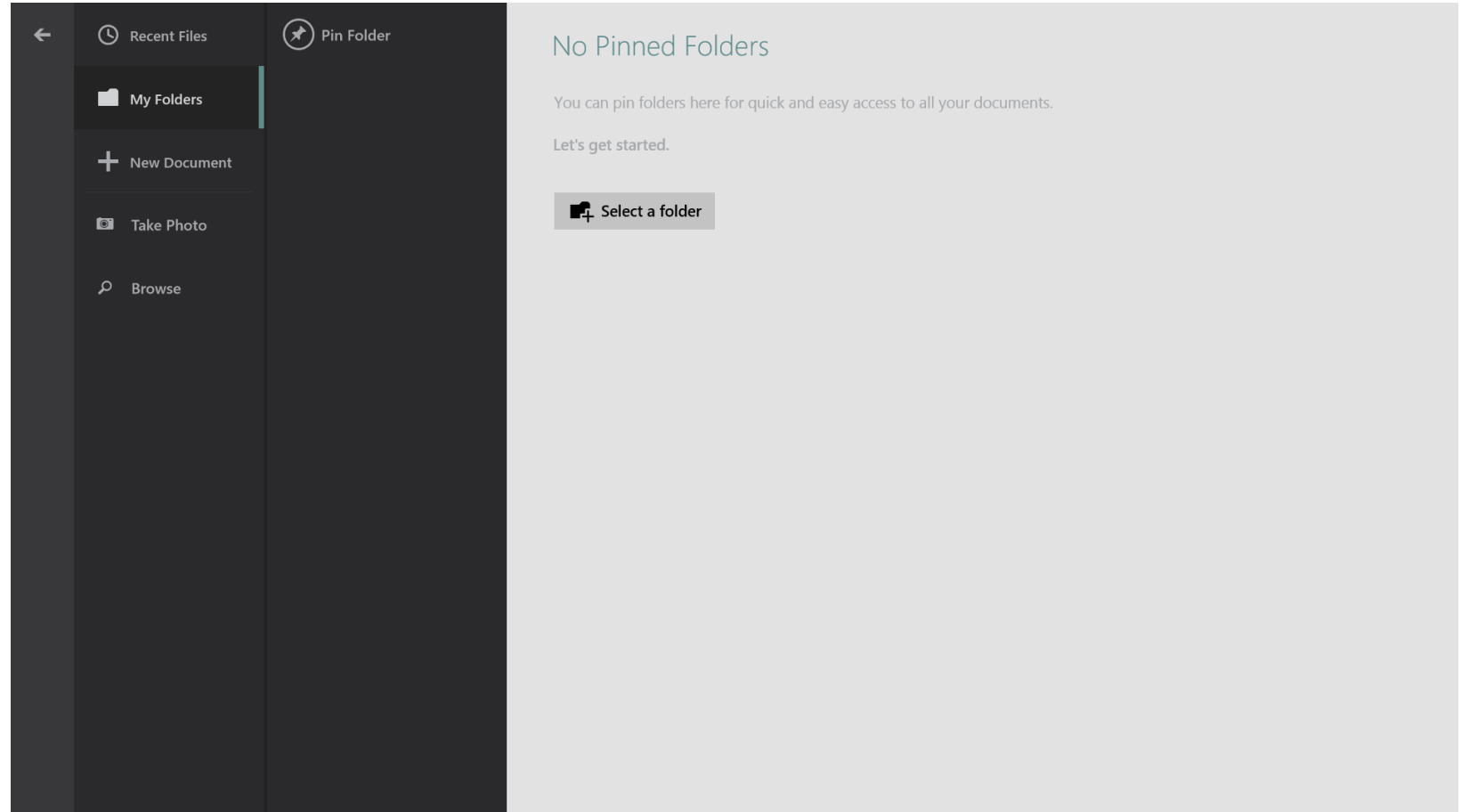
Francis

**MSc student studying
AI who worked in
industry previously.
More familiar with
American English than
British English. Uses a
Windows laptop and an
Android smartphone.**

