

A NEW APPROACH TOWARDS ENSURING GENDER INCLUSIVE SE JOB ADVERTISEMENTS

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HUMANISE

Acknowledgement of Country

We acknowledge the Elders – past, present and emerging of all the land we work and live on and their Ancestral Spirits with gratitude and respect.

I acknowledge the people of the Kulin nations, the traditional owners of the land on which I am meeting with you from today.

Background

Gender bias

- Majority of SE workforce is male^{1,2}
- Bias within SE job advertisements^{1,2}
- Limitations of word based bias checking in context of SE³
- Despite companies with a more diverse workforce (eg gender) performing better financially⁴



¹ 2016. Australia's STEM Workforce Report. <https://www.chiefscientist.gov.au/sites/default/files/Chapter-11-Information-Technology.pdf>. ² A Murphy, et al. 2019. Examining unequal gender distribution in software engineering. EuroSPI 2019, Edinburgh, Scotland. ³ D Gaucher et al. J Pers Soc Psych 101 1 (2011), 109–28. ⁴Technologist Perception of Race and Gender Equality and

Addressing bias in software

'GenderMag'

A way to identify gender bias within problem solving software interface^{5,6}

Designed on five facets of problem solving for which people of different gender differ^{5,6}

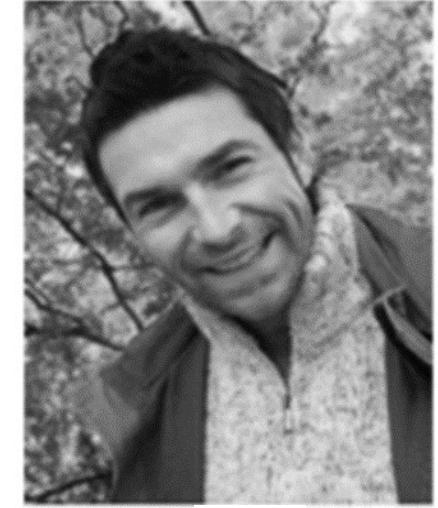
Different facet values are represented with three personas (Fig 1)

- *Abi* (containing facet values mostly seen in females)
- *Tim* (containing facet values mostly seen in males)
- *Pat* (combining facet values for both genders)

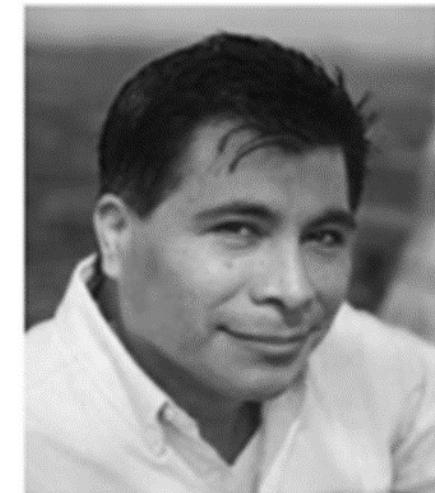
Cognitive walkthrough with the personas⁷



Abi



Tim



Pat

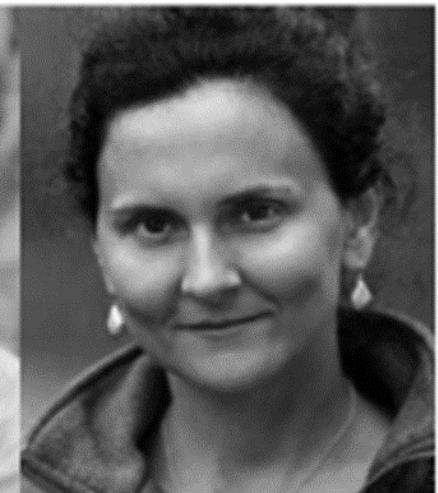


Figure 1: Abi, Tim and Pat 'GenderMag' personas

⁵ M. Burnett et al., *Interact. Comput.*, 2016, 28(6); ⁶ C. Mendez, et al, in *Proceedings of IEEE Symposium on Visual Languages and Human-Centric Computing*, 2019; ⁷ T. Mahatody, et al," *Int. J. Hum. Comput. Interact.*, 2010 26(8).

