

Heuristics to help you design, build and choose test tools



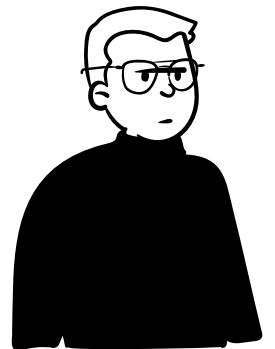
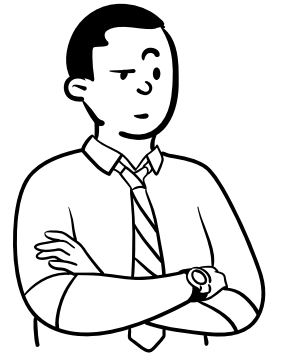
<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/README.md>

Isabel Evans (University of Malta)

October 2024

Let me tell you a story...

- A story about Anna
 - She built a tool to use herself, and suddenly found she was supporting the tool for other people to use...
- A story about Bill
 - He was using a vendor tool, and they offered an upgrade which would help solve that knotty problem he had with certain types of bugs...
- A story about Cam
 - They were designing a new feature for their test tool, and knew exactly how users would apply it...



(Anna, Bill and Cam are personas built from interviews, survey responses, workshop output...)

A story about Isabel...

- A practitioner and consultant who ...
 - Has lots of experience
 - And wanted to solve a problem...
- Started into academic research about testers and their tools
- And found errors in all her hypotheses...
- Plus unexpected evidence
- The discipline of academic research is slow and very exacting...
 - and robust



Research Questions

(and papers...)

1. What are testers' experiences with tools?

- 2018-2020: Hypothesis building

“Stuck in Limbo with Magical Solutions”

“Scared, Frustrated and Quietly Proud”

“Test Tools: an illusion of usability?”

2. Who is testing?

- 2020-2023: Accumulating evidence

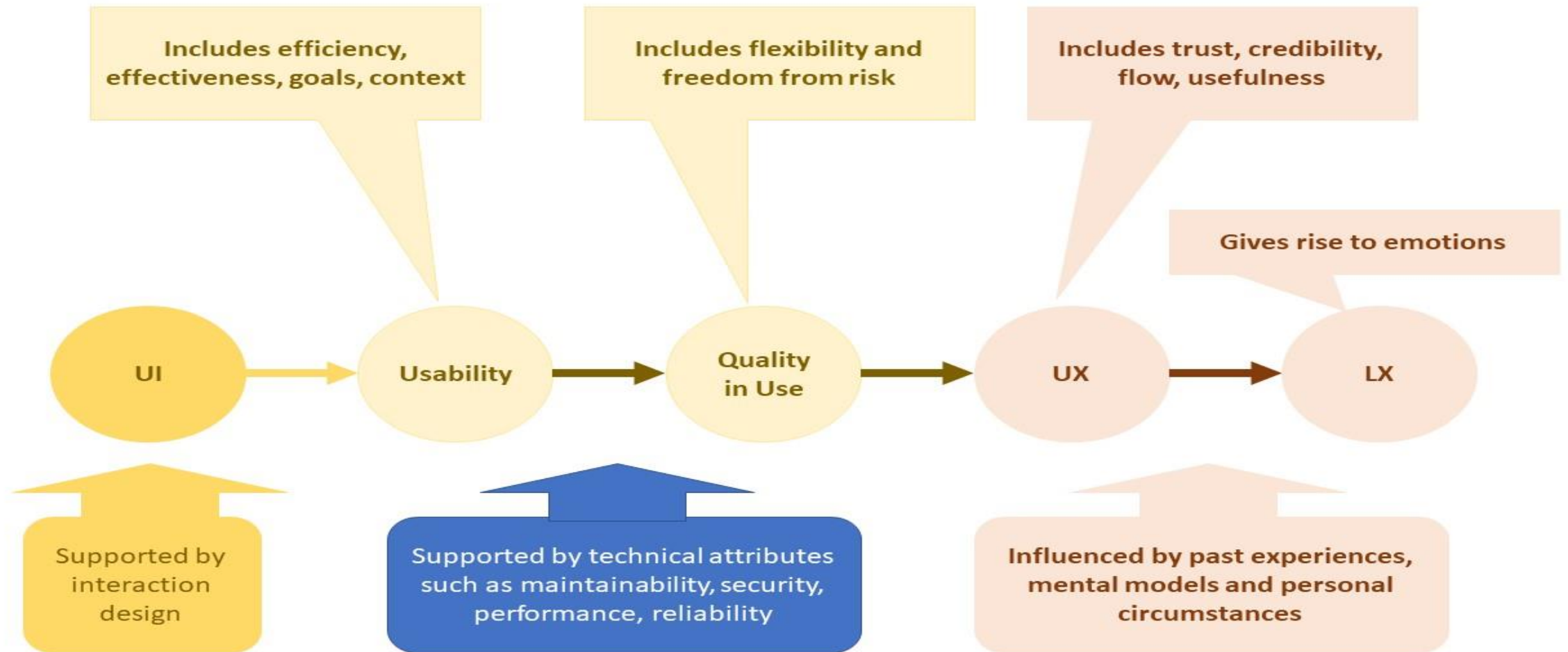
“Breaking testing stereotypes”