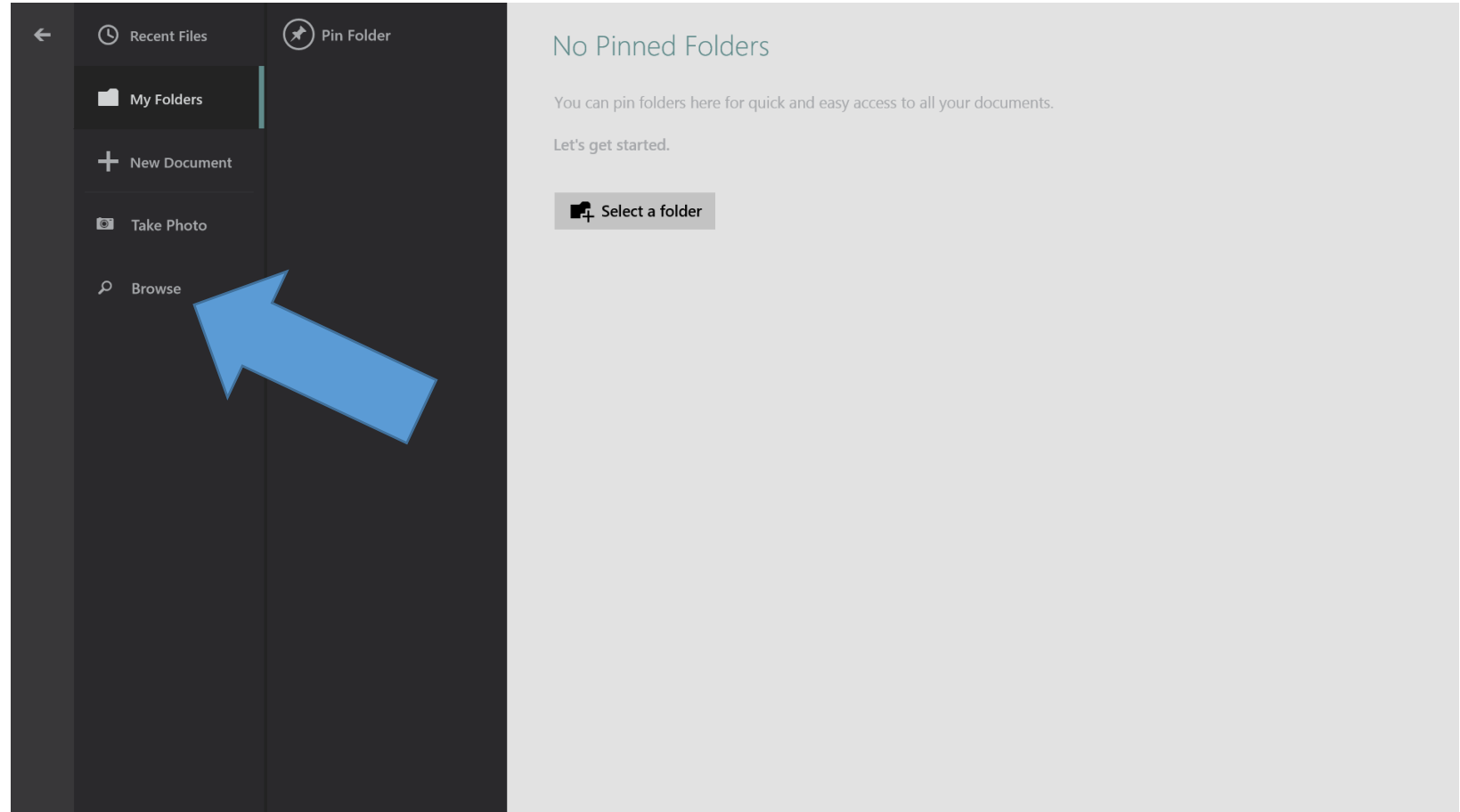
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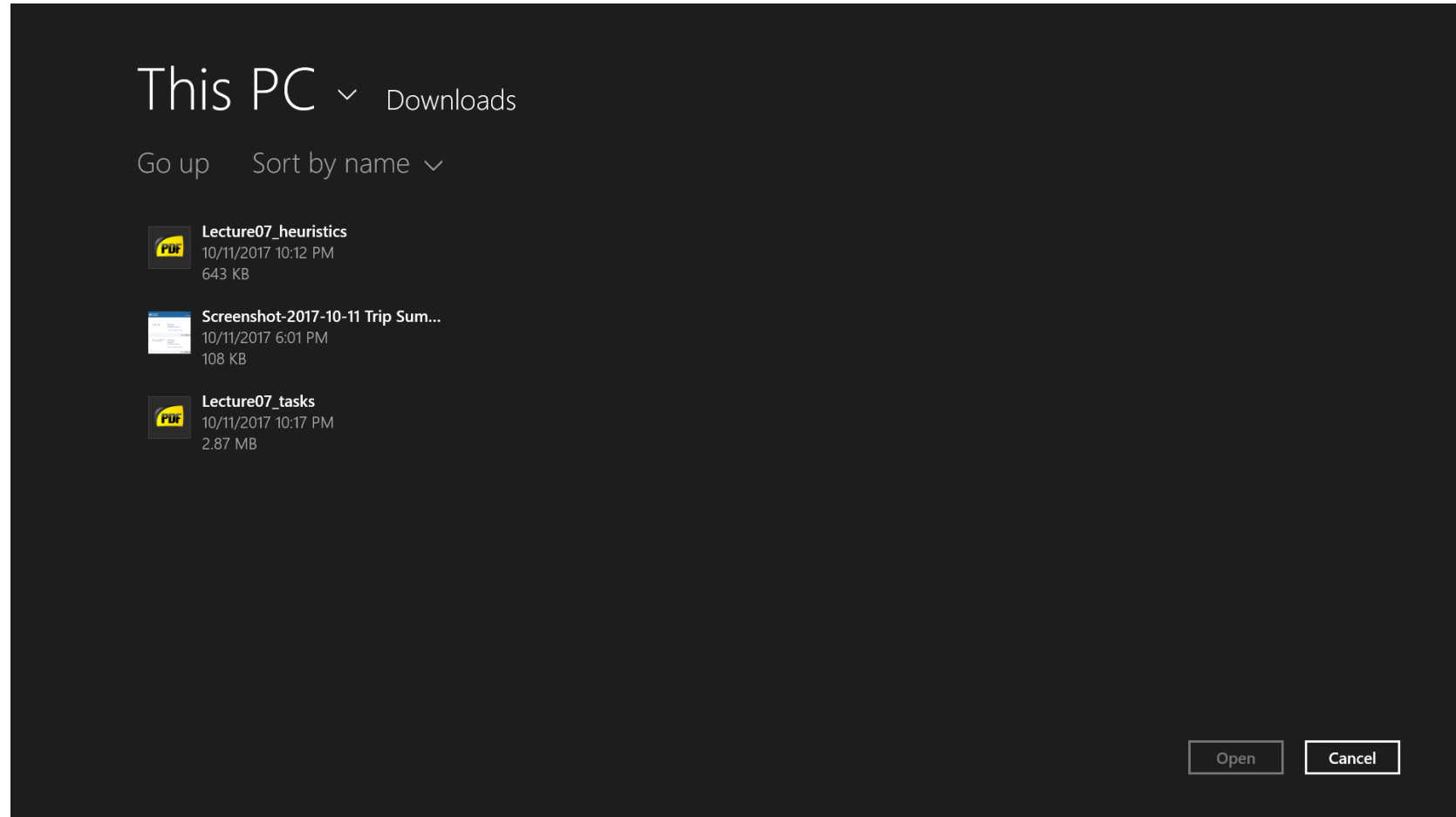
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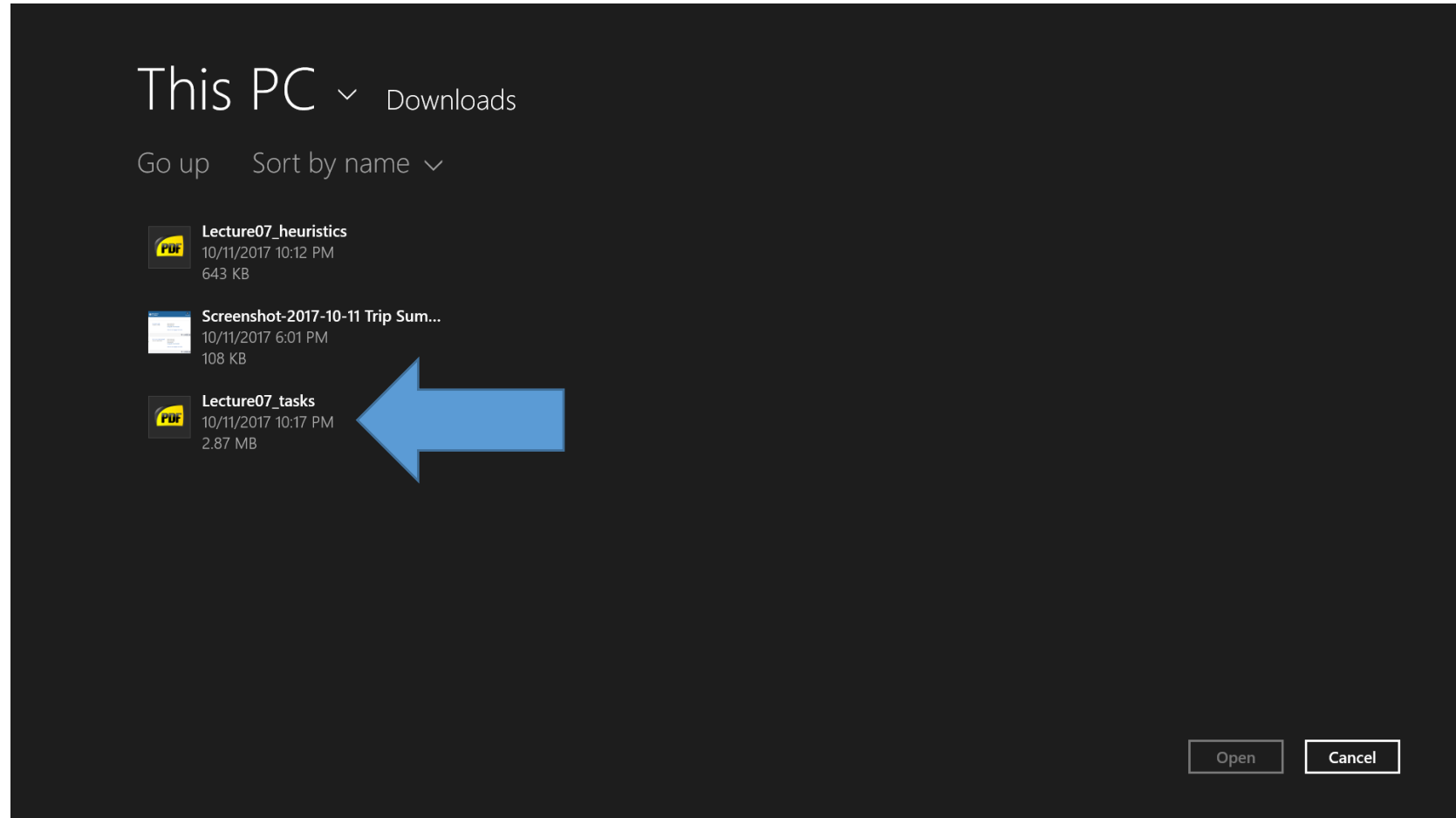
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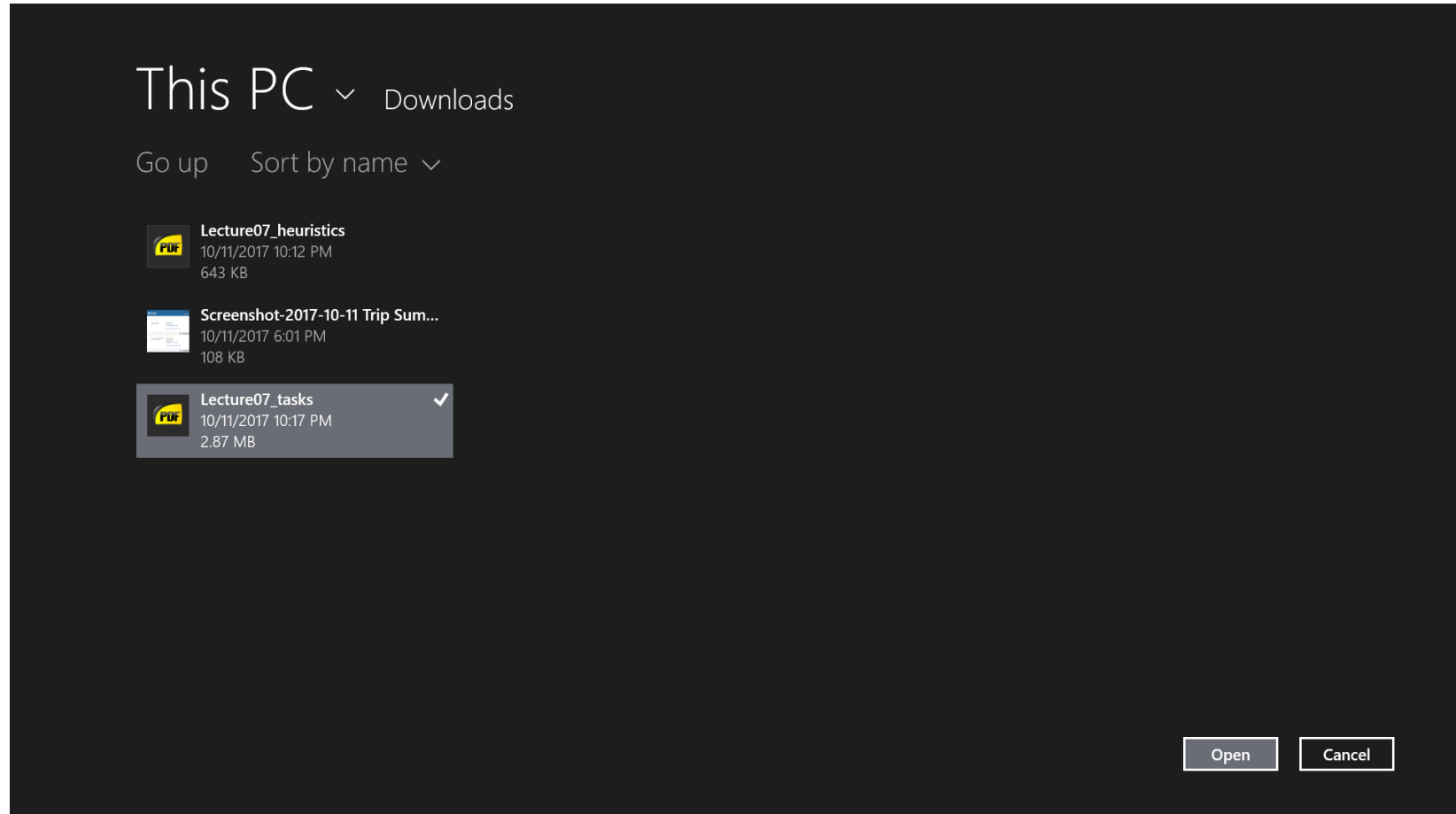
