Gender Inclusive Design

Learning Outcomes

- Describe gender issues in ICT/STEM and inclusive design
- Express the basic components of the GenderMag method
- Apply the GenderMag method
- Be able to formulate a plan to evaluate a software product to investigate gender issues
- Critically appraise work on gender and inclusive design

Gender stereotypes

Like the rest of society, misunderstandings and stereotyping have made their way into tech. Like:

- Women are emotional, men are more logical.
- Men are better at maths, women are better at languages.
- Men make great computer scientists, women make great nurses.
- Women like pink, men like blue.
- Gender roles perpetuated in novel technology such as voice assistants.

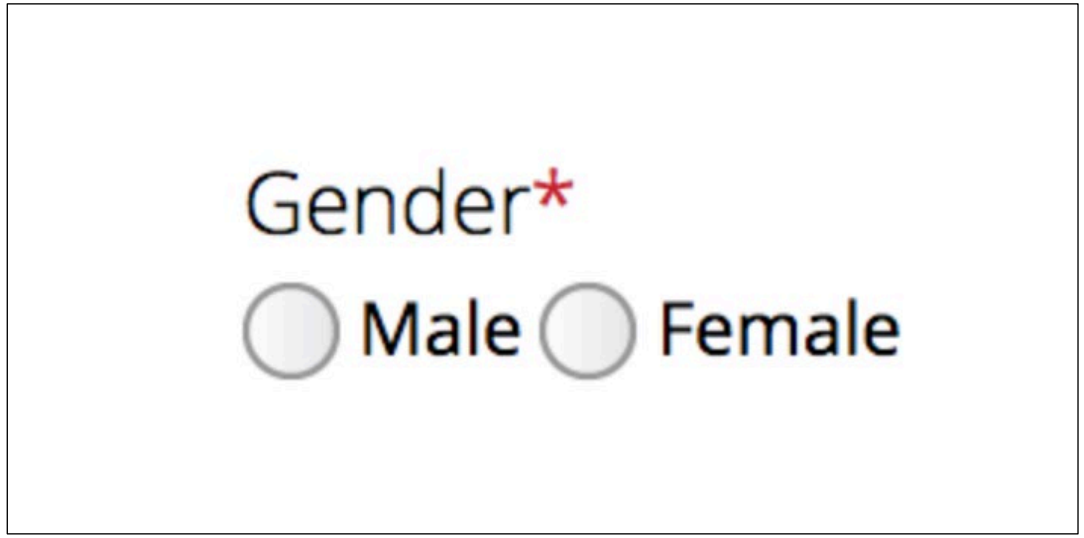
“Pink it and shrink it”

Where gender is acknowledged, the tendency is to apply a “pink it and shrink it” approach to design.

- Aesthetics become genderised.

Binary gender choices

- Gender is often perceived as binary.
- Choose between two options: Male or Female.
- Features associated with these binary choices can constrain use.



Are there gender differences underlying these stereotypes?

"Essentialist" response:

Yes, there are innate differences between men and women with respect to how they think, behave, etc. That's the way things are so we need gendered designs.

"Cultural" response:

No, men and women are very similar and any differences are due to society's ways of shaping and controlling behaviour. We need a feminist agenda and gender-neutral designs.

"Pragmatic" response:

Yes, but we are not sure if they are due to nature or nuture. However, we need systems that are gender-inclusive, i.e. support a variety of users.

Gender and cognitive and behavioural impacts

- Research shows that there are differences between genders and their technology use https://www.nowpublishers.com/article/Details/HCI-056
  - Not accounting for them in design can lead users to pay a ”cognitive tax”.
- Differences include:
  - Perception of vision and sound.
  - Language and communication.
  - Information processing styles.
  - Attitudes to risk.
  - Self-confidence and the belief in ability to succeed doing tasks (self-efficacy).
  - Reasons for using technology.
- However, there’s no evidence of any differences based on intelligence, drive to succeed or mathematical ability.

The development of gender differences

- Infancy
  - Hardly any, other than female infants quicker at motor development (but males catch up quickly)
  - No differences in temperament, activity level and social skills
  - *However*, how other people respond to gender is different
- Childhood
  - Gender identity and associated behaviour become entrenched early
- Adulthood
  - Differences “enculturated”
  - But careful: gender is dimensional, not categorical [Carothers and Reis 2012] https://www.sas.rochester.edu/psy/people/faculty/reis_harry/assets/pdf/CarothersReis_2012.pdf

Why gender-inclusion matters - Market potential [Stumpf et al. 2020]

- There's a roughly equal split between men and women in the worldwide population.
- Research showed that for some applications, women make up more than 50% of the market.
- By failing to heed gender-inclusion issues:
  - You may have created a weaker user experience for half – or more than half – of your target market.
  - You've wasted some of your team's efforts.

	Women	Men
Monthly usage of apps	30 hours 58 minutes	29 hours 32 minutes
Monthly usage of mobile web	3 hours 46 minutes	3 hours 45 minutes
App purchases	+17% more	
App installations	+40% more	
App spending value	+87% more	
Productivity apps	+89% more	
News apps	+90% more	
Social media apps	+611% more	
Health and Fitness		+10% more
Travel apps		+19% more
Navigation apps		+40% more
In-app spending value		+42% more
Games		+61% more
Business apps		+85% more

Why gender-inclusion matters - Ethics

- Gender-inclusion is ‘the right thing to do’.
- If we don’t design gender-inclusively we might:
  - Impair one section of society’s ability to achieve their goals – personally or professionally.
  - Cause an imbalance in participation, knowledge and skills throughout society.
  - Contribute negatively to issues of education and career choices, recruitment into STEM fields and disciplines.
  - Reinforce stereotypes.