3. Would people-focused approaches help?

- 2022-2024: Building and evaluating a set of heuristics

“Communicating Heuristics”

A good UI is not enough to guarantee happiness...



It can just give the *illusion* of usability

- 1) Over-focusing on attractiveness over usefulness;
- 2) Only focusing on one user group results in learnability and flexibility being in opposition;
- 3) Not providing *Quality in Use* so neglecting maintainability, performance, security, etc.; and
- 4) Not supporting change and growth for the personas and their requirements.

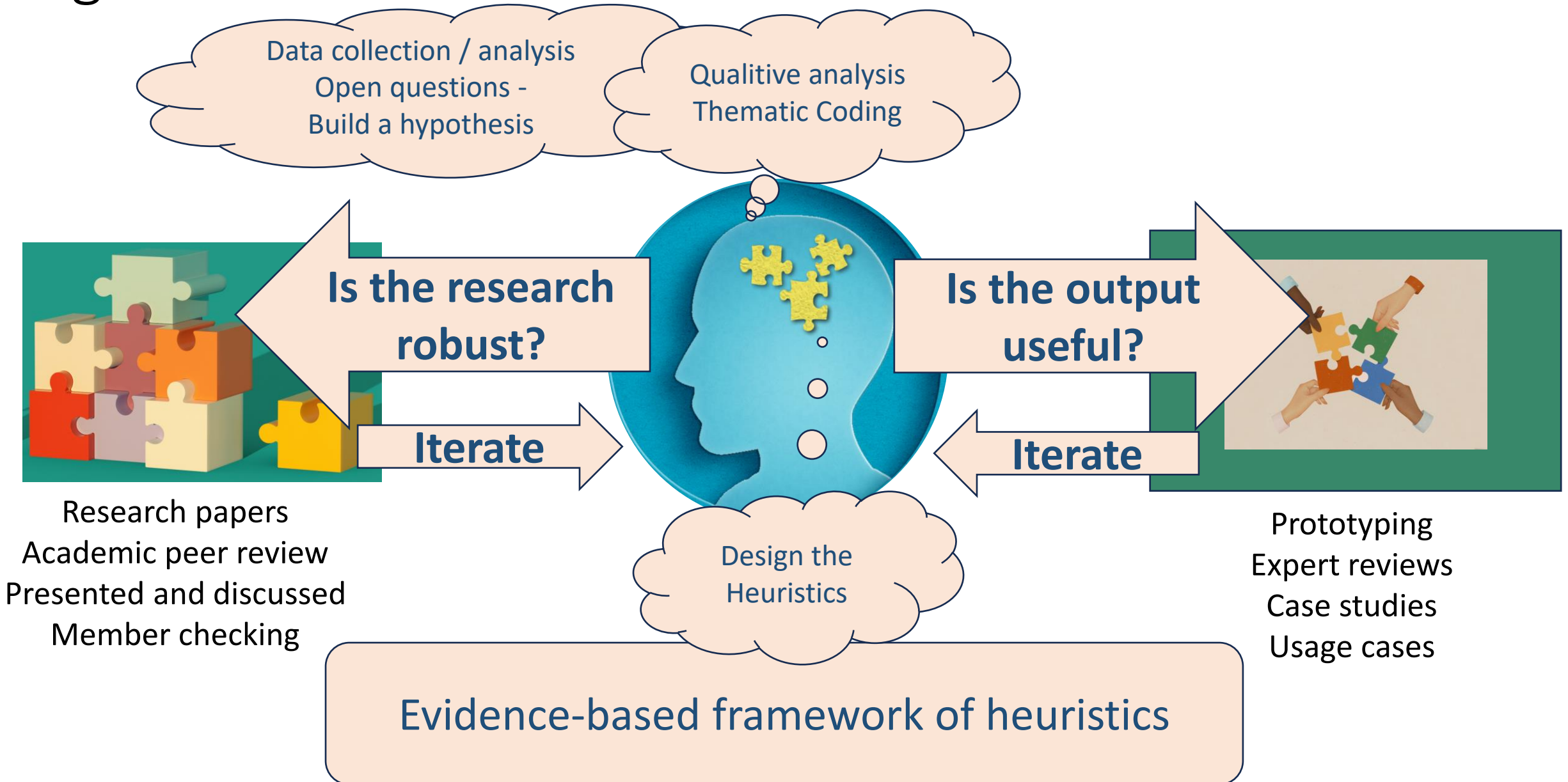


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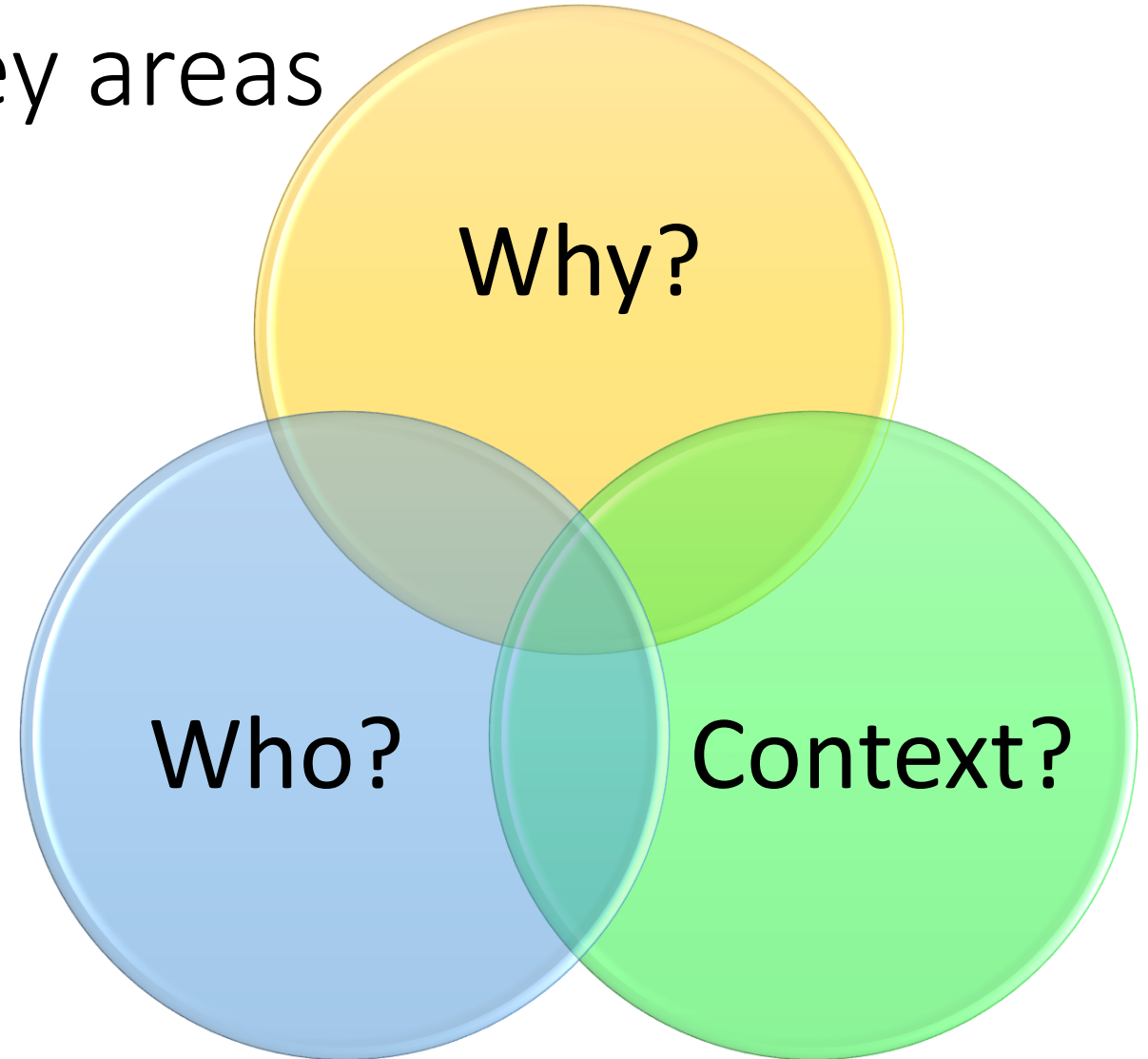
Stages to build the heuristics framework