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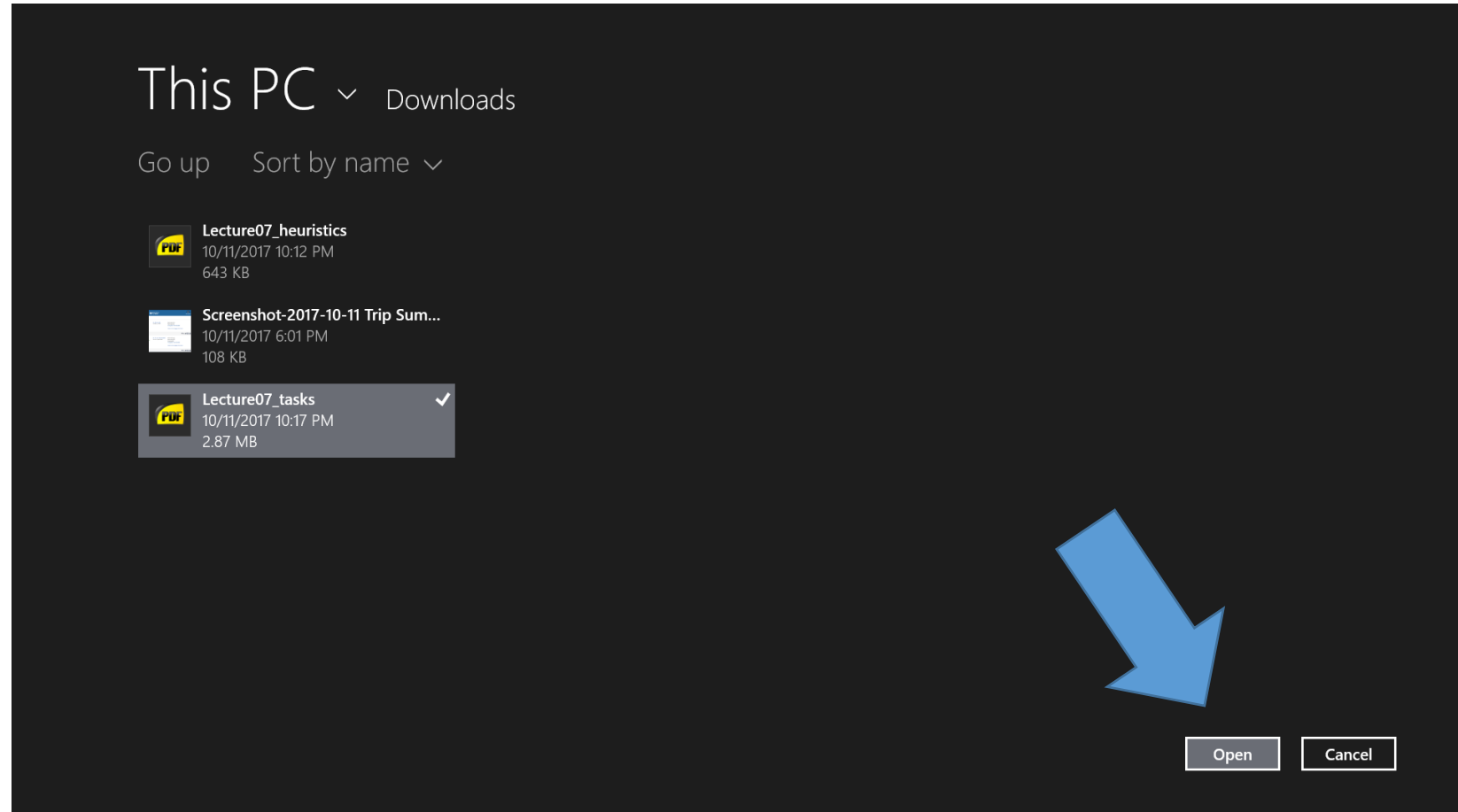
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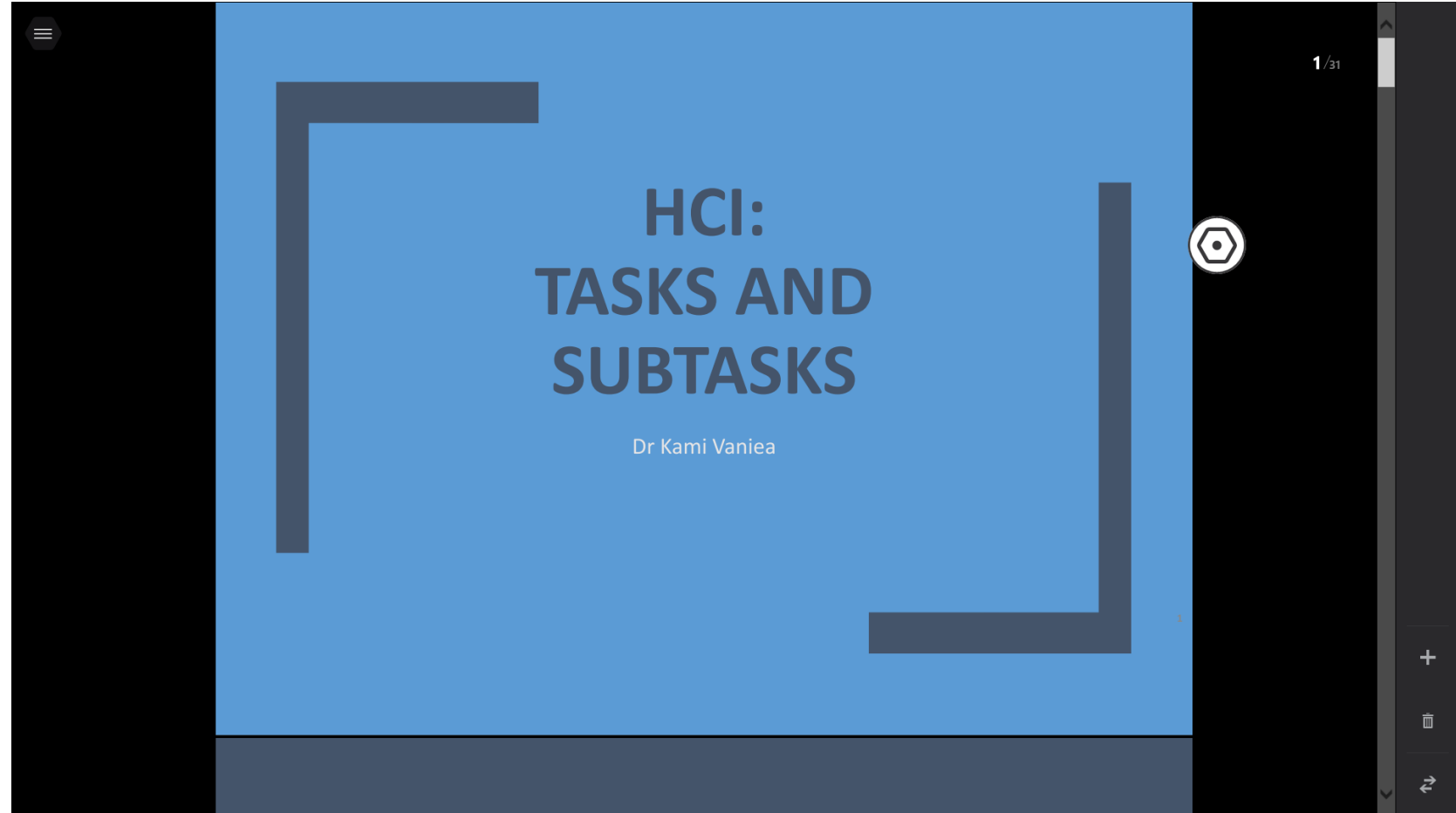
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Usability Aspect Report (UAR)