Our approach

Inspired by GenderMag

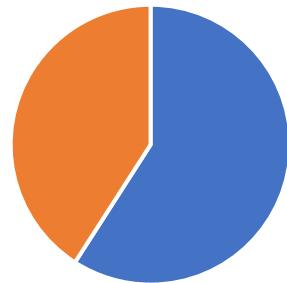
SE job advertisements instead of problem solving software

Replication

- Identification of the facets influencing SE job application behavior
- Crafting personas
- Validation of facets
- Pilot evaluation

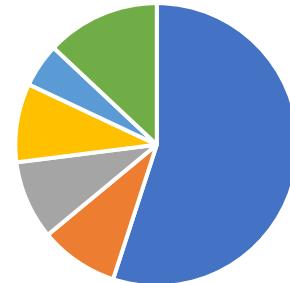
Identifying facets: Characteristics of participants

Gender n=44



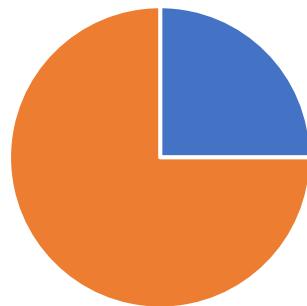
■ male ■ female

Occupation



■ programmers
■ UX designer/developers
■ managers
■ solution architects
■ analysts
■ other

Actively seeking SE work



■ actively seeking work
■ not seeking work

Years of Experience



■ Less than 1 year ■ Between 1 to 5 years ■ More than 5 years

Identification of facets

16 factors identified where male and female respondents differed

- 10 of those were important for predicting SE job application behavior

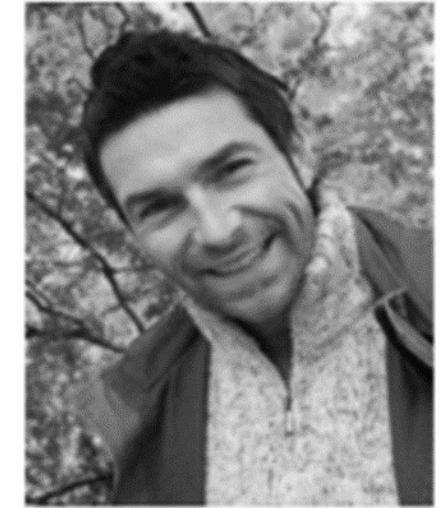
Table 1: Facets and Factors for SE job candidates

Facets	Factors	Definition	Importance to job application
SE views	SE team expectations	What characteristics they expect in the SE team they will join	Very important
	Frustration in SE	What within SE frustrates them	Somewhat important
Career goals	Short term career goals	Where they want to see them in next five years	Very important
	Long term career terms	Where they want to see themselves in 10-15 years	Very important
	Challenges	Perceived challenges in achieving those goals	Somewhat important
	Plans	Planned measures to overcome the challenges	Somewhat important
Job application behaviour	Reading style	Whether they read job advertisements selectively or sequentially	Very important
	Attraction	Most attractive information in jobs advertisements	Somewhat important
	Importance	Most important information in job advertisements	Very important
	Selection	What factors do they look for to decide to apply	Very important

Crafting persona

Highlights for Tim

- an open, collaborative team culture
- No politics, disorganisation, technology volatility in job
- roles that will lead to technical lead opportunities and/or opportunity to run own company
- roles enabling him to address time, procrastination and competition challenges
- roles that help him improve his routine, technology skill enhancement and overcoming short term challenges
- he tends to read job advertisements selectively, potentially missing some critical information if not clearly in title/standout text
- he looks for opportunities for growth, working with new technologies, has challenge and opportunities for social good contributions
- information about team and employer characteristics, location and leadership opportunities are important to him
- he seeks information about provided benefits and job flexibility