12 Heuristics: three key areas

Heuristics
communicated
as questions

Questions we
forget to
discuss...



Why?

H01 Why is this tool needed?

Why else?

Money?

Time?

Goals?

Quality?

**Problems
to solve?**

**Is there a
problem?**

**Will a tool
help?**

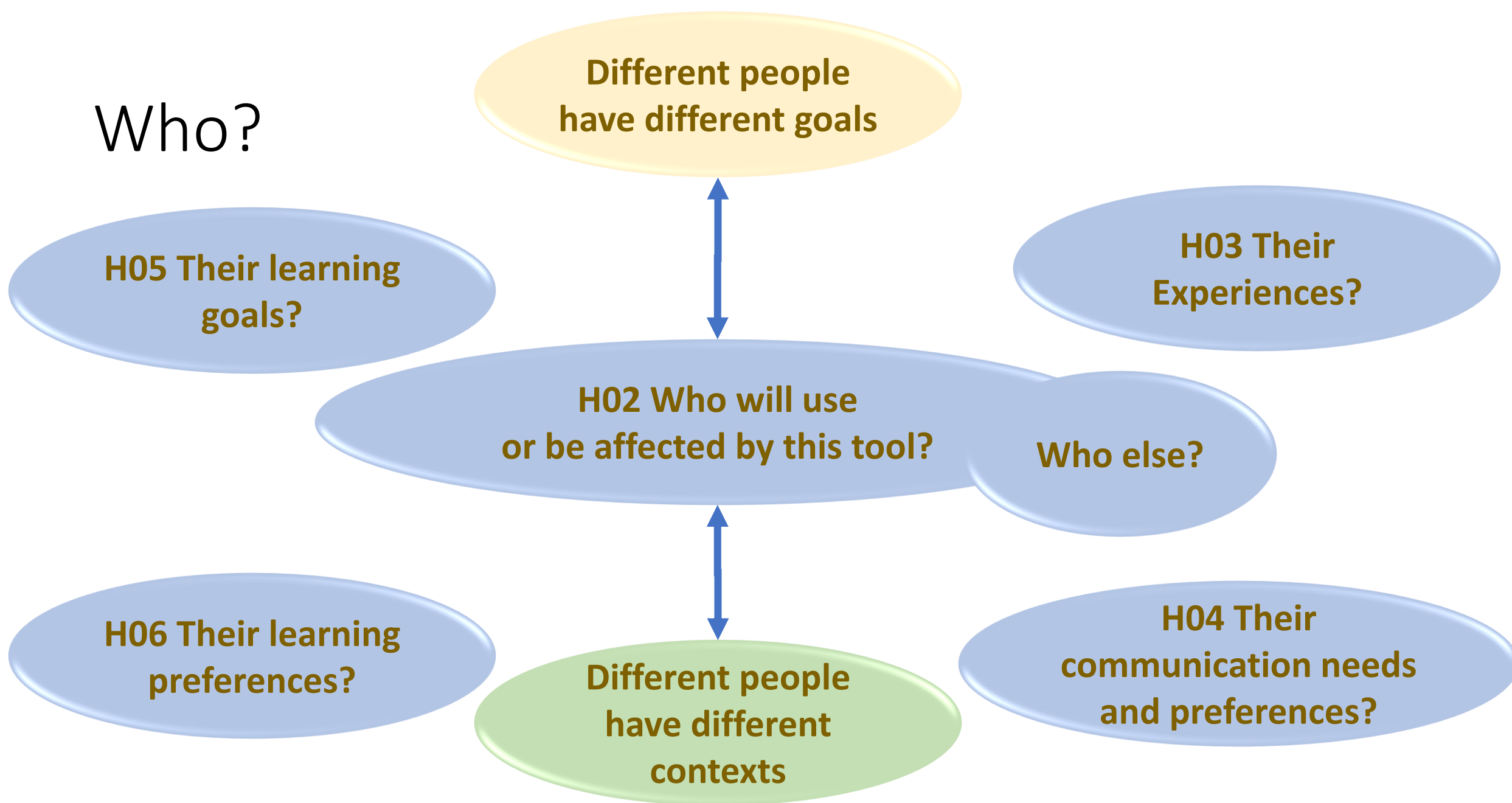
**Different people have
different goals and
different problems**