Usability Aspect Reports (UAR)

- Similar to a bug report, but for usability issues.
- Can be about good or bad interface aspects.
- Should link to a heuristic.

<i>No.</i>	<i>HE-</i>	Problem/Good Aspect:
Name:		
Evidence <i>Heuristic:</i> <i>Interface aspect:</i>		
Explanation		
Severity or Benefit <i>Rating:</i> <i>Justification (Frequency, Impact, Persistence)</i> <i>Frequency:</i> <i>Impact:</i> <i>Persistence:</i> <i>How I weighted the factors:</i>		
Possible solution and/or trade-offs		
Relationships		

HE-01

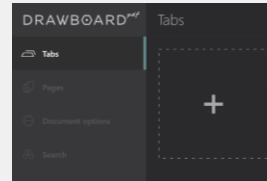
Problem/Good Aspect: Problem

Name: "Tabs" term is confusing

Evidence

Heuristic: Consistency and standards

Interface aspect: Interface uses the term "tabs" to refer to documents that are open concurrently.



Explanation: When trying to open a new document for the first time the user must select "Tabs" and then a + sign under a list of tabs. But the user is most likely trying to open a "document" or a "pdf" and may not associate these concepts with a "tab" since tabs are more often used for websites while "document" is more often used for PDF readers. The UI for Drawboard also does not have a tab UI element.

Severity or Benefit

Rating: Low

Justification: There are few other options, most tech literate users would figure it out.

Frequency: Medium

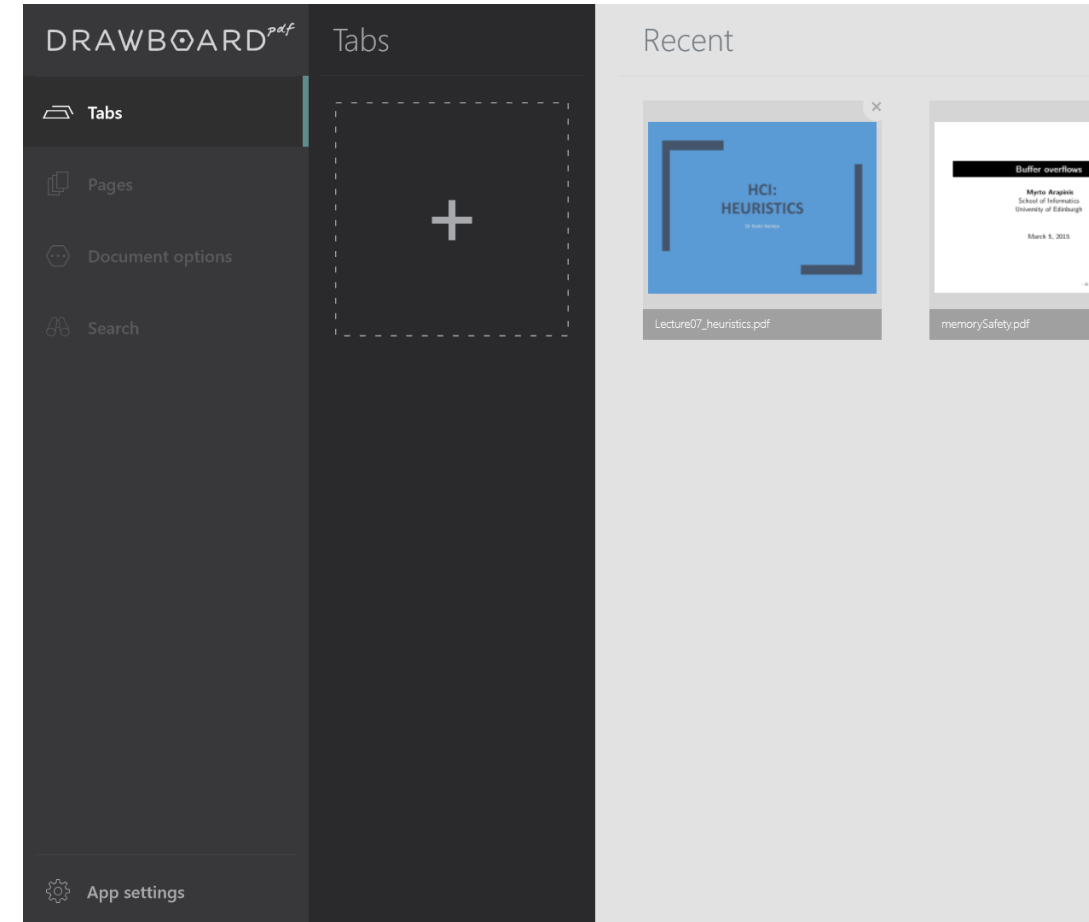
Impact: Low

Persistence: High (happens every time)

How I weight the factors: The issue will impact new and infrequent users more than those that use it often and become familiar with the language used. The term "tab" is also likely familiar to this persona and not very dissimilar to "document".

