



Sydney Science Trail evaluation report

Date: 16-19 August 2023

Venue: Australian Museum, Sydney

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Event description

Coordinated by the Australian Museum as part of its Sydney Science Trail event, The Sydney Science Trail Expo is a key part of how the Museum intends to inspire curiosity and interest in STEM and showcase the science community's innovations and achievements.

The Expo included more than twenty organisations whose work connected to a range of STEM areas. Each organisation provided visitors an opportunity for hands-on STEM-based activities and experiences and to share their science passion and knowledge.

FLEET participated in the event for four days, from Wednesday 16 August to Saturday 19 August. The Wednesday to Friday was open for primary and secondary school with one afternoon open to the public. On Saturday the expo was open to the public all day.

FLEET objectives for the event

I developed the event to achieve the following outcomes:

- An appreciation/awareness of the purpose and value of FLEET research and physics generally.
- An increased public awareness of the increasing demand for and energy consumption of computation, and the implications of this.
- A public thinking critically about the meaning and value of FLEET research.
- Primary and secondary students with a greater interest in and awareness and appreciation of physics



- FLEET researchers with improved communication skills and greater understanding of audience values and perceptions of physics/FLEET research

Audience and number of engagements

The following audience numbers are those recorded by the Australian Museum. While a large majority will have passed by FLEET exhibit and maybe witnessed the levitating superconductor being demonstrated, only a portion would have had some form of personal engagement with FLEET staff. We calculate this portion to be about 60% of the Australian Museum figures.

Australian Museum recorded audience numbers

- Primary/secondary school students and educators/teachers = 935
- General public = 2319

Key findings

- Visitor experience of the FLEET exhibit was overwhelmingly positive and visitors learned a bit about physics and how it is applied to solve real-world problems.
- Visitors gained an awareness and appreciation for the purpose and value of FLEET's research.
- Visitors thought critically about FLEET's research and research problem.
- People put emphasis on two different approaches to solving FLEET's research problem: a perception that technology will be the key driver in a solution to the problem, and cultural or socially focused solutions.
- All visitors desired a sustainable and socially responsible digital future.

Evaluation method

To evaluate the Sydney Science Trail Expo the following pre- and post-evaluation tools were developed:

- A short pre-evaluation survey (one question)
- Mind map
- Online exit survey

Pre-evaluation short survey

A short survey was used with the single 5-point Likert-scale question that contained the following statement and associated question:

Statement: The demand for computation is increasing 70% each year. Digital technologies use about 10% of global energy and this figure is doubling every decade.

1. Describe your level of awareness of the facts in this statement (Extremely aware to Not at all aware)

The survey was placed on a wall and participants simply placed a tick in the space corresponding to their perceived level of awareness. See Figure 1. This is supposed to be a survey that visitors do before they engage with the FLEET exhibit, but this rarely occurred because of the high volume of people. Visitors who contributed to the survey were



F L E E T

ARC CENTRE OF EXCELLENCE IN
FUTURE LOW-ENERGY
ELECTRONICS TECHNOLOGIES

therefore asked to think about what their level of awareness of the facts was before their engagement with FLEET.

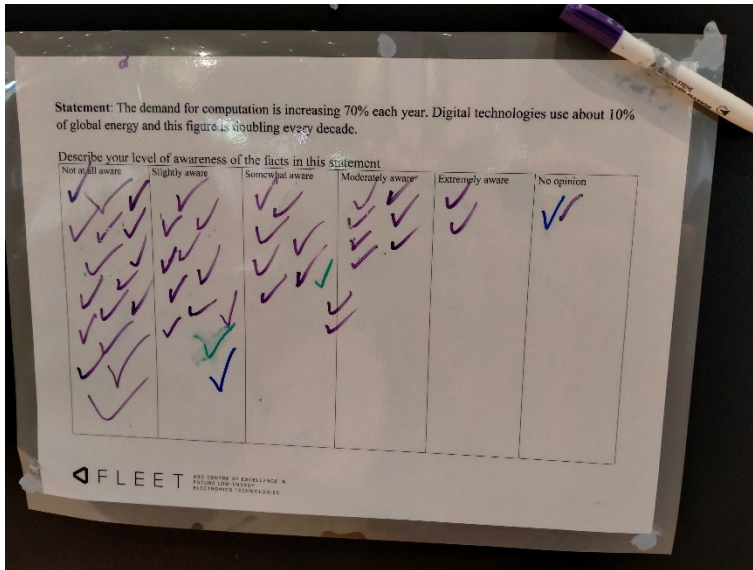


Figure 1. Pre-evaluation survey used to help determine visitor's level of awareness about FLEET's research problem.

Mind map

This post-evaluation activity consisted of large sheets of butchers paper attached to a wall. See Figure 2 below. Following visitor engagement with FLEET volunteers where they had an opportunity to watch the levitating superconductor and converse with FLEET volunteers about FLEET's research and the research problem we are trying to solve, visitors were asked if they would like to contribute their thoughts to the Mind Map that contained the statement, 'Digital technology uses lots of energy'. As guidance, visitors were simply asked what that statement meant to them.

The purpose of the mind map is to help FLEET understand how people perceive FLEET's research problem. It is an opportunity for visitors to reflect and think critically about their engagement with FLEET and then record this on the map.