H01 Why is this tool needed?

- Nearly 30% of challenges with implementing tools were management/organizational in origin
- Conflicting goals: *“There may be several organizations - even within one organization ... Audit versus Dev may have different views ...” (Bill)*
- Activities: ROI/cost benefit; SWOT; Gap analysis...

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H01-Why-do-we-need-this-tool.md>

Who?



H02 Who will use or be affected by this tool?

- A wider range of people may use the tool than you expect...
 - Only 6% of the Testers participating conformed to IT stereotypes – only 6%!
 - People may be affected without directly using the tool
- Conflicting usages: *“I wanted to solve this one problem for myself ... As I shared it with people ... they had exactly the opposite ideas about ... how it should it be used ... Completely different audience” (Anna)*
- Activities: Stakeholder mapping; Personas and Archetypes

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H02-Who-will-use-or-be-affected-by-this-tool.md>

H03 What previous experiences do people bring to the tool?

- People come from a wide range of backgrounds
 - 16.9% of participants had IT-related degrees
 - 9.9% were Arts graduates, nearly half of them had technical roles
 - 41% of the people with IT degrees were in non-technical roles
 - 18% had had training related to automation, tool support yet 59% had technical aspects to their roles
- *“among people I work with ... someone with a biology degree who became a tester, someone who is a saxophonist - an improviser ... ” (Bill)*
- Activities: persona development, especially learner personas

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H03-What-previous-experiences-do-people-bring-to-the-tool.md>

H04 What communication needs and preferences do those people have?

- Media, speed, level of detail, and other factors change:
 - Receiving versus imparting information;
 - Specific accessibility requirements;
 - Not a binary choice! Changes in different situations and over time.
- Conflicting communication needs: *“It’s been... there’s no source of truth – if you want to know how projects are doing you have to look in 4 or 5 places” (Bill)*
- Activities: personas with DISC profiles; MS Inclusive Design Methodology; Accessible Reality Pirates Workshop

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H04-What-communication-needs-or-preferences-do-those-people-have.md>

H05 What learning perspectives and goals do those people bring?