Possible solution and/or tradeoff: Change terminology to "document", "file" or similar word.

Relationships: None



Visibility of system status

Google

Hci QandA

to (GMT+01:00) London [Time zone](#)

All day Repeat...

Where

Video call [Add video call](#)

Calendar

Description

Attachment [Add attachment](#)

Event color

Notifications No notifications set
[Add a notification](#)

Show me as Available Busy

Visibility Calendar default Public Private

By default this event will follow the [sharing settings](#) of this calendar: event details will be visible to anyone who can see details of other events in this calendar. [Learn more](#)

[Publish event](#)

Add guests

Guests can

- modify event
- invite others
- see guest list

Visibility of system status

Me adding a Q&A session to my Google calendar.

Saving.

Then adding a reminder.

Google Search Calendar

← SAVE Discard changes Delete More Actions

Hci QandA

10/6/2016 2:00pm to 4:00pm 10/6/2016 (GMT+01:00) London Time zone

All day Repeat...

Event details Find a time

Where Enter a location

Video call Add video call

Calendar Kami Vaniea

Description

Attachment Add attachment

Notifications Notification 10 minutes ×

Show me as Available Busy

Visibility Calendar default Public Private

By default this event will follow the [sharing settings](#) of this calendar: event details will be visible to anyone who can see details of other events in this calendar. [Learn more](#)

[Publish event](#)

Add guests

Enter guest email address Add

Guests can

modify event

invite others

see guest list

Is the
reminder
saved?

Google

Hci QandA

to (GMT+01:00) London [Time zone](#)

All day Repeat...

Where

Video call [Add video call](#)

Calendar

Description

Attachment [Add attachment](#)

Event color |

Notifications [Add a notification](#)

Show me as Available Busy

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[Publish event](#)

Add guests

Guests can

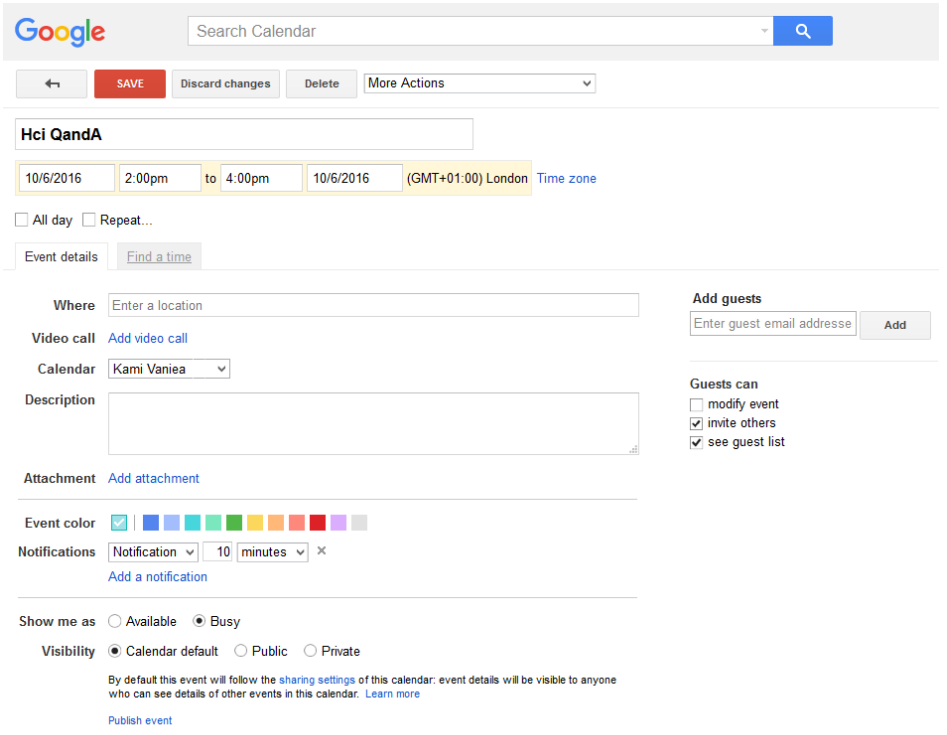
- modify event
- invite others
- see guest list

Visibility of system status

I click the back button without clicking “save” and get a warning

The screenshot shows the Google Calendar event creation interface. At the top, there is a search bar and navigation buttons: a back arrow, a red 'SAVE' button, 'Discard changes', 'Delete', and a 'More Actions' dropdown menu. The event title is 'Hci QandA'. The date and time are set to 10/6/2016 from 2:00pm to 4:00pm in the (GMT+01:00) London time zone. There are checkboxes for 'All day' and 'Repeat...'. Below this, there are sections for 'Event details' (with a 'Find a time' button), 'Where' (with a location input field), 'Video call' (with an 'Add video call' link), 'Calendar' (set to 'Kami Vaniea'), and 'Description' (with a text area). To the right, there is an 'Add guests' section with an input field and an 'Add' button, and a 'Guests can' section with checkboxes for 'modify event', 'invite others', and 'see guest list'. At the bottom, there are sections for 'Attachment' (with an 'Add attachment' link), 'Event color' (with a color palette), 'Notifications' (set to 'Notification' every '10 minutes'), 'Show me as' (set to 'Busy'), and 'Visibility' (set to 'Calendar default'). A modal dialog box titled 'Your Event' is centered on the screen, displaying the message 'Your event has not been saved.' and two buttons: 'Discard changes' and 'Continue editing'.

HE-02	Problem/Good Aspect: Problem
Name: Saved status not visible for calendar changes	
Evidence Heuristic: Visibility of status Interface aspect: No visual indication of the saved state of the document.	
Explanation: When a calendar event element is changed it is not clear if it is automatically saved or not. As a result a user may try and leave the page when it is not saved.	
Severity or Benefit Rating: Low Justification: A warning box pops up preventing accidental loss of data. Frequency: Medium Impact: Low Persistence: High (happens every time) How I weight the factors: The error is very recoverable and the warning is clear, so this may be an issue but it is a low importance one.	
Possible solution and/or tradeoff: Automatic saving is possible, but that may lead to other issues	
Relationships: None	



Task: Delete a node from a mindmap



Mindly (mind mapping)

dripgrind

Everyone

UNINSTALL

OPEN

In-app purchases



Downloads



19,073



Productivity



Similar

Mindly helps to organize your inner universe.

