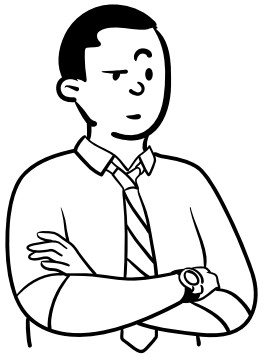
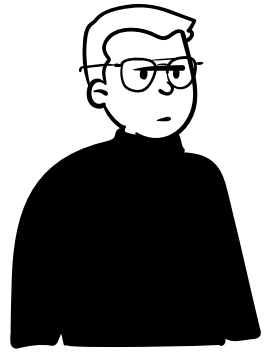
So you think a new tool will help? Here are some things to remember…

Anna



Bill



Cam

Isabel Evans (University of Malta)

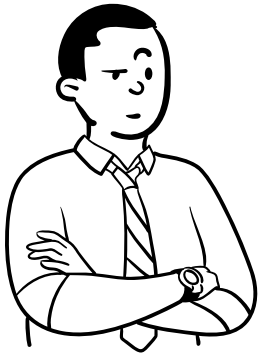
OREDEV November 2024

L-Università ta' Malta | Department of Computer Information Systems
Faculty of Information & Communication Technology

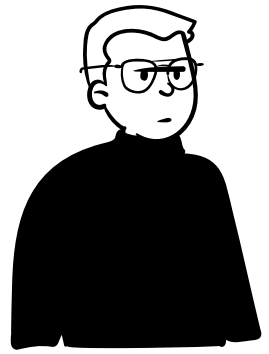
Let me tell you a story…

- 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

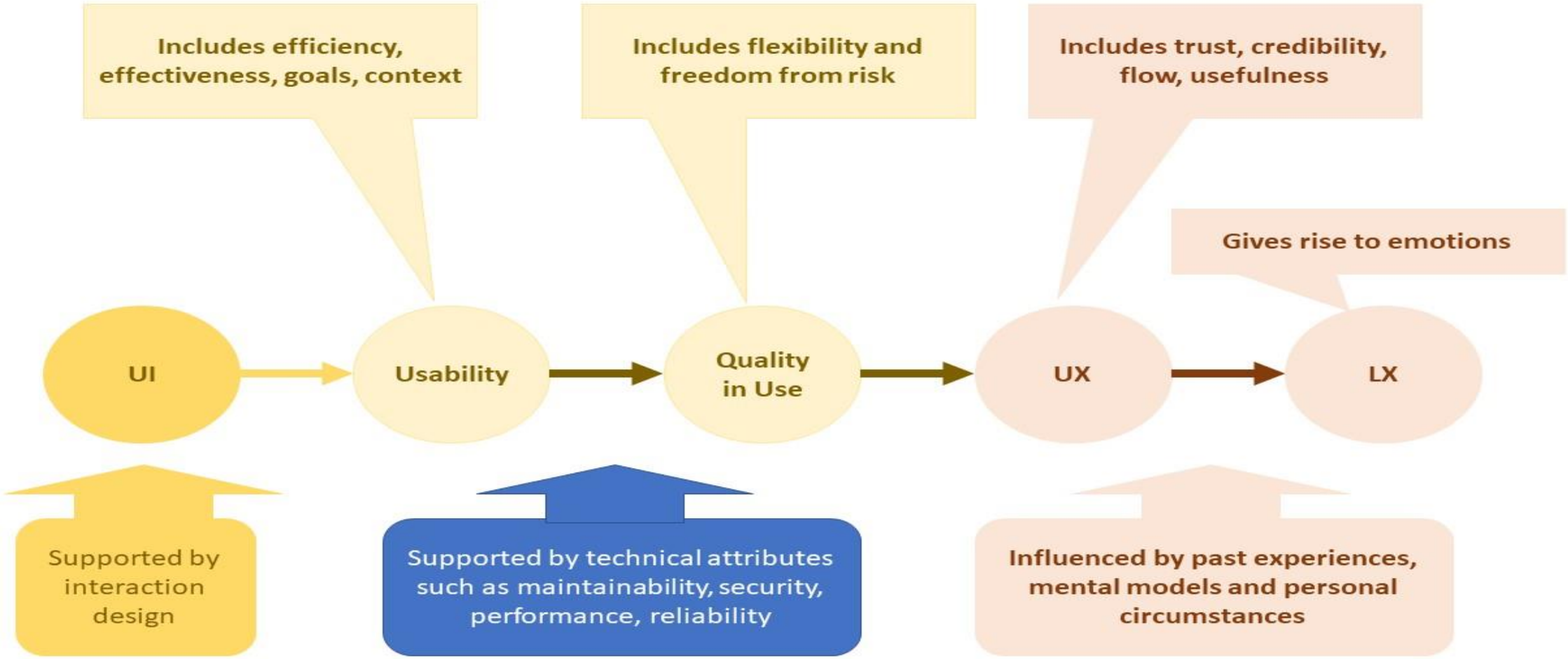
"Breaking testing stereotypes"