Inclusion

But remember, it’s not about building different versions of your products.

Just make one version that lets everyone have a great experience!

Designing for gender-inclusively?

"How can ordinary practitioners, with no background in gender research, identify which aspects of *their* software have gender-inclusiveness issues, realize why those issues are issues and thereby know what they should change?" [Burnett et al. 2016]

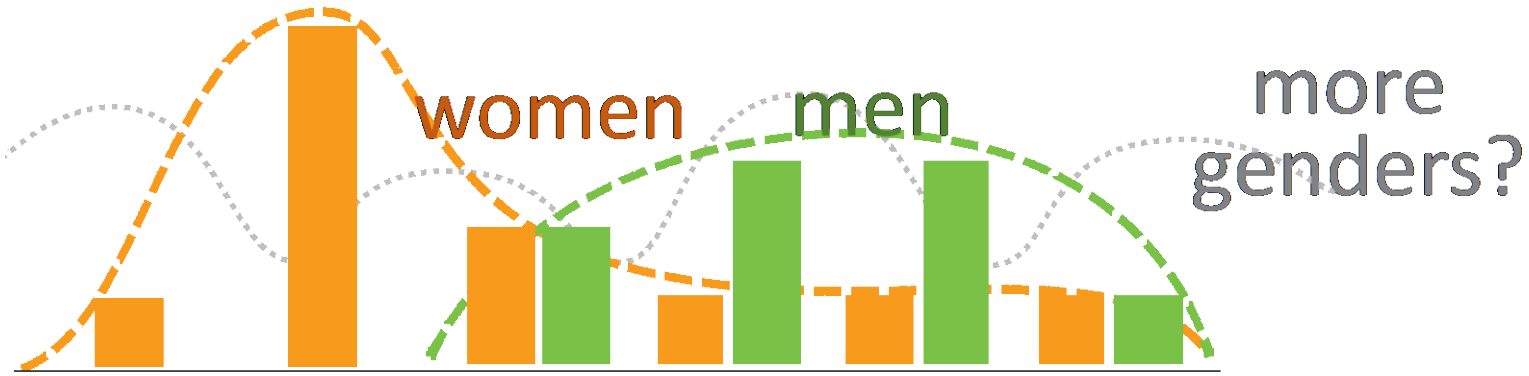
https://academic.oup.com/iwc/article-abstract/28/6/760/2417082?redirectedFrom=fulltext

Introduction to GenderMag

- GenderMag is a well-researched, structured approach for evaluating – and fixing – technology products and services.
- It consists of three parts:
  - A set of cognitive styles for using technology that statistically cluster by gender. These are the **5 facets**.
  - A set of a fictional people who have a particular value for each of the 5 facets, plus some background and other characteristics to bring the facets to life. These are **personas**.
  - A prescribed series of steps a team can take to see how these personas might carry out a function using specific technology to uncover gender-inclusion issues. This is the **evaluation walkthrough**.

Introduction to the 5 facets

- It’s worth noting that these facets are tendencies of behaviour along a spectrum.
- Behaviour will vary according to every individual.
- However, there are clusters of behaviour that tend to show more prevalently according to gender.



1. Information processing style

- To solve problems with technology, people need to look at, and understand, new information.

- Research showed that men tended to select promising leads, then backtrack if needed when using problem-solving technology.

- Women tended to gather information more comprehensively, collecting a fairly complete set of necessary information before proceeding.

2. Learning style for new technology

- In our research, men were much more likely than women to “tinker”. That is, playfully engage with a piece of technology on the way to learning it.

- Women tended to follow a process when it came to learning.

- Note though that when women did tinker, they tended to do so more mindfully than men, and learned more thoroughly.

3. Computer self-efficacy

- This concerns a person’s confidence that they’ll succeed at a specific task using technology.
- It’s important because it concerns how likely a person is to give up on a task, and how they cope when presented with obstacles.
- Research showed that men tended to have higher computer self-efficacy than women.

4. Attitude to risk

- Research has indicated that women tend to be more risk-averse than men.

- This means that women may not engage with certain technology feature sets as they may consider the risk of using them and wasting their valuable time to be too high.