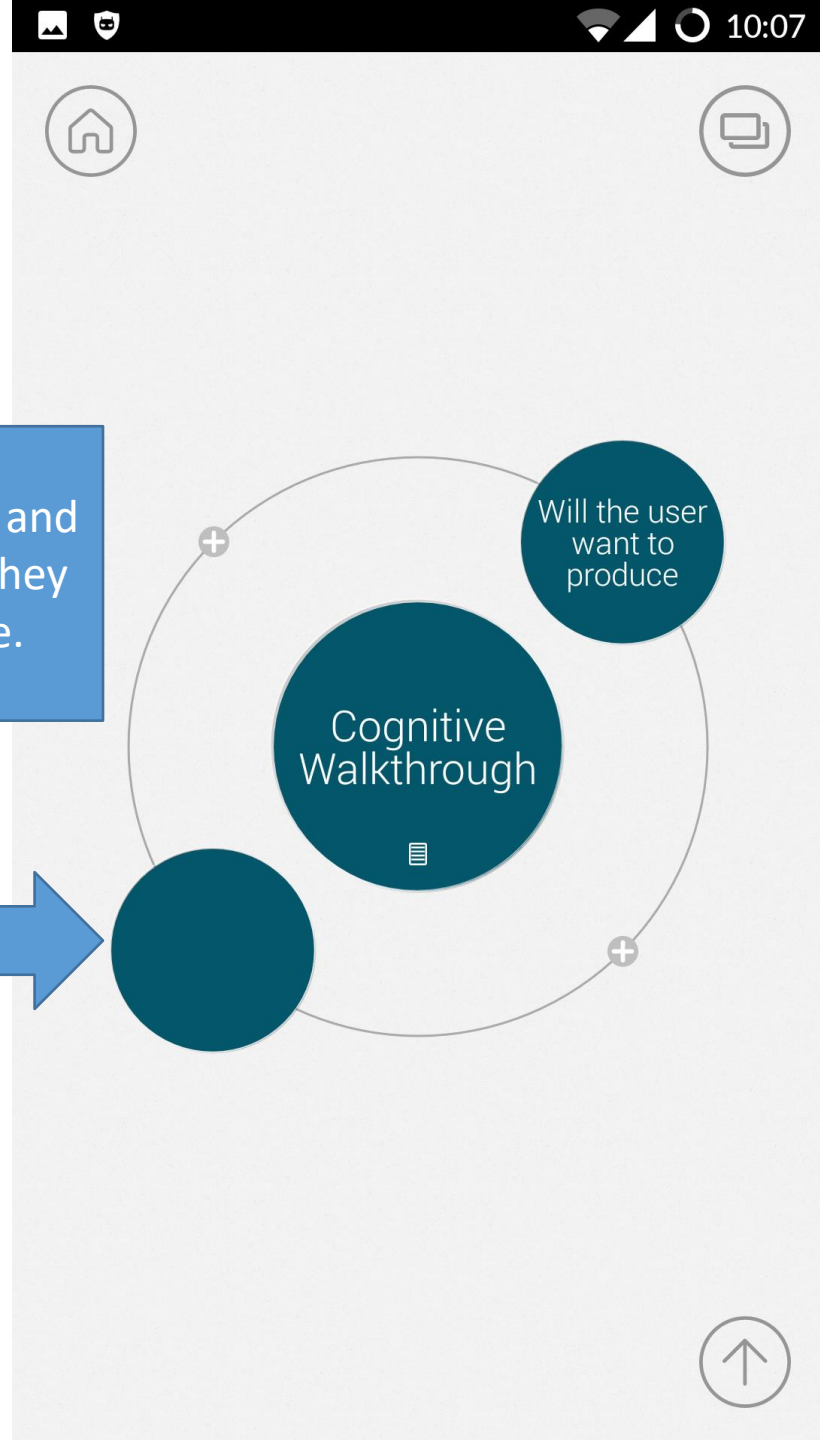
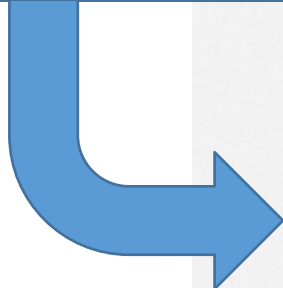