3. Would people-focused approaches help?
   - 2022-2024: Building and evaluating a set of heuristics

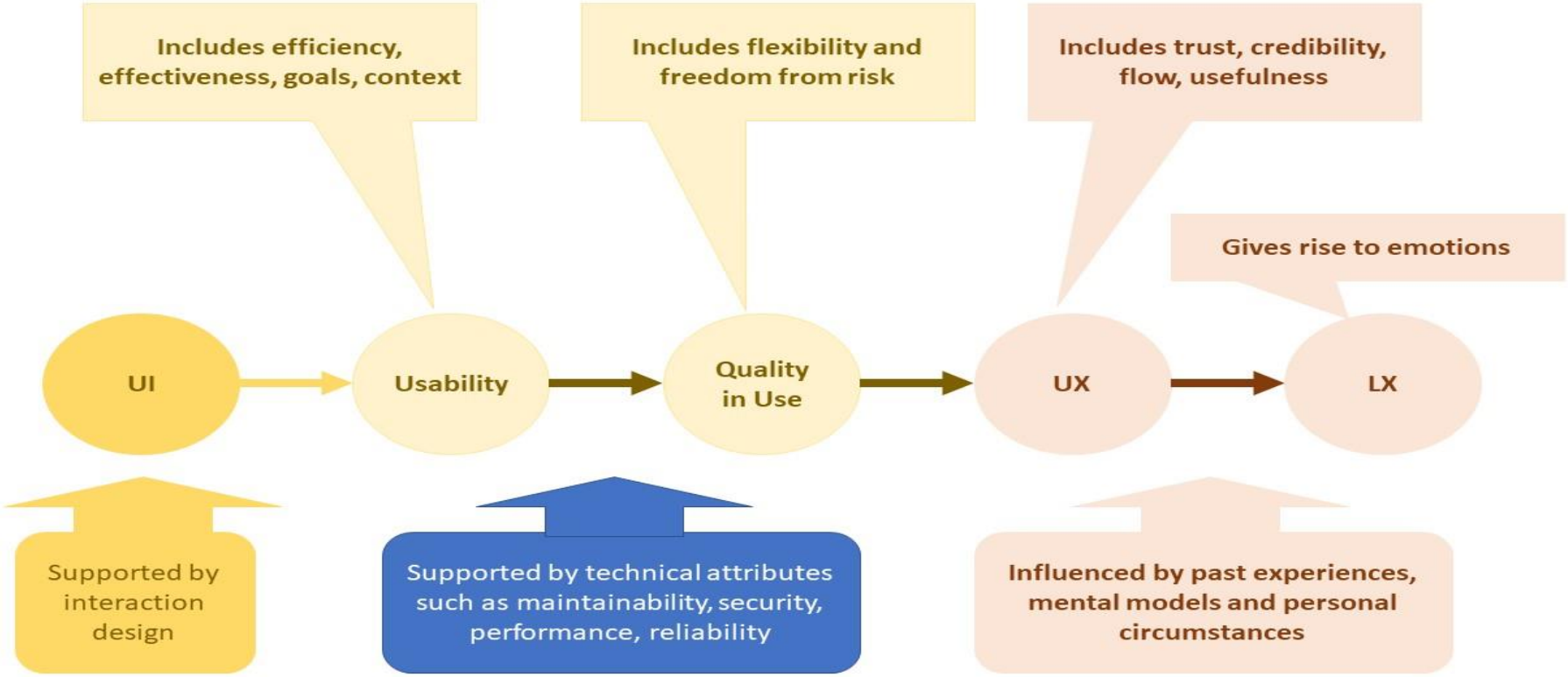
"Communicating Heuristics"

Heuristics Framework in repository…

A good UI is not enough to guarantee happiness…



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.

Stages to build the heuristics framework

Data collection / analysis
Open questions -
Build a hypothesis

Qualitive analysis
Thematic Coding

Is the research robust?

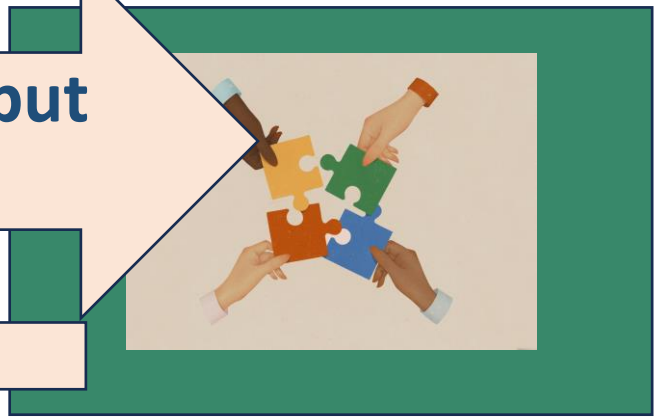
Iterate

Research papers
Academic peer review
Presented and discussed
Member checking

Design the Heuristics

Is the output useful?