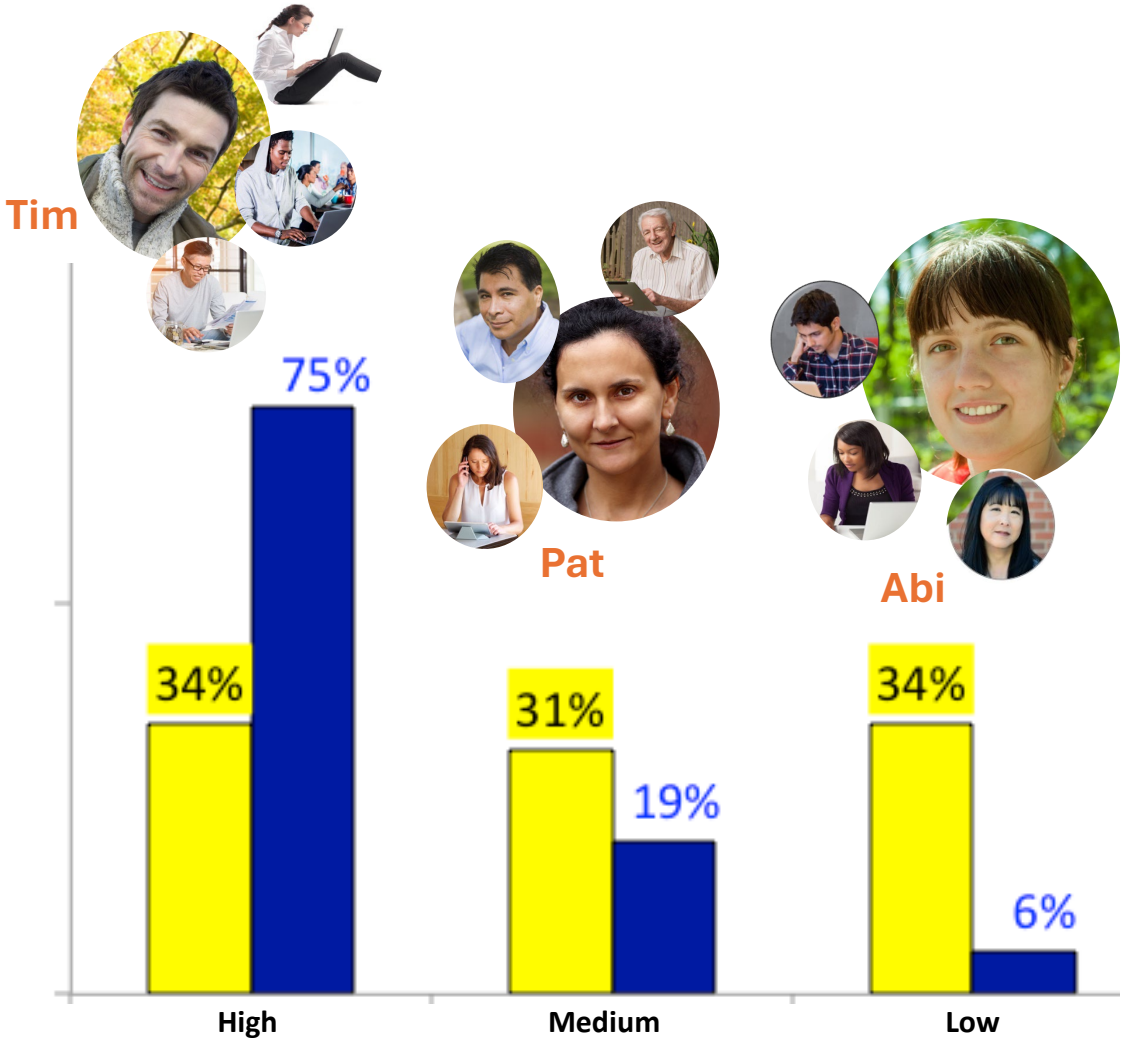
5. Motivations

- Why is the person using this technology
- Research showed that the tendency to use technology for the love of technology is more prevalent among men.
- Women tended to use technology because they had a particular task to carry out.

Introduction to GenderMag personas

- GenderMag uses 3 personas: Abi, Tim and Pat.
- Each has a customisable ‘back story’, so they’re very flexible; they’re designed to work across a wide range of settings.
- Each persona has facet characteristics that correspond to research-backed facet values. These can’t be altered.

http://gendermag.org/



GenderMag personas - Abi

- Her behaviour reflects facet values commonly seen in women during the research, such as high risk-aversion, low self-efficacy, and so on.
- For GenderMag evaluations, you're likely to use this persona a lot.
- Abi contrasts heavily with Tim, who we'll meet next.

Abi (Abigail/Abishek)[1]

- 28 years old
- Employed as an Accountant
- Lives in Cardiff, Wales

Abi has always liked music. When Abi is on their way to work in the mornings, they listen to music that spans a wide variety of styles. But when they arrive at work, Abi turns it off, and begins the day by scanning all their emails first to get an overall picture before answering any of them. (This extra pass takes time but seems worth it.) Some nights Abi exercises or stretches, and sometimes plays computer puzzle games like Sudoku.

Background and skills

Abi works as an accountant. Abi is comfortable with the technologies they use regularly, but they just moved to this employer 1 week ago, and their software systems are new to them.

Abi says they' a "numbers person", but she has never taken any computer programming or IT systems classes. She likes Math and knows how to think with numbers. She writes and edits spreadsheet formulas in her work.

In her free time, she also enjoys working with numbers and logic. She especially likes working out puzzles and puzzle games, either on paper or on the computer.

Motivations and Attitudes

- ***Motivations:*** Abi uses technologies to accomplish her tasks. She learns new technologies if and when she needs to, but prefers to use methods she is already familiar and comfortable with, to keep her focus on the tasks she cares about.
- ***Computer Self-Efficacy:*** Abi has lower self confidence than her peers about doing unfamiliar computing tasks. If problems arise with her technology, she often blames herself for these problems. This affects whether and how she will persevere with a task if technology problems have arisen.
- ***Attitude toward Risk:*** Abi's life is a little complicated and she rarely has spare time. So she is risk averse about using unfamiliar technologies that might need her to spend extra time on them, even if the new features might be relevant. She instead performs tasks using familiar features, because they're more predictable about what she will get from them and how much time they will take.