- Management and team members may have conflicting goals about training: fast and task based – or gaining mastery?
- *“pressure to keep going, learn what you need to know right now – prevents you from learning full capability, which could have helped you [strategically to improve long term]” (Bill)*
- Activities: persona development, using the [quality attributes information](#) in the repository

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H05-What-learning-perspectives-and-goals-do-those-people-bring.md>

H06 What learning preferences do those people have?

- Not everyone wants the same medium or style of learning...
- In one case study people choose ensemble for work and solo for learning...
- *“videos and training courses waste my time ... videos are too slow ... skimming text is quicker” (Anna) but...*
- *“video over text - small bites” (Cam)*
- Activities: developing learning personas; user survey, design training options

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H06-What-learning-preferences-do-those-people-have.md>

Context?

**Different people
have different
contexts**

**Different contexts
mean different
goals**



**H07
Where will this tool be used?**

Where else?

H12 How long for?

H08 What Workflows?

**H11 When will it be
used?**

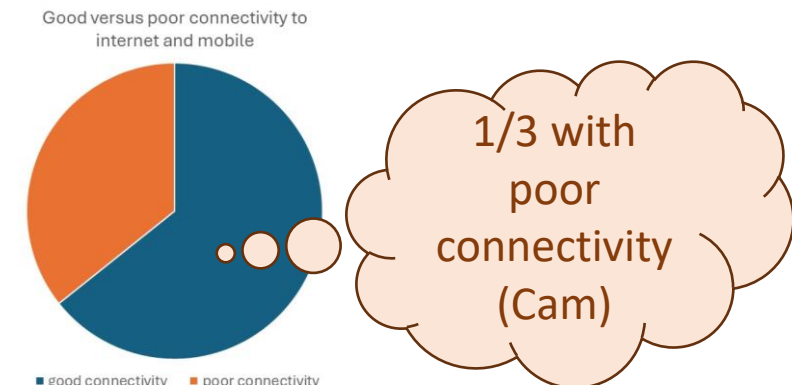
**H10 What
Autonomy and
Work Styles?**

H09 What Risks?

H07: Where will the tool be used?

- People were mandated to use tools that were not available to them because of their location ... We also found that tools might be available, but not be findable... or were used outside offices and in noisy stressful environments...
- *“stuck in limbo...” (Bill)*
- *“in a hospital ... in a warehouse” “... in a field...” (Cam)*
- Activities: think about geography, technical environment and physical environment

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H07-Where-will-the-tool-be-used.md>



H08 What workflows will this tool be part of?

- Testers reported tools not supporting their workflow ... unsuitable workflows ... imposed. Workflows in tools ... sometimes were barriers to progress rather than enablers.
- Not having a choice can be a blocker, but sometimes it is essential (see H09).
- *“most test case management systems impose a workflow that forces testers to waste time creating fake artifacts for exploratory testing; [tool named] is a sinkhole for time & effort” (Bill)*
- Activities: journey mapping; service blueprint

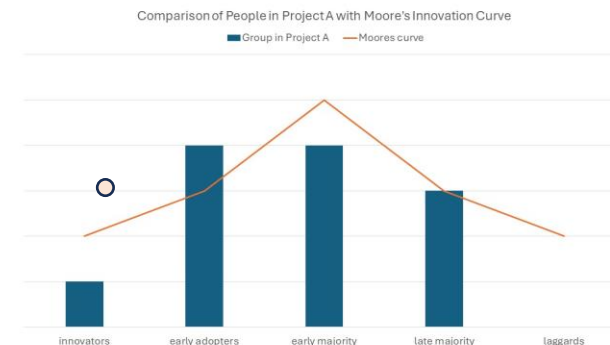
<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H08-What-workflows-will-the-tool-be-part-of.md>

H09 What risks are associated with these workflows?