Iterate



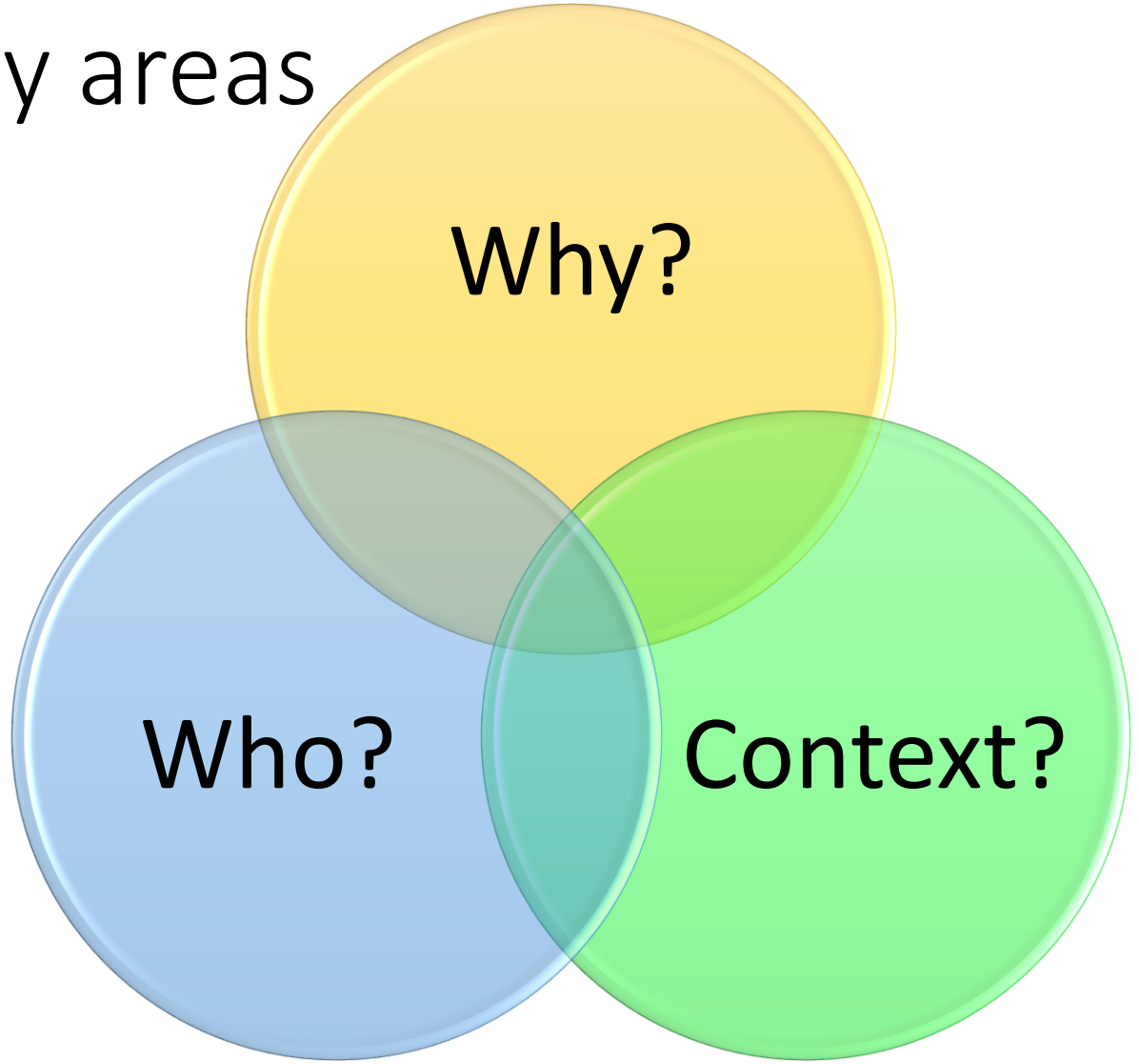
Prototyping
Expert reviews
Case studies
Usage cases

Evidence-based framework of heuristics

12 Heuristics: three key areas

Heuristics communicated as questions

Questions we forget to discuss…



12 Heuristics (at present…)

- H01 Why is this tool needed?
- H02 Who will use or be affected by this tool?
- H03 What previous experiences do they bring to the tool?
- H04 What communication needs and preferences do they have?
- H05 Do they want "tool mastery" or "task completion"?
- H06 What learning preferences do they have?
- H07 Where will this tool be used?
- H08 What workflows is it part of?
- H09 What risks associated with those workflows?
- H10 What autonomy of work style?
- H11 When will it be used?
- H12 How long will it be used for?

H01 Why is this tool needed?

Time?

Quality?

Money?

Problems to solve?

Goals?

Is there a problem?

Why else?

Will a tool help?

H02 Who will use or be affected by this tool?

H03 Their Experiences?

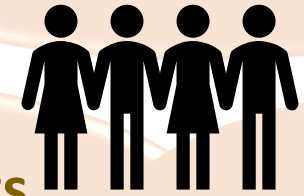
H04 Their communication needs and preferences?

Who else?

H05 Their learning goals?

H06 Their learning preferences?