How Abi Works with Information and Learns:

- ***Information Processing Style:*** Abi tends towards a *comprehensive information processing style* when she needs to more information. So, instead of acting upon the first option that seems promising, she gathers information comprehensively to try to form a complete understanding of the problem before trying to solve it. Thus, her style is "burst-y"; first she reads a lot, then she acts on it in a batch of activity.
- ***Learning: by Process vs. by Tinkering:*** When learning new technology, Abi leans toward process-oriented learning, e.g., tutorials, step-by-step processes, wizards, online how-to videos, etc. She doesn't particularly like learning by tinkering with software (i.e., just trying out new features or commands to see what they do), but when she does tinker, it has positive effects on her understanding of the software.

[1] Abi represents users with motivations/attitudes and information/learning styles similar to hers.
For gender distribution data on users similar to and different from Abi, see http://gendermag.org/

GenderMag personas - Tim

- His behaviour reflects facet values strongly associated with men.
- Significantly, Tim and Abi have exactly the same background and job; they should only be different when it comes to the way they reflect the 5 facets.

Tim (Timara/Timothy)[1]

- 28 years old
- Employed as an Accountant
- Lives in Cardiff, Wales

Tim loves public transportation. He knows several routes to get there from home and he's always exploring ways to optimize his trips into the office. Work starts with email, which he answers one at a time, as soon as he reads them. (Sometimes this backfires, if there is a second related message he hasn't read yet, but he doesn't mind sending a follow-up email.) Some nights he plays computer games with his online friends.

Background and skills

Tim works as an accountant. He just moved to this employer 1 week ago, and their software systems are new to him. For Tim, technology is a source of fun, and he is always on the lookout for new computer software. He likes to make sure he has the latest version of all software with all the new features.

Tim says he's a "numbers person", but he has not taken any computer programming or IT classes. Tim likes Math and knows how to think in terms of numbers. He writes and edits spreadsheet formulas for his work.

He plays the latest video games, has the newest smart phone and a hybrid car. He downloads and installs the latest software, and experiments with its settings. He is comfortable and confident with technology and he enjoys learning about it and using new technologies.

Motivations and Attitudes

- ***Motivations*:** Tim likes learning all the available functionality on all of his devices and computer systems he uses, even when it may not be necessary to help him achieve his tasks. He sometimes finds himself exploring functions of one of his gadgets for so long that he loses sight of what he wanted to do with it to begin with.
- ***Computer Self-Efficacy*:** Tim has high confidence in his abilities with technology, and thinks he's better than the average person at learning about new features. If he can't fix the problem, he blames it on the software vendor; it's not his fault if he can't get it to work.
- ***Attitude toward Risk:*** Tim doesn't mind taking risks using features of technology that haven't been proven to work. When he is presented with challenges because he has tried a new way that doesn't work, it doesn't change his attitudes toward technology.

How Tim Works with Technology and Learns

- ***Information Processing Style:*** Tim leans towards a *selective information processing style* or "depth first" approach. That is, he usually delves into the first promising option, pursues it, and if it doesn't work out he backs out and gathers a bit more information until he sees another option to try. Thus, his style is very incremental.
- ***Learning: by Process vs. by Tinkering*:** Whenever Tim uses new technology, he tries to construct his own understanding of how the software works internally. He likes tinkering and exploring the menu items and functions of the software in order to build that understanding. Sometimes he plays with features too much, losing focus on what he set out to do originally, but this helps him gain better understanding of the software.

[1] For distribution data on users similar to and different from Tim, see http://gendermag.org/ for customizable versions including customizable pronouns.

GenderMag personas - Pat

- They're designed to cover the large fraction of users – men and women – who don't fit Abi's or Tim's behaviour profile. They are somewhere in-between the spectrum.

- Again, they have exactly the same profile background as Abi and Tim, only varying regarding their alignment with the 5 facets.

Pat (Patricia/Patrick)[1]

- **43 years old**
- **Employed as an Accountant**
- **Lives in Cardiff, Wales**

Pat loves public transportation and knows at least three routes to get there from home. When they arrive at work, they scan all emails first to get an overall picture before answering any of them. (This extra pass takes time but seems worth it.) Some evenings Pat plays computer puzzle games like Sudoku before bed.

Background knowledge and skills

Pat works as an accountant in a consulting firm. They prefer to stay with the technologies for which they've has already mastered the peculiarities. Pat just moved to this employer 1 week ago, and their software systems are new to them.

Pat describes themselves as a "numbers person", but is not a professional programmer and has never taken any computer programming or IT systems classes. Pat has a degree in accounting so they know plenty of Math and how to think in terms of numbers.

In their free time, even though they're an accountant and deals with numbers all day at work, Pat likes working with numbers in their free time, too. They especially like Sudoku and other computer games that involve puzzling.

Motivations and Attitudes

- ***Motivations*:** Pat learns new technologies when they need to, but doesn't spend their free time exploring technology or exploring obscure functionality of programs and devices that they use. They tend to use methods they are already familiar and comfortable with to achieve their goals.
- ***Computer Self-Efficacy*:** Pat has medium computer self-efficacy about doing unfamiliar computing tasks. If problems arise with their technology, they will keep on trying to figure out how to achieve what they have set out to do for quite awhile; Pat doesn't give up right away when computers or technology present a challenge to them.
- ***Attitude toward Risk*:** Pat is busy, so they rarely have spare time. So Pat is risk averse and worries that they will spend time and not get any benefits from doing so. They prefer to perform tasks using familiar features, because they're more predictable about what they will get from them and how much time they'll take.