- Nearly 20% actively involved in risk management...
- Better integration of risk management requested.
- Attitudes to innovation can mirror attitude to risk:
Case study: participants ranked how innovative they wanted their new tool to be... we matched it to Moore's innovation curve (Anna, Bill and Cam)
- Activity: survey/white board voting

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H09-What-risks-are-associated-with-those-workflows.md>

This group is more interested in innovation and not so risk averse as the average



H10 What autonomy of work styles is allowed?

- Not all testers had autonomy to choose their approaches and tools to fit within the wider business workflows.
- Use of visualization increased with expertise.
- Nearly 20% mentioned collaborative approaches ... some testers were frustrated by tools that prevented pair or team working.
- *“The company decided this before my hiring. [The tool] is the single worst software to plague efficient and effective development. It is difficult to use, incredibly buggy, inflexible and bloated.” (Anna)*
- Activities: autonomy and authority levels mapping, and compare with H09 Risk

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H10-What-autonomy-of-work-styles.md>

H11 When will the tool be used?

- Think about
 - timescale of the product under test: urgency and risks may change in different lifecycle stages of the SUT.
 - the person using the tool may need more time to complete a task.
 - the workflow may be done in stages over time with gaps.
 - Test artefacts may need to be maintained and changed at different frequencies
- *“...running the tests is quite easy. The difficult part is maintaining the tests when it grows massive” (Anna)*
- Activities: Revisit journey maps made for H08 to add time factors; Consider PERT charting.

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H11-When-will-the-tool-be-used.md>

H12 How long will the tool be used?

- Think about the lifespan of the tool itself – how long will it be used and maintained, and who maintains it?
- When do you need to see ROI, and how will you measure that?
- *“Switching to new versions and dependency management takes up time that could be better spent on the actual software we develop.” (Anna)*
- *“Return on investment - is the time and money I'm going to invest in automating a task worth it?” (Bill)*
- Activities: prepare a business case, including ROI, tool maintenance plan, design in maintainability.

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H12-How-long-will-the-tool-be-used.md>

Resources

The repository:

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/README.md>

Quick heuristics list:

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/Heuristics-list-for-quick-meeting.pdf>

How to use the heuristics:

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/How-to-use-the-heuristics.md>

More about the research

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/About-the-research-and-researcher.md>

Evidence about quality attributes:

<https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/Qualityattributesv2.md>

Using the heuristics - options

I'm choosing
a tool...



Why?
Who for?
Context?

I'm setting a
tool
strategy...

Where are
the
heuristics?

What is my
route
through the
heuristics?

I'm designing
a tool...



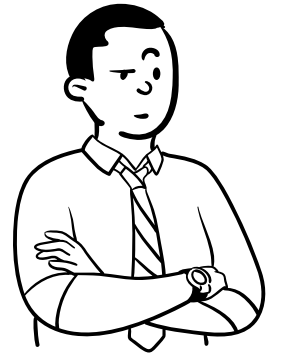
Who for?
Why?
Context?

I'm building
test
automation



Let's catch up with...

- Anna
 - She built a tool to use herself, and when she saw the heuristics she said...
- A story about Bill
 - He used the heuristics to evaluate the vendor tool and found that...
- A story about Cam
 - They used the heuristics to evaluate the prototype for the new feature and realized that...



Next steps

For me...

Complete the Repository of Heuristics

Complete Case Studies, Final Expert Reviews

Write up Thesis, Submit, Viva... and then, I hope.... Graduation...

Infographic? Book? Website? Podcasts?....

What's
next?

Use the Heuristics

For you...

Talk to me...

Send me comments!

[Via my website comment page](#)



Formats: Infographic? Book? Website? Podcasts?....

Expert reviewers?

Mistakes...

So many acknowledgements and thank yous!

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Testersuite

And others...

- 2 long-suffering supervisors...
- 12 hours of expert interviews
- 300+ person-hours of workshops
- 230+ survey participants
- 20+ expert reviews of prototypes
- 5+ mini-usage cases
- 5 industry case studies
- Over 3000 data points collected
- Multiple colleagues and friends...
- More expert reviews to come

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Thank you! Questions?