Different people have different goals



Different contexts mean different goals

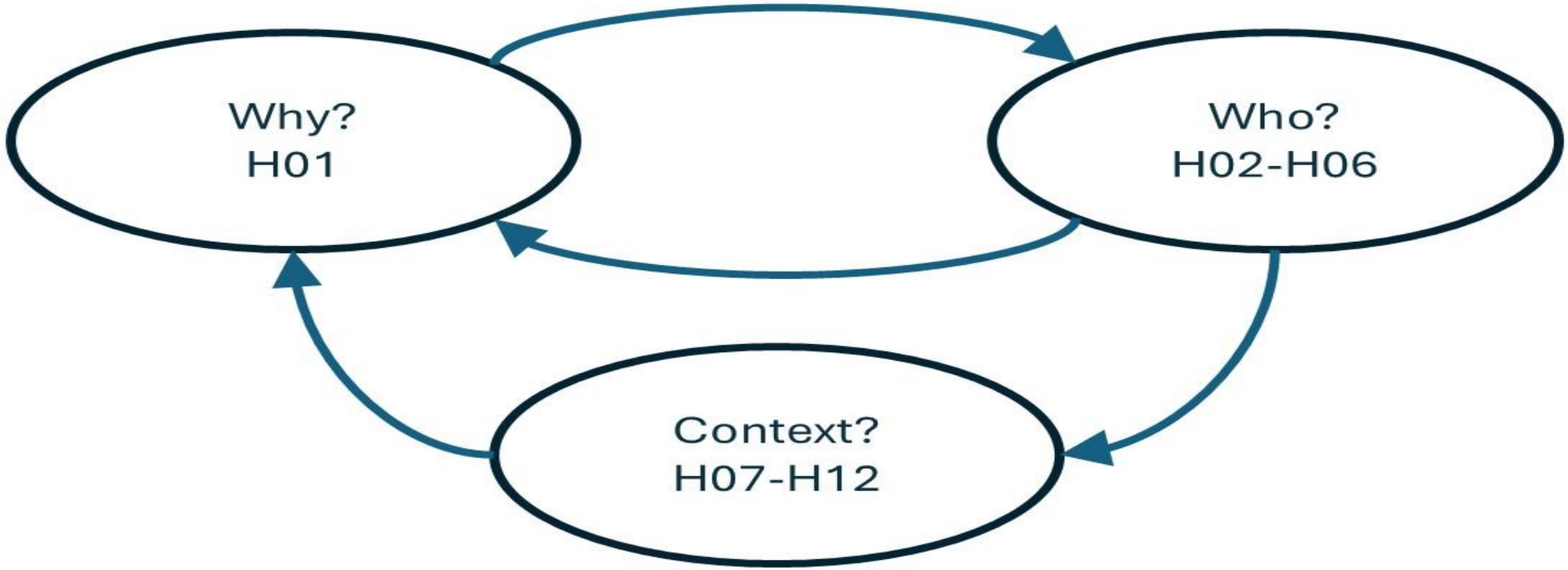
Different people have different contexts

Where else?

Where

Clusters of questions that work together in an iterative network rather than a linear process

How the interconnection worked in one case-study….



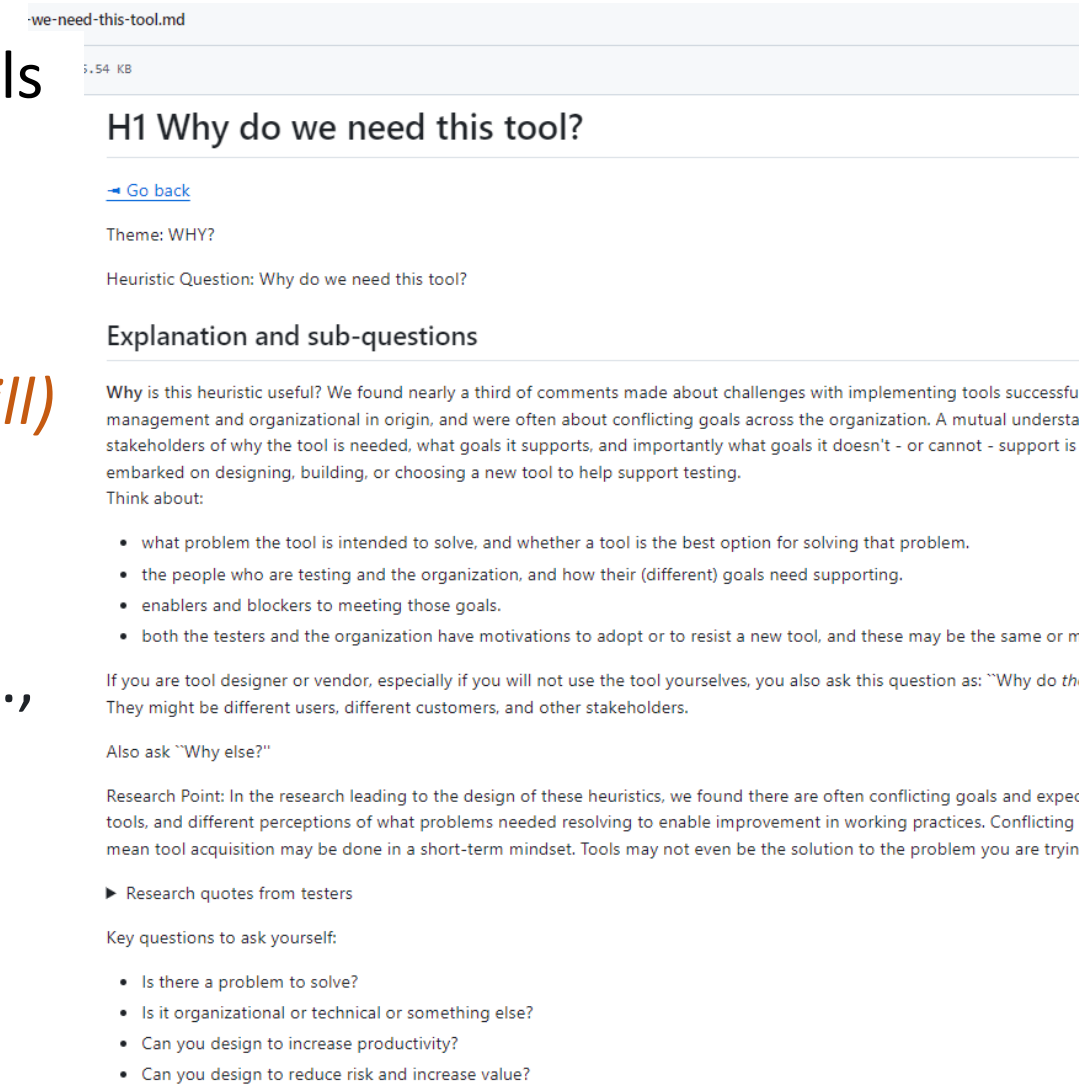
Built from research data, then validated…