How Pat Works with Information and Learns

- ***Information Processing Style*:** Pat leans towards a *comprehensive information processing style* when they need to gather information to problem-solve. So, instead of acting upon the first option that seems promising, they first gather information comprehensively to try to form a complete understanding of the problem before trying to solve it. Thus, their style is "burst-y"; first reading a lot, then acting on it in a batch of activity.
- ***Learning: by Process vs. Tinkering*:** When Pat sees a need to learn new technology, they do so by trying out new features or commands to see what they do and to understand how the software works. When doing this, they do so purposefully; that is, reflecting on each bit of feedback they get along the way to understand how the feature might benefit them. Eventually, if they don't think it will get them closer to what they want to achieve, Pat will revert back to ways that they already knew worked.

[1]For distribution data on users similar to and different from Pat, see http://gendermag.org/ for customizable versions including customizable pronouns.

The GenderMag walkthrough

- GenderMag uses a variation of a usability evaluation process called a **Cognitive Walkthrough.**

- Rather than testing design features directly with users, a walkthrough enables non-users to work with a paper or implemented interface.

- Following a defined set of questions, the evaluator can ascertain whether a prospective user is likely to be able to use the feature or function in question.

- This process is part of the GenderMag evaluation.

The Walkthrough: Preparation

Preparation step 1

- The first step of your GenderMag evaluation is to choose the technology and use case to evaluate.

Preparation step 2

- Next, choose a persona and customise it.

Preparation step 3

- Schedule your walkthrough session for 2 hours with your evaluation team. In a pinch, it can be done by one person.

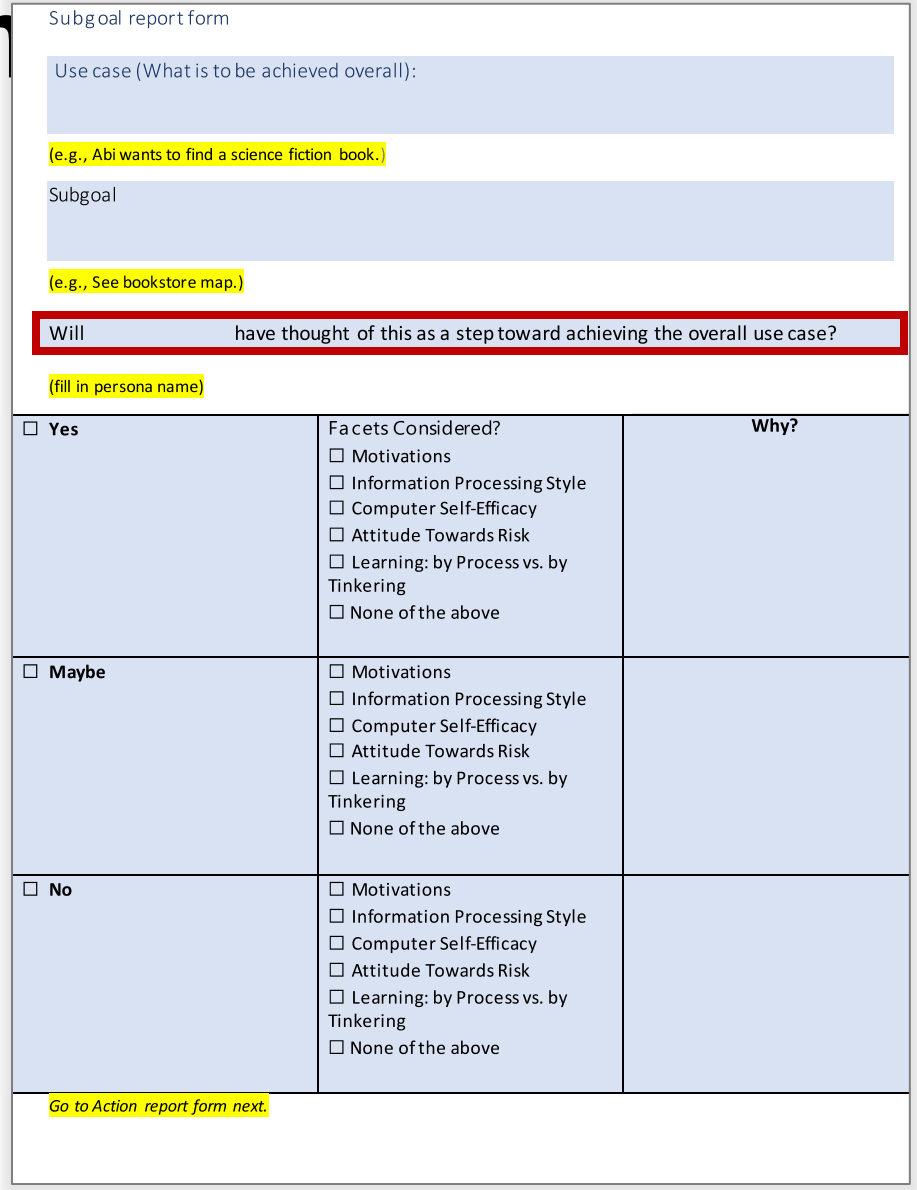
Preparation step 4

- Prepare your materials including reporting forms.

The Subgoal Report form

This is the form you'll use to evaluate the success of your subgoal. It clearly states:

- The use case
- The current subgoal
- The single question "Will [persona name] have thought of this as a step toward achieving the overall use case?"
- This form also documents the evaluation



Subgoal report form

Use case (What is to be achieved overall):

(e.g., Abi wants to find a science fiction book.)