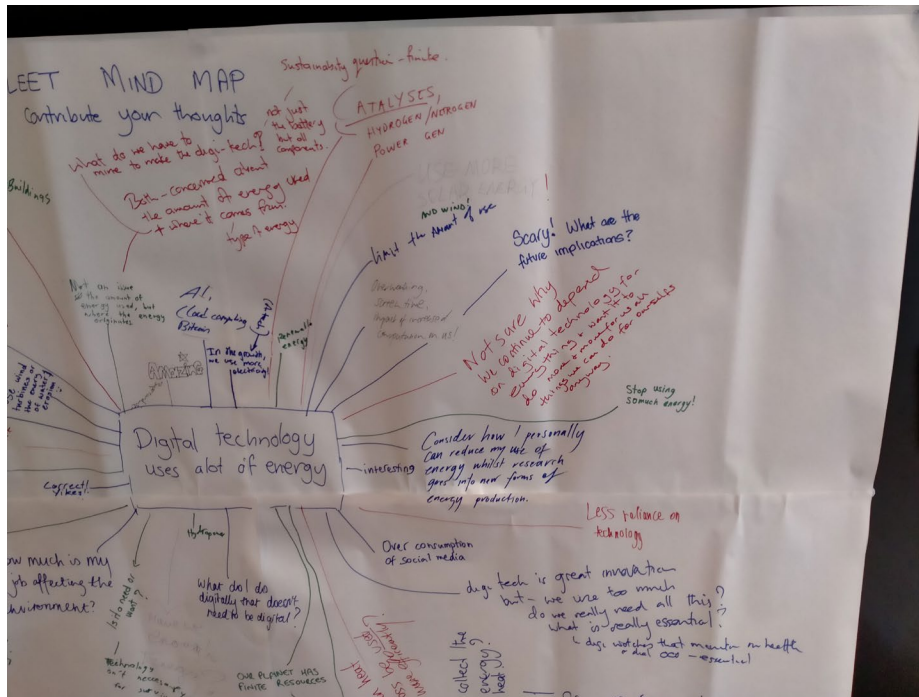


Figure 2. Mind Map used at Sydney Science Trail

Exit survey

An online exit survey was also conducted to further understand visitor perception of FLEET research, and how they interpreted their engagement with the FLEET exhibit. The survey asked the following seven questions:

1. Participant's age
2. Write one interesting thing you remember from your experience with FLEET?

The demand for computation is increasing 70% each year. Digital technologies use about 10% of global energy and this figure is doubling every decade. In the context of this problem, indicate your level of agreement/disagreement with the following statements:

3. My experience today has changed my understanding about society's use of digital technology
4. Low-energy technologies are unlikely to make a difference to the lives of ordinary people
5. I am unconcerned because there is always a technological solution to problems such as the energy consumption of digital technologies
6. My awareness of the applications of quantum physics has increased
7. What three words would you use to describe this experience with FLEET?

People were given a QR code that gave them access to the survey. About half visitors completed the survey just before they left the FLEET exhibit. The other half completed it at a later time (all surveys were completed within one day following the end of the Expo).



Results

Pre-survey. Level of awareness (N=50)

There was a low level of public awareness about the facts in the statement, The demand for computation is increasing 70% each year. Digital technologies use about 10% of global energy and this figure is doubling every decade.

Most people (56%) were either not aware at all or slightly aware about the facts in the statement. Only 9 (18%) people were moderately or extremely aware of the facts. See Table 1 and Figure 3. This data reflects data from similar public events that FLEET has participated in.

Table 1. Level of awareness about facts in the statement, The demand for computation is increasing 70% each year. Digital technologies use about 10% of global energy and this figure is doubling every decade.

| Not at all aware | Slightly aware | Somewhat aware | Moderately aware | Extremely aware | No opinion |
|------------------|----------------|----------------|------------------|-----------------|------------|
| 17 | 12 | 10 | 7 | 2 | 2 |