WHAT'S NEW

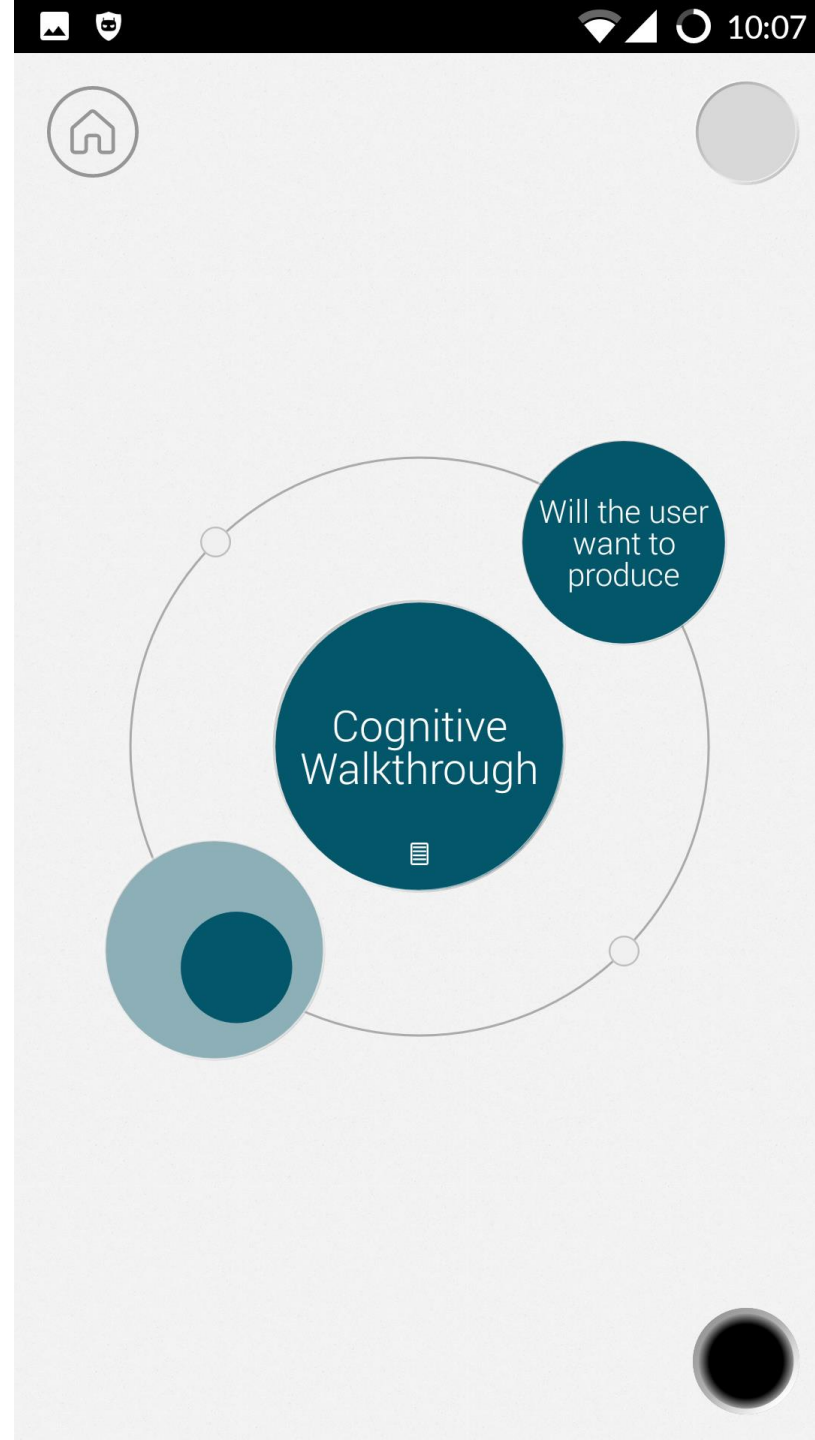
High quality image attachment support

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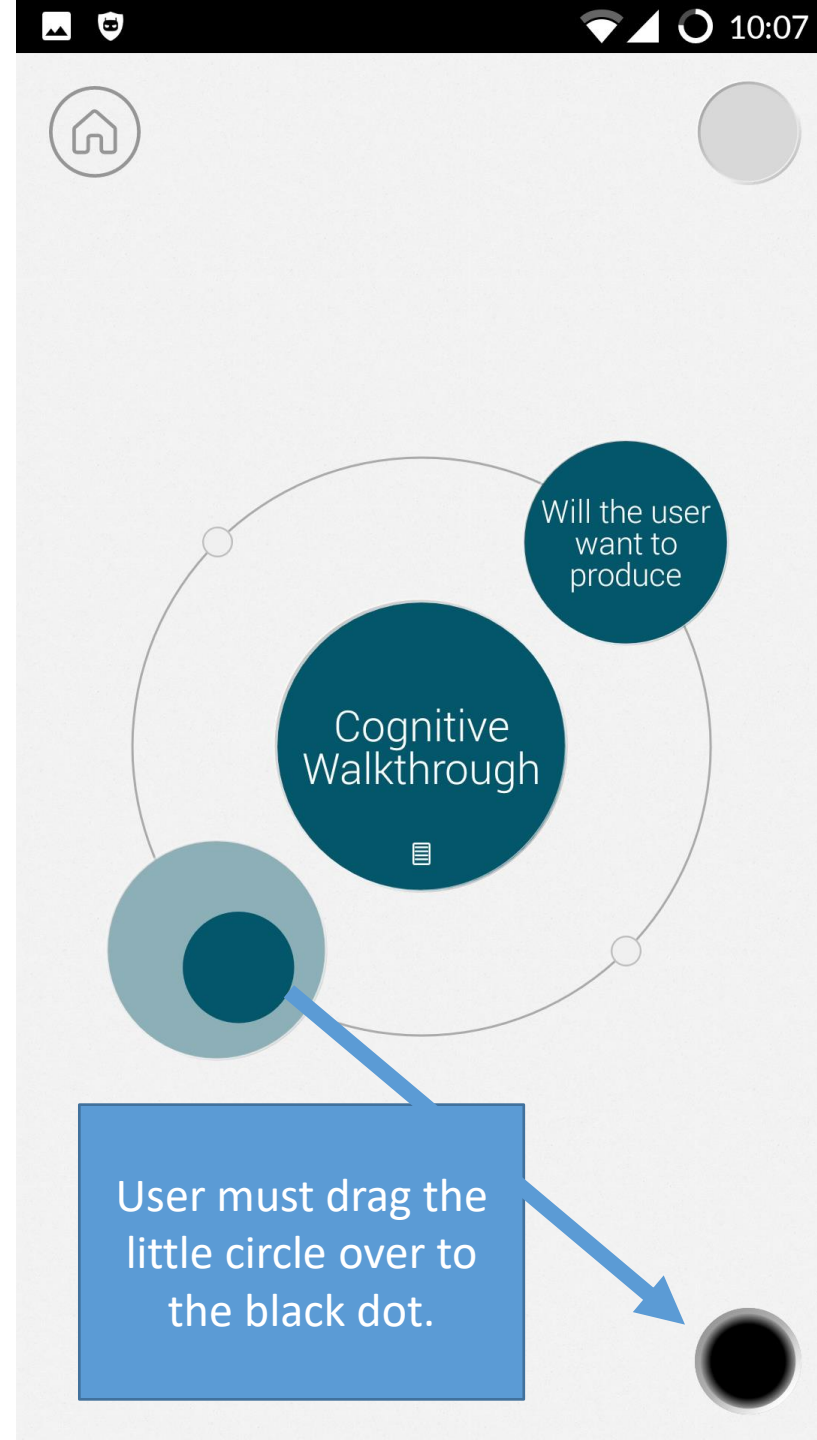
User must press and hold the circle they wish to delete.