- Prototypes and expert reviews
- Case studies
  - Tool vendor designing new features
  - In-house test automation suites
    - Mature
    - Early stages
    - Mid-life changes
  - Tool evaluation
  - In-house automation strategy
  - Tool pre-sales meeting
  - Retrospective on tool customer comments
- Mini-usage studies for example
  - Feature planning for open source usability tool
  - Tool choice for remote project team communication
  - Self-build tool by individual – retrospective
- Expert reviews
  - Throughout prototyping
  - Final expert review to come

H01 Why is this tool needed?

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

- 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)*
- Tool not the answer: *"the problem turned out to be communication blocks across silos…" (Bill)*
- Activities: ROI/cost benefit; SWOT; Gap analysis…, problem analysis…



we-need-this-tool.md

5.54 KB

H1 Why do we need this tool?

⇥ Go back

Theme: WHY?

Heuristic Question: Why do we need this tool?

Explanation and sub-questions

Why is this heuristic useful? We found nearly a third of comments made about challenges with implementing tools successfu management and organizational in origin, and were often about conflicting goals across the organization. A mutual understa stakeholders of why the tool is needed, what goals it supports, and importantly what goals it doesn't - or cannot - support is embarked on designing, building, or choosing a new tool to help support testing.
Think about:

- what problem the tool is intended to solve, and whether a tool is the best option for solving that problem.
- the people who are testing and the organization, and how their (different) goals need supporting.
- enablers and blockers to meeting those goals.
- both the testers and the organization have motivations to adopt or to resist a new tool, and these may be the same or m

If you are tool designer or vendor, especially if you will not use the tool yourselves, you also ask this question as: ``Why do *th* They might be different users, different customers, and other stakeholders.

Also ask ``Why else?''

Research Point: In the research leading to the design of these heuristics, we found there are often conflicting goals and expec tools, and different perceptions of what problems needed resolving to enable improvement in working practices. Conflicting mean tool acquisition may be done in a short-term mindset. Tools may not even be the solution to the problem you are tryin

▶ Research quotes from testers

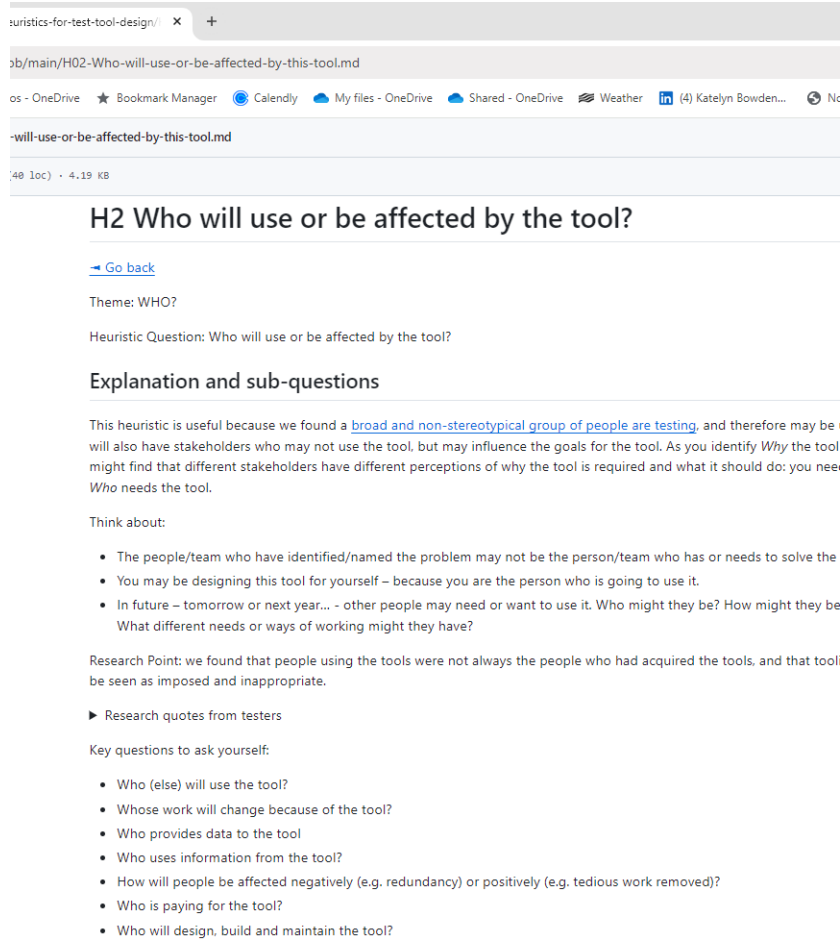
Key questions to ask yourself:

- Is there a problem to solve?
- Is it organizational or technical or something else?
- Can you design to increase productivity?
- Can you design to reduce risk and increase value?