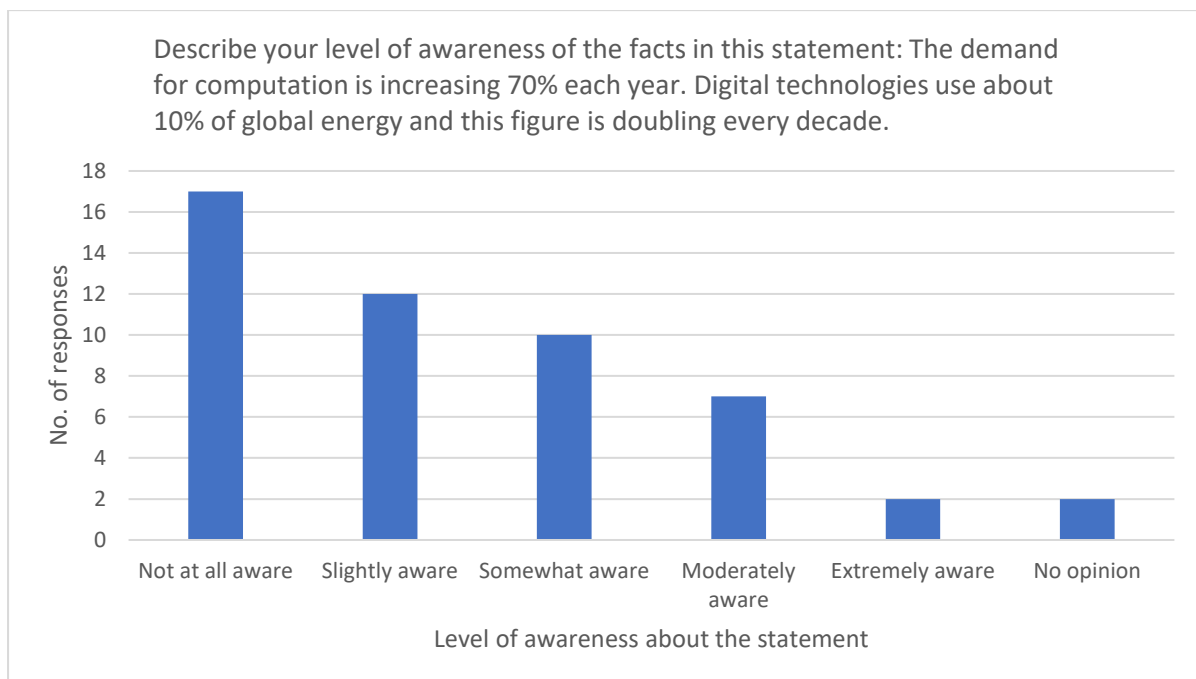


Figure 3. Level of awareness about facts in the statement, The demand for computation is increasing 70% each year. Digital technologies use about 10% of global energy and this figure is doubling every decade.

Exit survey (N=18)

Question 1. Participant's age

Given the low number of respondents relative to the numbers FLEET engaged with, it is difficult to know whether the age of survey respondents is a true reflection of all the visitors to the FLEET exhibit. But eight of the 18 respondents were school students between the ages of eight and 16. The other 10 ranged in age from 33 to 78. The average age of all



respondents was 30.33. This reflects anecdotal observation that when the Expo was open to the public that most visitor were young families. See Figure 2.

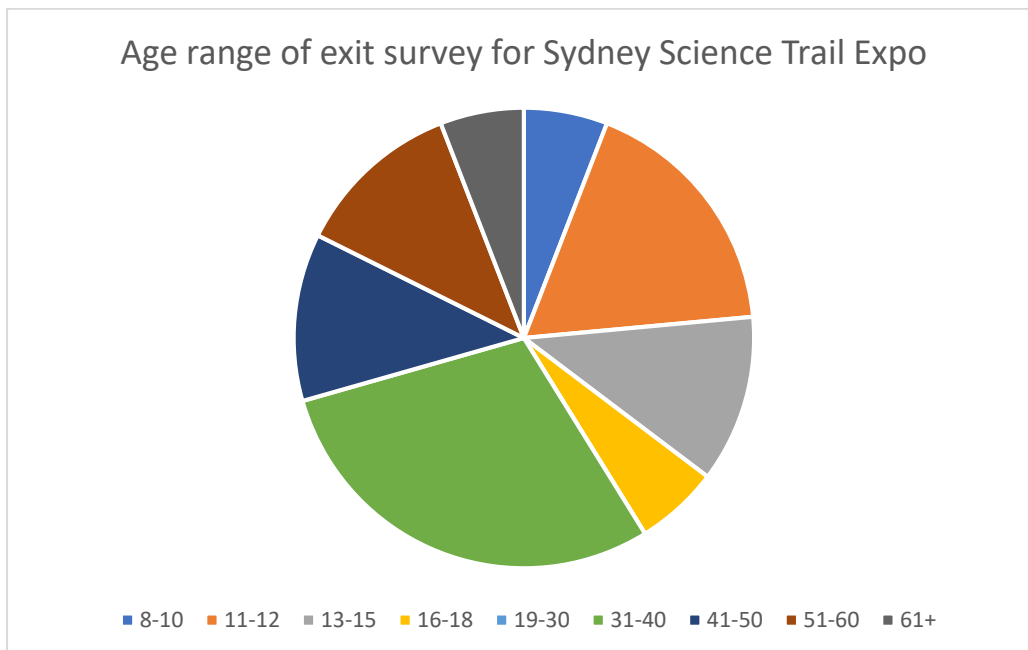


Figure 4. Ages ranges of respondents to Sydney Science Trail exit survey

Question 2. Write one thing about your experience with FLEET today.

Apart from a handful of exclamations along the lines of Enlightening and fascinating, the responses to question 2 were positive with one exception.

Two general themes emerged: Scientific recollection and Thought-provoking learning experience

Science recollection: Where respondents recalled a scientific fact

“Bismuth Ferrite is a promising material for low energy electrics.”

“The more efficient my technology parts get, the less cooling my PC needs.”

Thought-provoking learning experience: Where respondents described their high level of interest and engagement with the exhibit

“It was highly informative and interesting, and kept me hooked the whole time.”

“Super interesting conversation and learning experience.”

“The presentation was excellent and the talk was fantastic. They really connected with my students found where they were at and continued on to their learning.”

The exception was a comment that suggested FLEET volunteers displayed some level of discrimination toward her. I doubt this was deliberate given our focus on increasing gender diversity in physics, but it is something to be mindful of



“For the first few minutes of discussion the person we were peaking to only addressed or looked at my younger brother, felt like sexism. don’t want to complain about it but consider that next time.”

Question 3. My experience today has changed my understanding about society’s use of digital technology.

Nearly all (14 or 78%) agreed or strongly agreed that their experience with the FLEET exhibit changed their understanding of society’s use of digital technology. Nobody disagreed with this statement. See Figure 5.