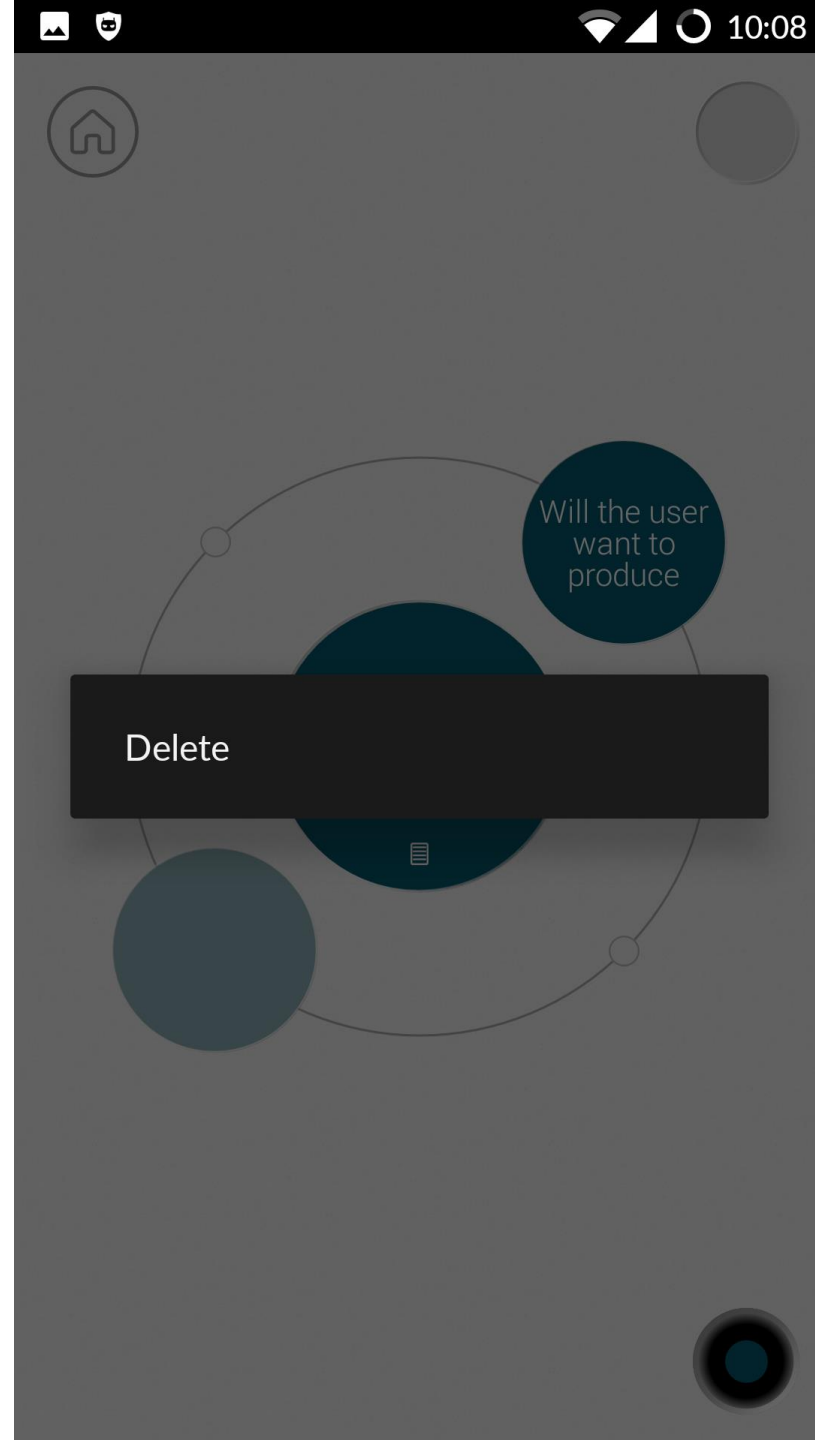
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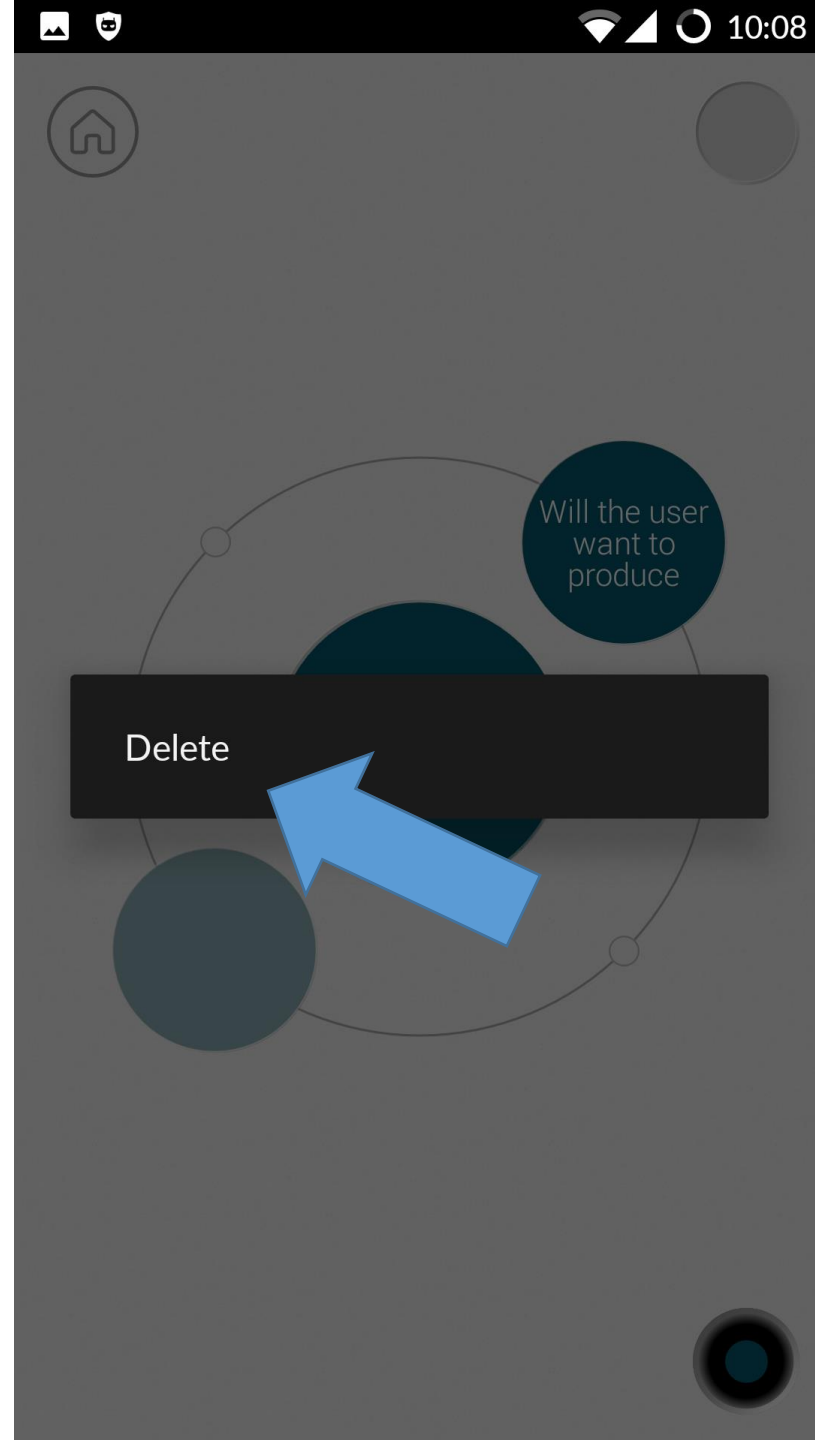
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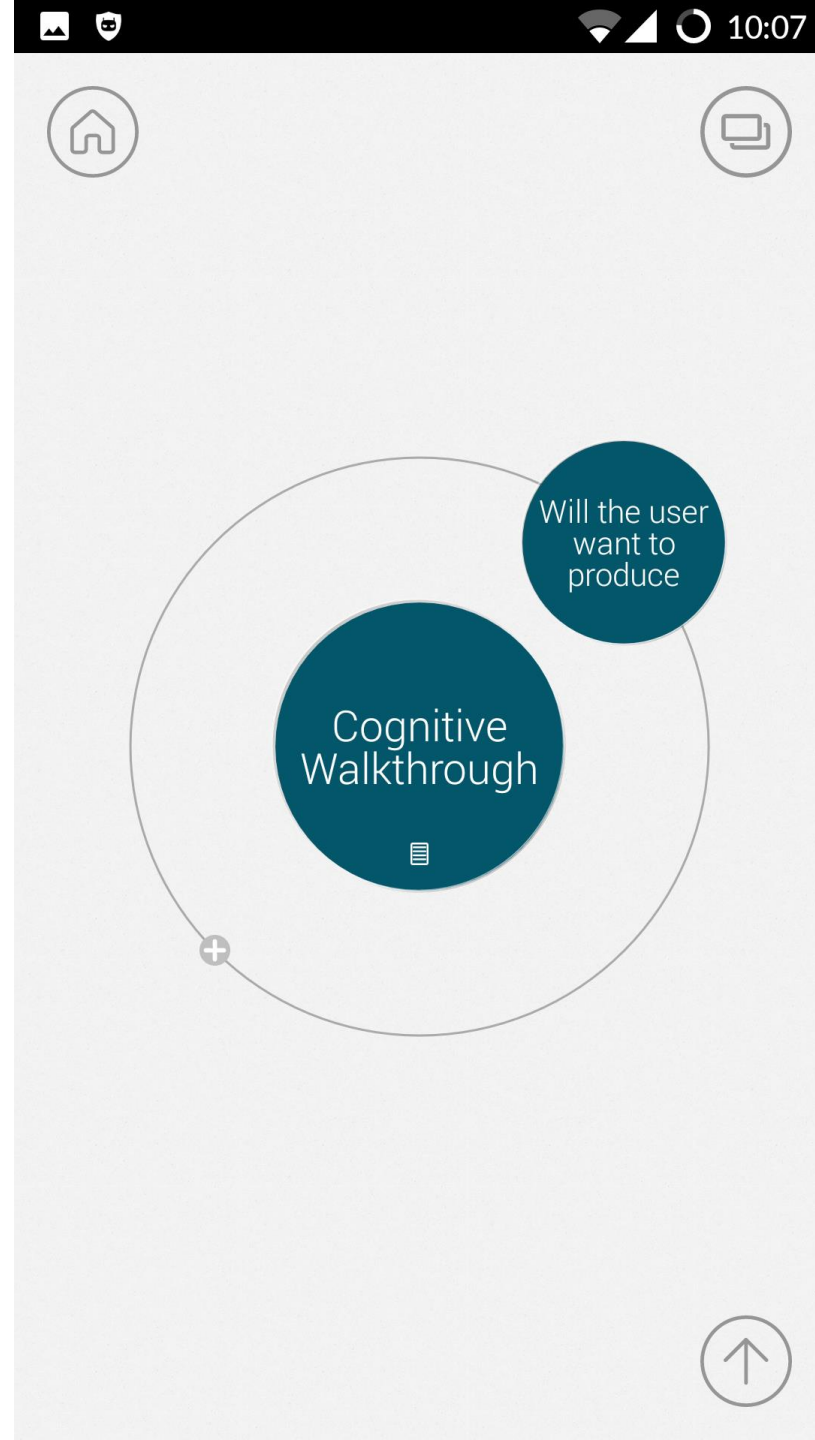
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Cognitive Walkthrough outcome

	Q1: produce effect	Q2: see control	Q3: recognize effect	Q4: understand feedback
Push and hold	No. User wants to delete, not select. There are + symbols elsewhere to add a node, user may attempt to find a - symbol to directly delete rather than trying to select the node.	No. The control is invisible so there is no way to see it. User may also try tapping rather than a long hold, which will also prevent them from seeing it.	Yes.	Yes.
Drag circle	Yes.	Yes.	No. The black hole in the corner is not obviously a way to delete nodes. Users may see it, but they are likely to not recognize it as a way to delete.	Yes.
Tap “delete” button	Yes.	Yes.	Yes.	Yes.

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