Subgoal

(e.g., See bookstore map.)

Will have thought of this as a step toward achieving the overall use case?

(fill in persona name)

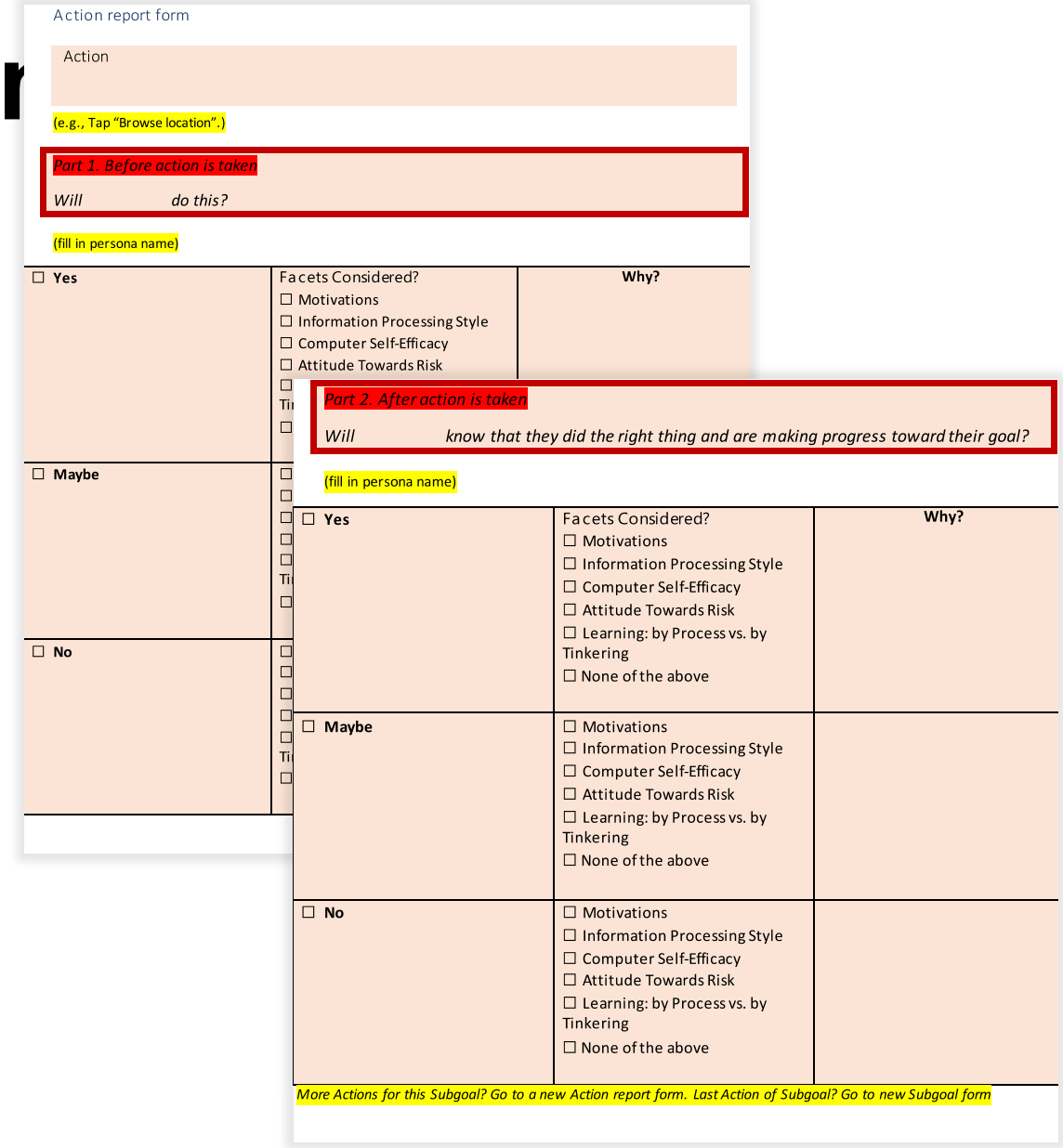
☐ **Yes**	Facets Considered? ☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	**Why?**
☐ **Maybe**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	
☐ **No**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	

Go to Action report form next.

The Action Report form

You'll use this to record actions taken along the use case.

- It's in two parts: before and after.
- The first part asks whether the persona would take the action.
- The second part asks whether the persona would know they're making progress toward their goal.
- Again, it forms part of your evaluation's documentation.



Action report form

Action

(e.g., Tap "Browse location".)

Part 1. Before action is taken

Will do this?

(fill in persona name)

	Facets Considered?	Why?
☐ **Yes**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk	
☐ **Maybe**		
☐ **No**		

Part 2. After action is taken

Will know that they did the right thing and are making progress toward their goal?

(fill in persona name)

	Facets Considered?	Why?
☐ **Yes**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	
☐ **Maybe**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	
☐ **No**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	

More Actions for this Subgoal? Go to a new Action report form. Last Action of Subgoal? Go to new Subgoal form

The Walkthrough: Evaluation

Once you're fully prepared, you can get on with your actual evaluation.

Evaluation Step 1

- Decide on and write down your use case's subgoals.

Evaluation Step 2

- Evaluate each subgoal.

Evaluation Step 3

- Evaluate the actions you hope your persona would take within the current subgoal **before** taking this action and **after** performing the action.