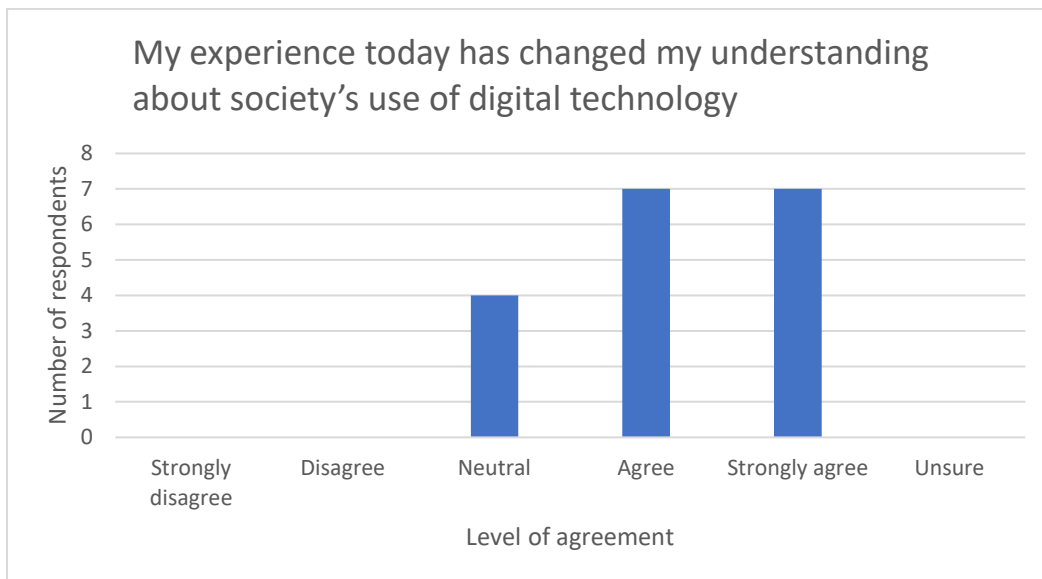


Figure 5. Exit survey question examining how respondents’ experience with FLEET affected their understanding of society’s use of digital technology.

Question 4. Low-energy technologies are unlikely to make a difference to the lives of ordinary people

While most people strongly disagreed (39%) or agreed (22%) that low-energy technologies are unlikely to make a difference to our live, there was some spread across all levels of dis/agreement with 22% of respondents agreeing or strongly agreeing that such technologies will make no difference. See Figure 6.

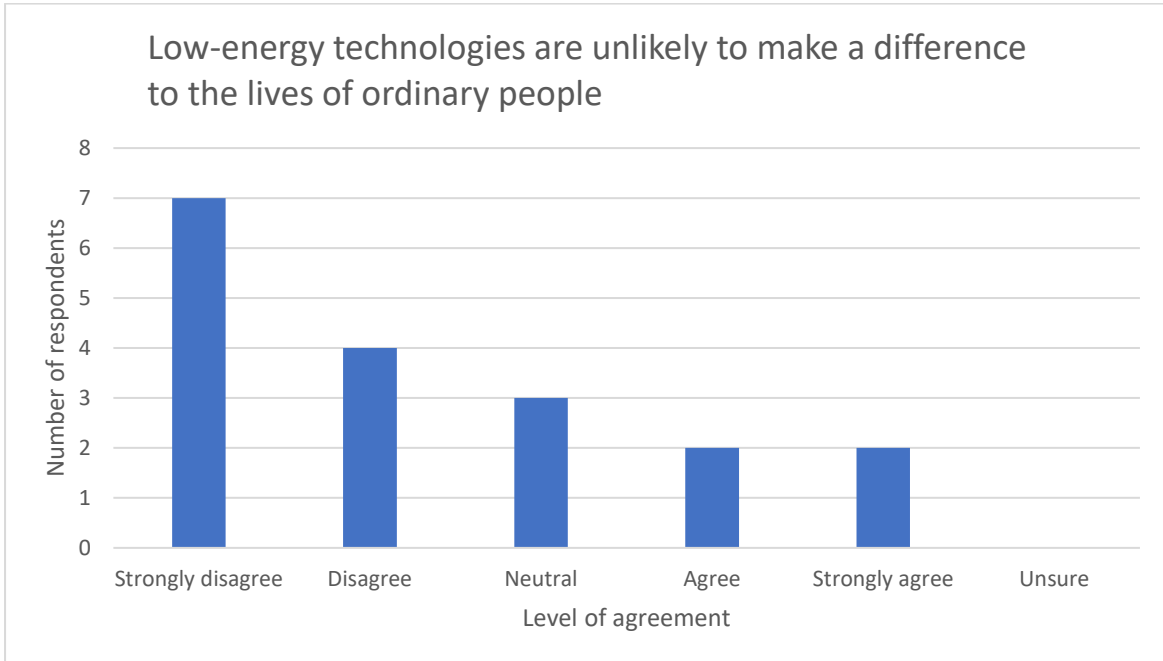


Figure 6. Exit survey question examining respondents' perception about what level of impact low-energy electronics will have on our lives

Question 5. I am unconcerned because there is always a technological solution to problems such as the energy consumption of digital technologies

There is a reasonable spread of opinion relevant to this question indicating diverse views about the role of technology in solving this problem. See Figure 7.