Crafting persona

Highlights for Abi

- gender equality in team culture
- she will be given her share of challenging tasks
- there will be an over-large or unfair workload
- roles that will lead to managerial opportunities and financial security
- roles that provide challenges, ability to demonstrate her work ethic, time management, and commitment and focus
- she tends to read job advertisements in full to find all required information she needs
- she looks for jobs that meet her role expectations and technical skill set
- she looks for roles supporting her career and skill growth
- flexibility provided by employers is important to her



The personas

Abi



SE Views

The characteristics Abi expects in the SE team she will join are teamwork, inclusive culture, and no gender stereotyping. Abi does not like when she is given easier tasks as female. Sometimes the male teammates make it look like a piece of cake! She is also unhappy when given a lot of work.

Career Goals

In short term Abi wants to see herself in general managerial roles, in long term Abi plans to achieve financial security/independence. She thinks as a female having to prove herself at every stage is a challenge to achieve this goal. Abi is determined to work hard and do more work, to improve her time management and focus to overcome the challenges.

Job application behavior

Abi prefers to read job advertisements in full, however sometimes she is selective. The most attractive information in the job ad are requirements of the role. The most important information in a job ad is the required technical skills and potential for growth. While selecting the job Abi prefers flexibility provided by the job provider.

Tim

SE Views

The characteristics Tim expects in the SE team he will join are teamwork, inclusive culture, no politics, good communication, open, collaboration and harmony. There are many things within SE that frustrates Tim, such as insufficient documentation, organizational issue, ever changing technologies resulting in needs to learn new languages, frameworks, libraries, tools, etc.



Career Goals

In short term Tim wants to see himself in senior technical roles, in long term Tim plans to develop start-ups/own company. Tim considers procrastination, competition and improper time management are challenges to achieve this goal. Tim wants to improve his routine, dedicate some time to know about technology and put some focus on short term goals to overcome the challenges.

Job application behavior

Tim is selective while reading job advertisements, he checks the title or other selective parts first and then decides to read in full. The most attractive information in the job ad are opportunities for growth, working with new tech, challenges involved and possibilities of making social impact. The most important information in a job ad is the required technical skills and potential for growth. Tim also gives importance to the information on the team/employer, leadership opportunities and location of the job. While selecting the job Tim prefers flexibility provided by the job provider, he also checks what benefits are provided by the job.

Facet validation survey

Participants (n=17)