H02 Who will use or be affected by this tool?

- A wider range of people may use the tool than you expect…
  - Only 30% of IT workers conform to stereotypes about IT workers… (McChesney et al)
  - Only 6% of the participants in my survey 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



H2 Who will use or be affected by the tool?

← Go back

Theme: WHO?

Heuristic Question: Who will use or be affected by the tool?

Explanation and sub-questions

This heuristic is useful because we found a broad and non-stereotypical group of people are testing, and therefore may be will also have stakeholders who may not use the tool, but may influence the goals for the tool. As you identify *Why* the tool might find that different stakeholders have different perceptions of why the tool is required and what it should do: you nee *Who* needs the tool.

Think about:

- The people/team who have identified/named the problem may not be the person/team who has or needs to solve the
- You may be designing this tool for yourself – because you are the person who is going to use it.
- In future – tomorrow or next year... - other people may need or want to use it. Who might they be? How might they be What different needs or ways of working might they have?

Research Point: we found that people using the tools were not always the people who had acquired the tools, and that tool be seen as imposed and inappropriate.

▶ Research quotes from testers

Key questions to ask yourself:

- Who (else) will use the tool?
- Whose work will change because of the tool?
- Who provides data to the tool
- Who uses information from the tool?
- How will people be affected negatively (e.g. redundancy) or positively (e.g. tedious work removed)?
- Who is paying for the tool?
- Who will design, build and maintain the tool?

H03 What previous experiences do people bring to the tool?

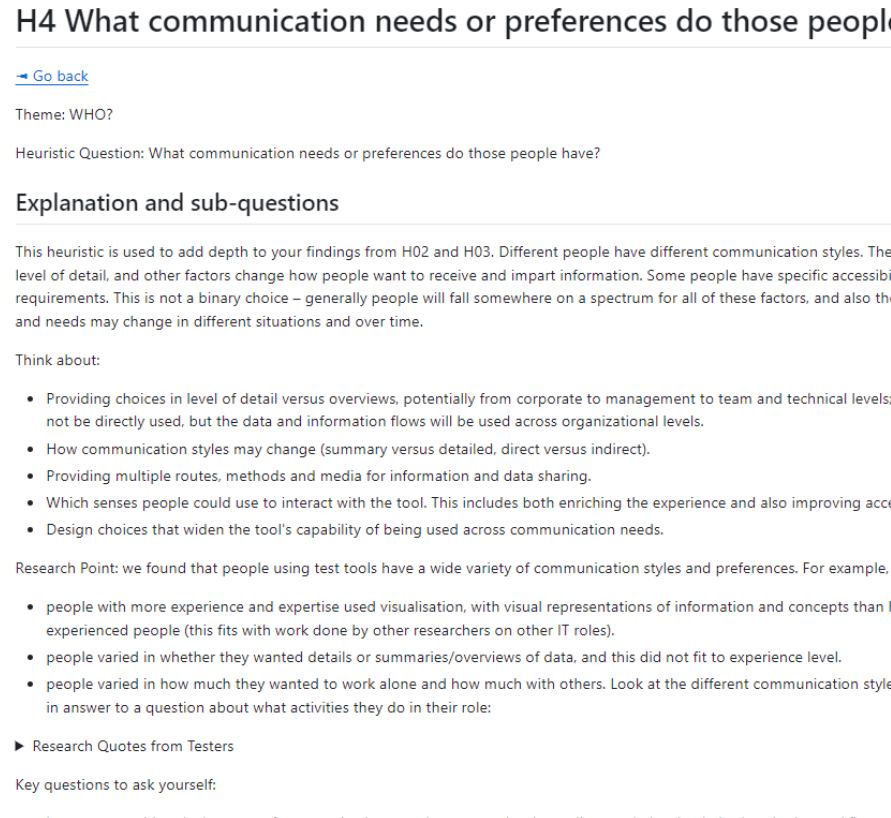
https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H03-What-previous-experiences-do-people-bring-to-the-tool.md

- 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
- Many backgrounds*: ``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

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)*
- Accessibility: "*copy the data to a spreadsheet to do my work*" *(Anna)*
- 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



H4 What communication needs or preferences do those peopl

→ Go back

Theme: WHO?

Heuristic Question: What communication needs or preferences do those people have?

Explanation and sub-questions

This heuristic is used to add depth to your findings from H02 and H03. Different people have different communication styles. The level of detail, and other factors change how people want to receive and impart information. Some people have specific accessibi requirements. This is not a binary choice – generally people will fall somewhere on a spectrum for all of these factors, and also th and needs may change in different situations and over time.

Think about:

- Providing choices in level of detail versus overviews, potentially from corporate to management to team and technical levels; not be directly used, but the data and information flows will be used across organizational levels.
- How communication styles may change (summary versus detailed, direct versus indirect).
- Providing multiple routes, methods and media for information and data sharing.
- Which senses people could use to interact with the tool. This includes both enriching the experience and also improving acc
- Design choices that widen the tool's capability of being used across communication needs.