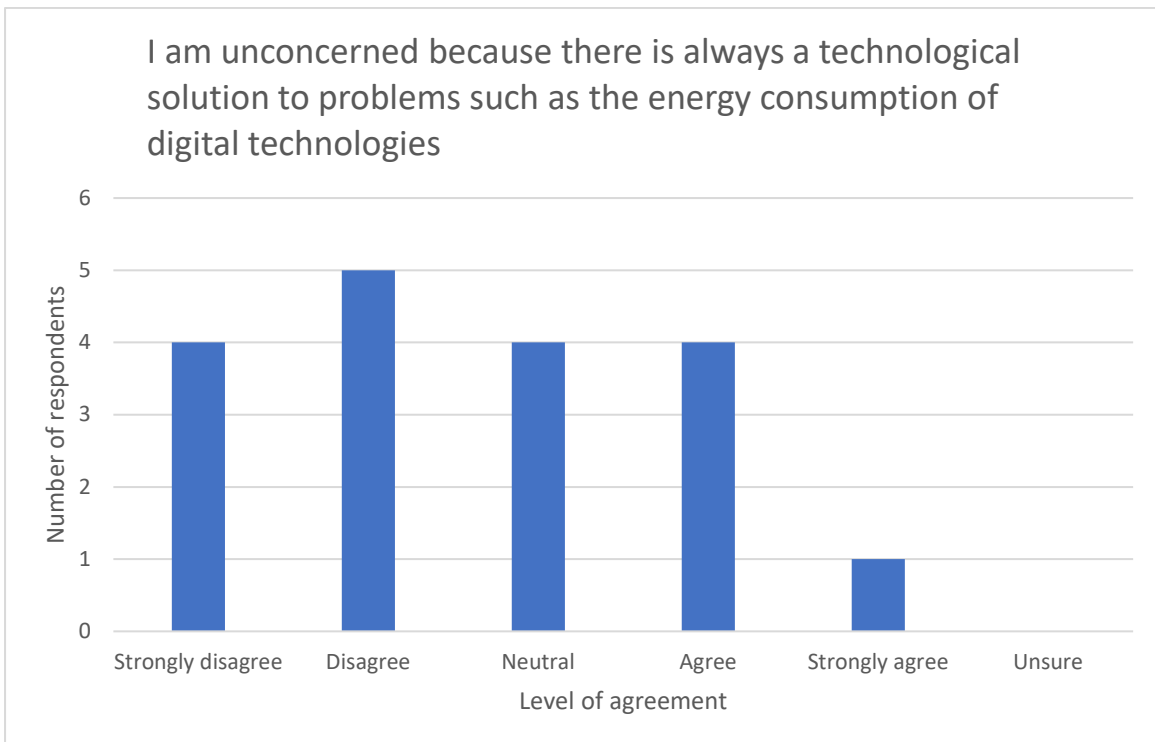


Figure 7. Respondents' level of agreement about the role of technology to help solve the increasing energy consumption of digital technologies.



Question 6. My awareness of the applications of quantum physics has increased
Nearly all respondents (83%) agreed or strongly agreed that their experience with the FLEET exhibit increased their awareness about the applications of quantum physics.

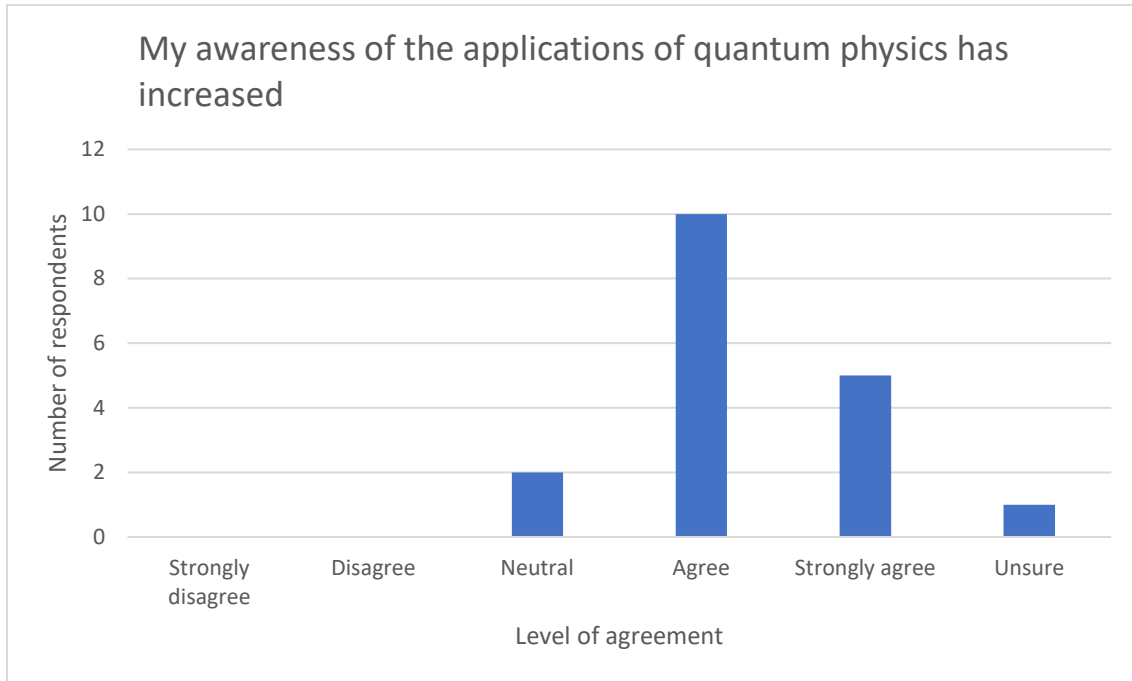


Figure 8. Respondents' level of agreement about whether their experience with the FLEET exhibit increased their awareness about the applications of quantum physics

Question 7. What three words would you use to describe this experience with FLEET?
The words contributed were put into a word cloud. See Figure 9. All words reflected a positive engagement with FLEET. While most words simply reflect that the visitors enjoyed the experience (awesome, cool), a few words support the other survey and mind map data that there was learning (informational learning; low-resistance conductance; educational) and critical thought (thought-provoking; hopeful).