■ male ■ female

Years of Experience



■ Less than 1 year ■ Between 1 to 5 years
■ More than 5 years

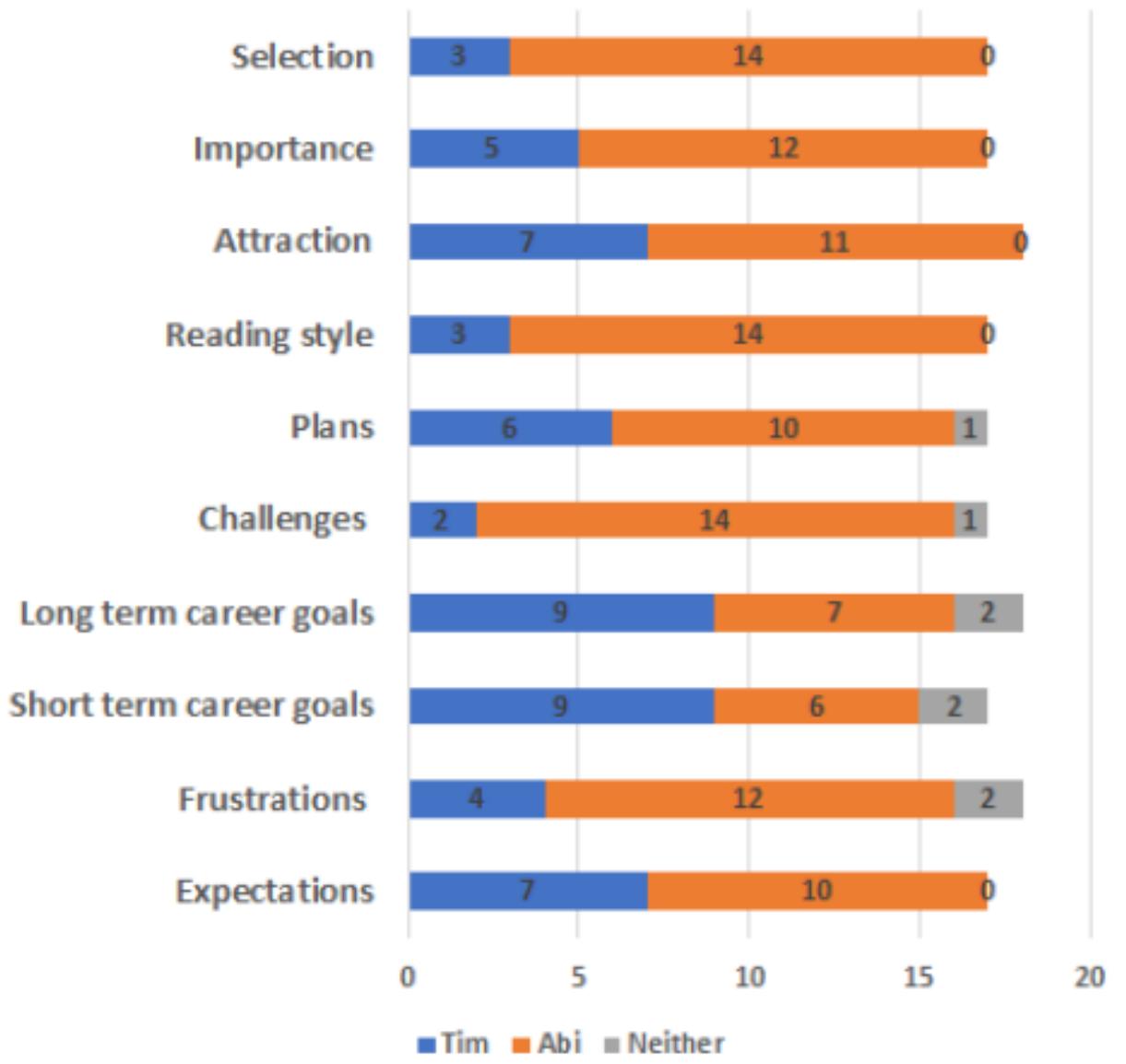
Do the SE candidates relate to the identified factors or not?

On each facet are they Tim or Abi?

Facet validation survey

On 5 factors participants always related with either Tim or Abi

On the other 5 factors – some participants said “neither Tim nor Abi”



Results

Pilot evaluation: Cognitive Walkthrough on a set of SE job advertisements

Table 2: Pilot evaluation

Job Role	Cognitive Walkthrough (CW)			Participant review	Comparison
	Persona	Decision	Facets used to make decision (apply/not apply)		
Project manager	Tim	Maybe	Career goals, job application behaviour	Yes - 3 No - 6 Maybe - 0	45%
	Abi	Maybe	SE views		
Programmer	Tim	No	SE views, job application behaviour	Yes - 5 No - 3 Maybe - 0	30%
	Abi	No	Career goals, SE views		
Analyst	Tim	Yes	SE views and job application behaviour	Yes - 5 No - 1 Maybe - 2	57%
	Abi	Maybe	Job application behaviour		
Tester	Tim	Maybe	Job application behaviour	Yes - 3 No - 4 Maybe - 1	55%
	Abi	Yes	SE views, job application behaviour and career goals		

Implications for practice

Systematic way of bias detection and de biasing

Inclusivity statements are not enough!

Importance of male and female SE role facets

Useful SE candidate personas

Better SE role design

Easy-to-learn method

Implication for researchers

More persona development

Automation of the process

Other biases

Multidimensional view on biases

Inclusion of non-binary genders



Questions?

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