Evaluation Step 4

- Debrief by counting issues and deciding on how to resolve them.

Applying GenderMag: StackOverflow Walkthrough

Preparation

1. The first step will be to customise your persona. In this case we'll use Abi. Characteristics:
   - Lower computer self-efficacy, Process-oriented, Risk-averse, Comprehensive information processing style

Then set your use case:

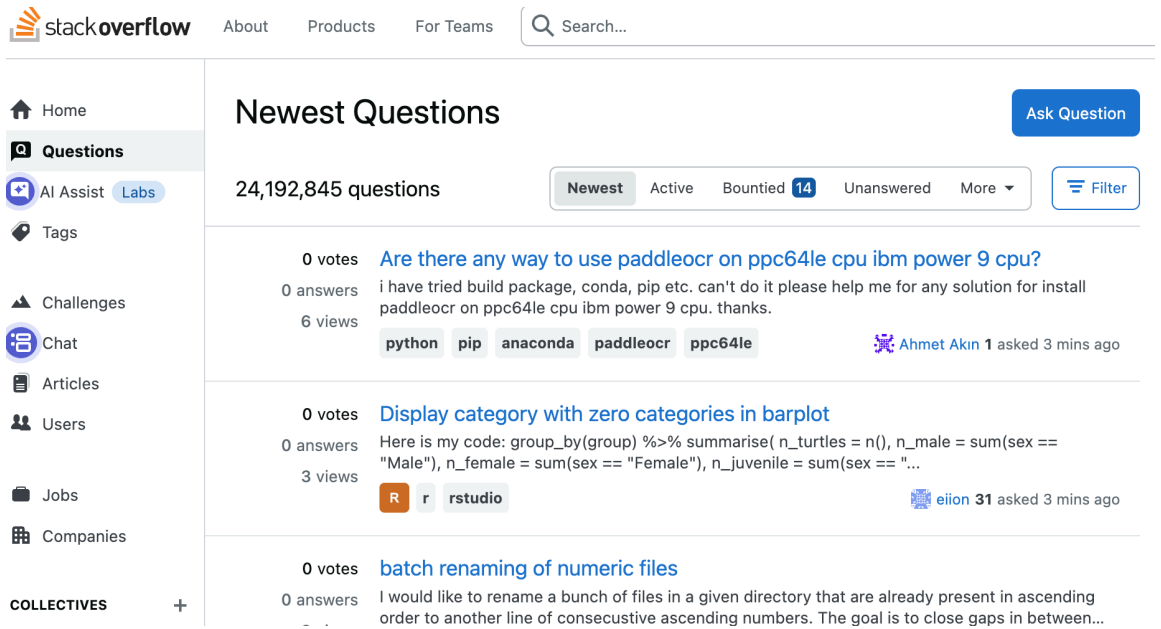
- Abi wants to ask a programming question

Then set your subgoals:

- Find where to ask a question
- Understand how to write a good question
- Add appropriate tags

Applying GenderMag: StackOverflow Walkthrough

- Subgoal 1: Know how to ask a new question

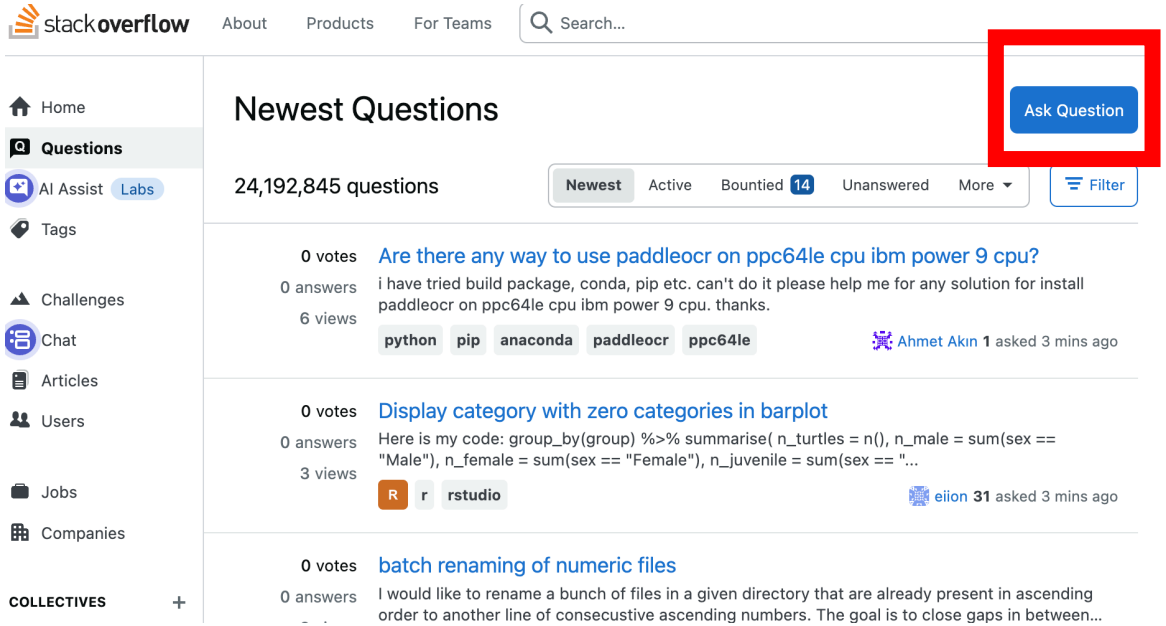


Use case (What is to be achieved overall): Share captioned video with her students
Subgoal: Get to Asking a new Question
Will Abi have thought of this as a step toward achieving the overall use case?