Figure 9. Word cloud reflecting words that described visitors' experience with the FLEET exhibit

Mind Map

The mind map was used to encourage critical thinking about FLEET's research and its research problem. For FLEET it is also a tool to understand how the public perceive FLEET, how they value our research and the public perception of the FLEET research problem: the unsustainable energy use of digital technologies.

There were four core themes to emerge from the comments on the Mind Map: Seeking the tech fix; Rethinking digi-tech values; Environmental impact; and ubiquitous digi-tech. Detailed insight into each theme is outlined in Table 2. Note, that comments in Table 2 preceded by a hyphen represent comments linked to a thread in the mind map. See Figure 10 that shows the thread linked to the example comment used below, What do we have to mine to make the digi-tech? See Appendix one for the full list of comments under each theme. There were two other minor themes that were not included in this analysis because they were outlier comments, noting that contributors thought the science was "cool" or agreed in general with the Mind Map statement.

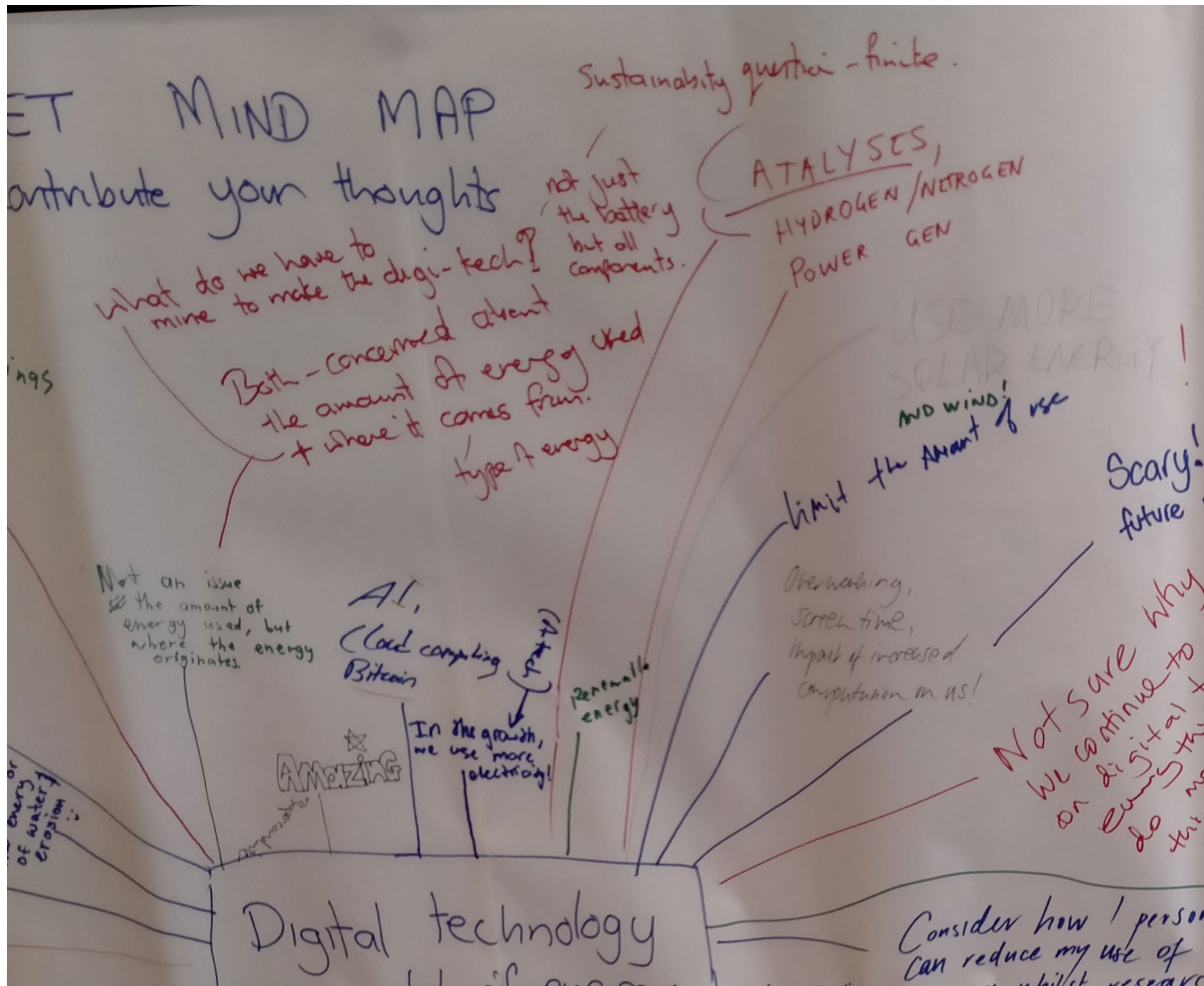


Figure 10. Mind map example of linked comment

Table 2. Themes to emerge from the Sydney Science Trail Mind Map

| Themes (Numbers and percentage of Mind Map responses in this theme) | Theme explanation & supporting Mind Map quotes |
|---|---|
| Seeking the tech-fix (N=21 – 26%) Sub-theme: Valuing FLEET research | While it is implied in the language that there is concern about the energy consumption of digital technologies (e.g., “we need to use renewable energy more”), people making the comments under this theme prioritized, as their first thought, a technological solution to the problem. The solutions included the use of more renewable energy, or for research into novel technologies such as using the waste heat from computing as an energy source. Nuclear was also a definitive option for one person. |