Research Point: we found that people using test tools have a wide variety of communication styles and preferences. For example,

- people with more experience and expertise used visualisation, with visual representations of information and concepts than l experienced people (this fits with work done by other researchers on other IT roles).
- people varied in whether they wanted details or summaries/overviews of data, and this did not fit to experience level.
- people varied in how much they wanted to work alone and how much with others. Look at the different communication style in answer to a question about what activities they do in their role:

▶ Research Quotes from Testers

Key questions to ask yourself:

H05 Do these people ~~this person~~ want "tool mastery" or "task completion"? ~~What learning perspectives and goals do those people bring?~~

- Management and team members may h
  conflicting goals about training: fast and ta
  based – or gaining mastery?
- Conflicting goals: *"pressure t
  learn what you need to know
  prevents you from learning fu
  which could have helped you
  to improve long term]" (Bill)*
- Activities: persona development, using the quality attributes information in the repository

https://github.com/hci-lab-
for-test-tool-
ain/H05-
ing-goal-
sk-based.md

EDITS IN PROGRESS – this really is iterating through the reviews and case studies!!

H06 What learning preferences do those people have?

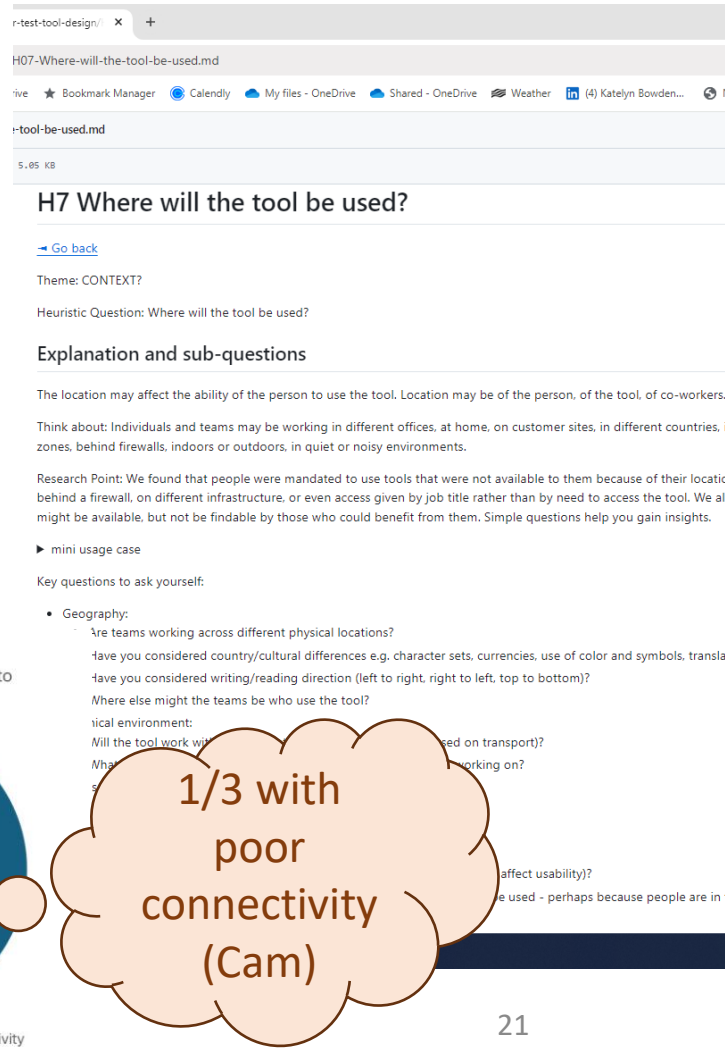
- Not everyone wants the same medium or style of learning…
- In one case study people choose ensemble for work and solo for learning…
- Conflicting needs: *“videos and training courses waste my time ... videos are too slow ... skimming text is quicker” (Anna)* but…
- *“video over text - small bites” (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

H07: Where will the tool be used?

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

- 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…
- Blockers: *"stuck in limbo…" (Bill)*
- *"in a hospital … in a warehouse" "… in a field…" (Cam)*
- Activities: think about geography, technical environment and physical environment



H08 What workflows will this tool be part of?

- People 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).
- Tools making it worse: ``*… impose a workflow that forces [us] to waste time creating fake artifacts for exploratory testing;[tool named] is a sinkhole for time & effort'' (Bill)*
- Activities: journey mapping; service blueprint

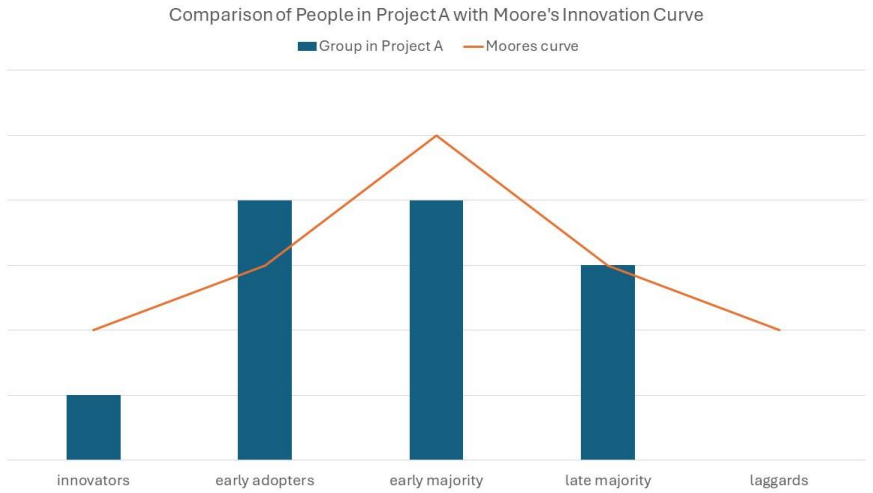
https://github.com/hci-lab-um/heuristics-for-test-tool-design/blob/main/H08-What-workflows-will-the-tool-be-part-of.md