☐ **Yes**	**Facets Considered?**	**Why?**
	☐ Motivations	
	☐ Information Processing Style.	
	☐ Computer Self-Efficacy	
	☐ Attitude Towards Risk	
	☐ Learning: by Process vs. by Tinkering	
	☐ None of the above	
☐ **Maybe**	☐ Motivations	
	☐ Information Processing Style	
	☐ Computer Self-Efficacy	
	☐ Attitude Towards Risk	
	☐ Learning: by Process vs. by Tinkering	
	☐ None of the above	
☐ **No**	☐ Motivations	
	☐ Information Processing Style	
	☐ Computer Self-Efficacy	
	☐ Attitude Towards Risk	
	☐ Learning: by Process vs. by Tinkering	
	☐ None of the above	

Applying GenderMag: StackOverflow Walkthrough

- Subgoal 1: Ask a new question
  - Action 1, Part 1: Click on Ask a new question



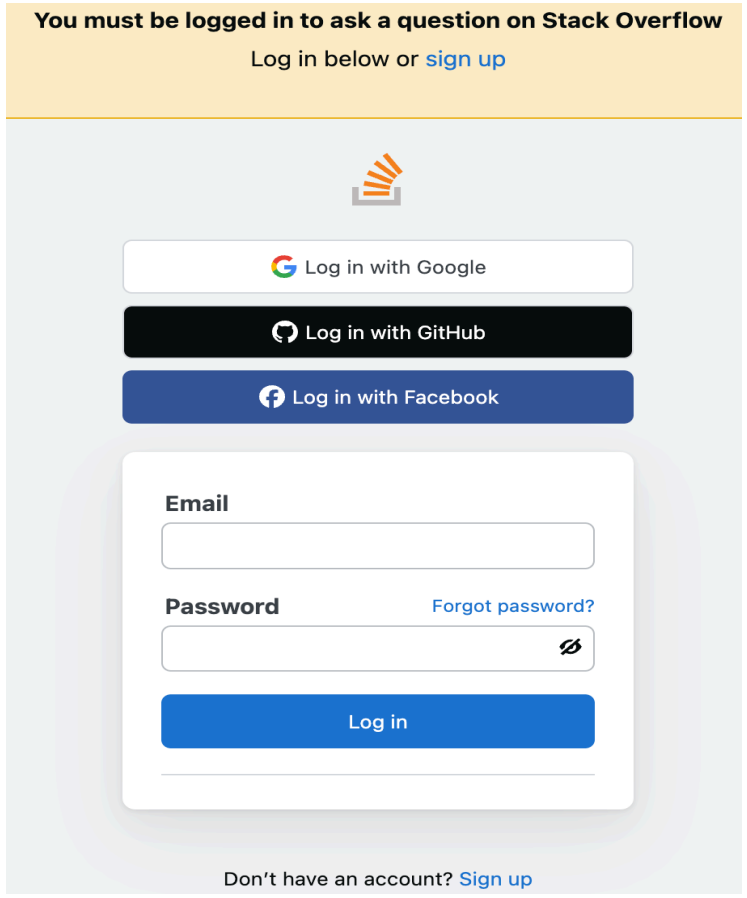
Action: ***Click on Ask a new question button***

Part 1. Before action is taken Will Abi do this?

☐ **Yes**	**Facets Considered?**	**Why?**
	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	
☐ **Maybe**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	
☐ **No**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	

Applying GenderMag: Example Walkthrough

- Subgoal 1: Ask a new question
  - Action 1, Part 2: Click on Ask a new question



Action: ***Click on Ask a new question button***

Part 2. After action will Abi know she did the right thing?

	Facets Considered?	Why?
☐ **Yes**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	
☐ **Maybe**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	
☐ **No**	☐ Motivations ☐ Information Processing Style ☐ Computer Self-Efficacy ☐ Attitude Towards Risk ☐ Learning: by Process vs. by Tinkering ☐ None of the above	

Debrief

- How to identify gender-inclusion issues:
  - All the “no” and “maybe” answers on the forms **with** a facet checked.
- How to identify usability issues
  - All the “no” and “maybe” answers on the forms **without** a facet checked.
- Prioritization of issues:
  - All the “no” answers point to definite issues that can be blockers in the path to what the user wants to achieve. Should resolve these fairly quickly.
  - All the “maybe” answers point to potential problems that users might encounter. They might be slowed down in achieving want they want to do and so you should try to resolve these but it’s not a top priority.

The Walkthrough: Ground rules

- Five things to remember are:

1. Stay true to the persona.
    - It’s not about what you or people you know might do.
2. Follow the sequence.
    - Don’t try to predict a sequence of events that the persona might follow.
    - Only evaluate the set of actions the designer or developer wants the persona to do.
3. Answer every question.
    - Don’t skip any question or step.
    - Answer them all as if your persona has gone this far.

The Walkthrough: Ground rules

4. Just find the issues
   - Don’t try to fix issues during the walkthrough; wait until you’re finished.
5. You don’t have to agree with each other
   - This is not an exercise in consensus building. If one person in a team finds an issue, chances are a percentage of users will have that issue too. Note them all during the walkthrough.

Reading

Burnett et al. (2016) GenderMag: A Method for Evaluating Software's Gender Inclusiveness. Interacting with Computers.