| | |
|---|--|
| | <p>Three student comments were placed in the sub-theme: Valuing FLEET research. These students considered the development of low-energy electronics important to reduce energy consumption. The caveat here is that such students may merely be repeating what they heard rather than applying critical reflection to the issue.</p> |
| Rethinking digi-tech values (N=20 – 24.5%) | <p>Following their engagement with FLEET, people raised questions about our reliance on digital technologies and questioned how we value them.</p> <p>“It is important [but] you do not really need it to survive.”</p> <p>“Technology isn’t necessary for survival.”</p> <p>There was some concern about the perceived prevalence of unnecessary digital technologies that catered to personal desires rather than societal needs. This prompted the call for a rethink on how we value digital technology</p> <p>“Not sure why we continue to depend on digital technology for everything and want it to do more and more for us, all things we can do for ourselves anyway.”</p> <p>“What do I do digitally that doesn’t need to be digital?”</p> <p>“Digi-tech is a great innovation but we use too much. Do we really need all this? What is really essential. Digi-watches that monitor our health and dial 000 are essential.”</p> <p>“Can we survive without digi-tech? Would it really be that bad? [to not have it]”</p> |
| Environmental impact (N=20 – 24.5%) | <p>Under this broad theme, different the following sub-themes emerged related to</p> |



| | |
|--|--|
| | <p>people’s explicit concerns about the environmental effects of digital technology:</p> <p>Sub-theme: concerns about the source of materials used to develop digital technologies, including batteries – are they sustainable, non-toxic, recyclable;</p> <p>“What do we have to mine to make the digital technologies?”</p> <p>“- not just the battery, but all components”</p> <p>Sub-theme: Is the source of energy itself – is it renewable/sustainable;</p> <p>“Not an issue re: the amount of energy used, but where the energy originates from.”</p> <p>Sub-theme: Behaviour change around how we use energy – we need to reduce our use of/reliance on digi-tech to reduce energy consumption.</p> <p>Some people in this sub-theme questioned how their own use of such technologies affected the environment.</p> <p>“How much is my job affecting the environment?”</p> <p>“Too much technology will ruin the environment”</p> |
| <p>Ubiquitous digi-tech (N=9 – 11%)</p> | <p>These comments appear to reflect the acceptance that digital tech is embedded into every aspect of our lives. While not explicit, it is implied that the ubiquitous presence of digital technology results in the consumption of large amounts energy. One comment connected to these references calls for the need for green surplus renewable energy. A reference to data centres likely reflects a poster we had on display that quantified the large amount of energy data centres use.</p> <p>Lighting up the world -Buildings -Structures</p> |



| | |
|--|--|
| | <ul style="list-style-type: none">-Cities-Homes <p>Screens are everywhere, phones, computers, train timetables, ordering systems.</p> <p>Data Centres</p> <ul style="list-style-type: none">-Quantum computing-Need for green surplus renewable energy |
|--|--|

FLEET volunteer outcomes

Only two volunteers responded to a short survey to understand the impact of the outreach experience for them. This limits the ability to draw strong conclusion about the impact of outreach on FLEET members. In this instance, we can only talk about the impact of the outreach for the individual FLEET members that responded to the survey as there is not enough data for strong themes to emerge.

I emailed each FLEET member that volunteered at Sydney Science Trail Expo and asked them the following questions:

The big picture

1. In the context of the value you got from volunteering at Sydney Science Trail, can you tell me about your experience? (A deliberately broad and open question to try find a breadth and depth of perspectives)

More specific stuff

2. How did volunteering at Sydney Science Trail contribute to your skill set as a scientist? (ie here I am talking about your skills beyond the 'lab bench' or research you do)

3. What did you learn about the public's perspective on FLEET's or your own research?

4. How, if at all, did this awareness of the public's perception of FLEET/your research make you think about the role of communication/engagement and how you communicate to others outside your area of research expertise?

General

Any other comments you have about the event generally - its value for FLEET, ability to engage with the public, not enough/too many volunteers, more interactive stuff needed...etc

From the two responses to the survey the following themes emerged that are relevant to these individuals only.



Validation/affirmation: There was some personal gratification and motivation to know that their research is valued and appreciated. It acted as a positive reinforcement for their own motivation to keep pursuing their research goals.

Learning transferable skills: In this case the transferable skills are largely about learning to communicate clearly to different audiences.

Enjoyment in engagement: This lacks some depth of understanding about what makes the engagement enjoyable, but these FLEET volunteers enjoyed this form of outreach.

SST2023 impact

Visitor experience of the FLEET exhibit was overwhelmingly positive and visitors learned a bit about physics and how it is applied to solve real-world problems (even quantum physics); they gained an awareness and appreciation for the purpose and value of FLEET's research, and thought critically about FLEET's research and research problem.