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

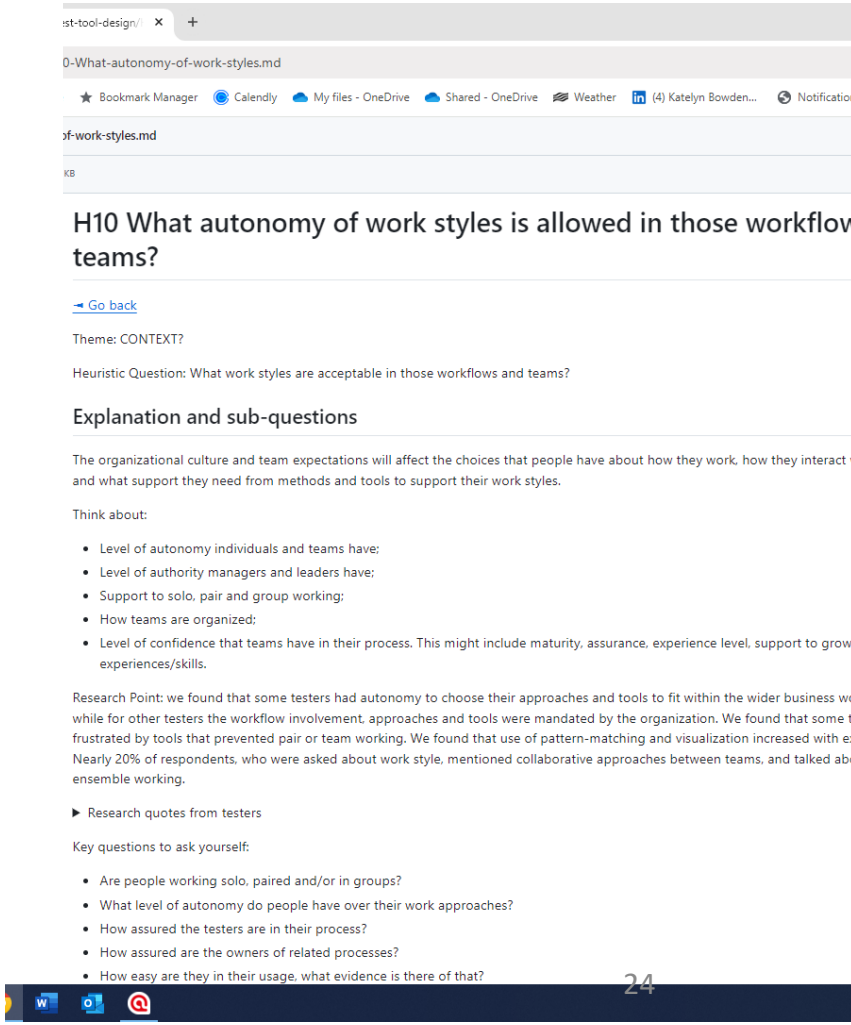
This group is more interested in innovation and not so risk averse as the average



H10 What autonomy of work styles is allowed?

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

- Not everyone 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 participants were frustrated by tools that prevented pair or team working.
- Lack of autonomy:*“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



H11 When will the tool be used?

- Think about
  - timescale of the product being delivered: 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.
  - Artefacts may need to be maintained and changed at different frequencies
- Change over time: *"...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?
- *"OMG … when will we decommission?"* (Bill)
- ROI and longevity: *"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?" (Cam)*
- 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

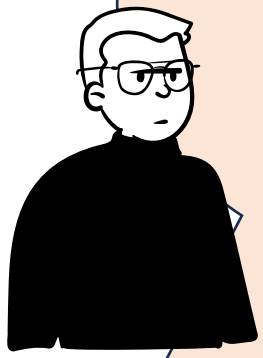
Using the heuristics - options

I'm choosing a tool…

Why?
Who for?
Context?

Where are the heuristics?

I'm designing a tool…



Who for?
Why?
Context?

I'm setting a tool strategy…

What is my route through the heuristics?

I'm building test automation

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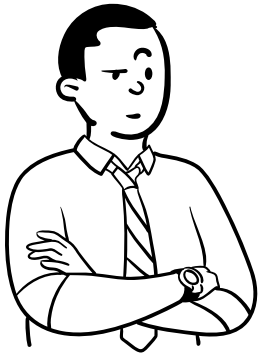
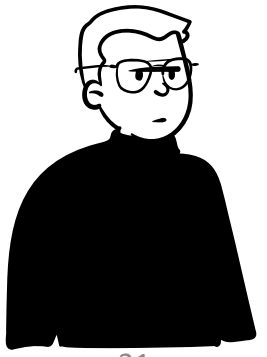
Let’s catch up with…

- 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?

For you…

- ***Use the Heuristics***
- ***Talk to me…***
- ***Send me comments!***
  https://isabelevansuk.wordpress.com/contact/
- ***Formats: Infographic? Book? Website? Podcasts?….***
- ***Expert reviewers?***
- ***Mistakes…***

So many acknowledgements and thank yous!

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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
- 6 industry case studies
- Over 3000 data points collected
- Multiple colleagues and friends…
- More expert reviews to come

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