New awareness

Before their engagement with FLEET, most people had minimal or no awareness of the problem regarding the unsustainable energy consumption of digital technology. Their experience with the FLEET exhibit had a strong impact on their awareness and, indeed understanding, of society's use of digital technology, and what the potential implications are of this use. The Mind Map data is indicative that visitors used this new awareness and understanding to think critically about the value of FLEET's research and research problem.

Critical thought and the goal of a socially responsible digital future

While in principle people supported and valued FLEET research they raised questions and concerns about the means FLEET and similar research groups were conducting to achieve its goal of low-energy electronics. There were broad environmental concerns about the sustainability and toxicity of the materials used to develop low-energy electronics along with the need for greater use of renewable energy to provide the energy to power them. To a lesser extent people began to realize and have some concern about the ubiquitous presence of digital technology in our lives and how reliant we have become on it.

People put emphasis on two different approaches to solving this problem: a perception that technology will be the key driver in a solution to the problem, and cultural or socially focused solutions.

The tech-fix approach included the development and implementation of low-energy electronics, but also included greater use of renewable energy sources. The cultural approach involved a shift in how we value digital technology. Following their engagement with FLEET, people began to question their own and society's reliance on digital technology, strongly implying that we need to rethink how we value digital technology. That is, people questioned what digital technologies have a socially responsible function and what were potentially frivolous desires. The emphasis for this approach was to consider what digital technologies we could do without to reduce consumption of energy and ensure a shift toward more socially responsible digital future. There was also a strong concern about the



source and use of the materials that enabled low-energy electronics. Any innovation in this space will need social licence.

The exit survey data to some extent supports this dichotomy as survey respondents showed mixed levels of agreement regarding the ability of a technical solution to solve a problem, and while most people did think that low energy tech would make a difference, there was still some level of disagreement with this statement.

For both approaches there was a goal of a sustainable and socially responsible digital future. Each person reiterated that reducing energy consumption of digital technology was necessary and the solution must be a sustainable one. People just placed different emphases on the acceptable means to achieve that goal. See Figure 11.

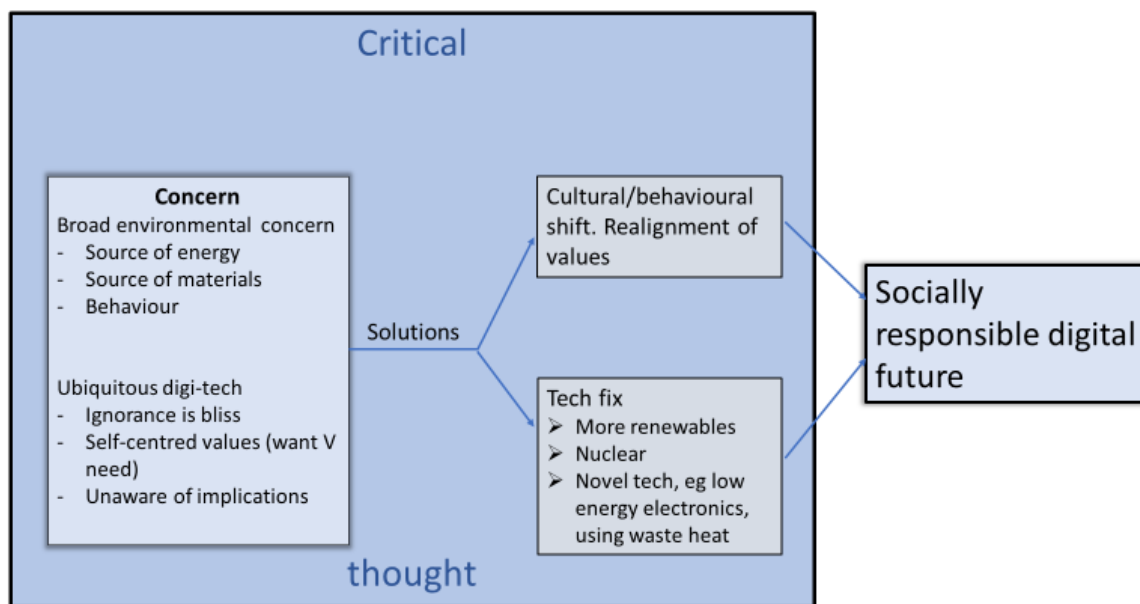


Figure 11. Thematic model of themes that emerged from evaluation data for Sydney Science Trail

FLEET volunteer impact

For the individual FLEET members who responded to the volunteer survey, the positive feedback they received from the public about their own and FLEET's research and that people were actually interested in and valued what they do, validated their work and provided incentive and motivation to continue their research.

One might argue that this public validation and affirmation of their "life's work" was facilitated by their effective communication, which both survey respondents thought was a key value of such outreach. That is, such outreach was an opportunity to learn better ways to explain physics and to improve their communication skills overall.

See Appendix 2. for the complete volunteer responses to the survey.



Appendix 1. Mind Map contributions from visitors to the FLEET exhibit at the Sydney Science Trail Expo

Below are the responses visitors to the FLEET exhibit at the Sydney Science Trail wrote on the Mind Map. Responses are listed under the themes that emerged from thematic analysis of the Mind Map.

Theme: Seeking the tech-fix (N=21 – 26%)

While it is implied in the language that there is concern about the energy consumption of digital technologies (e.g., “we need to use renewable energy more”), people making the comments under this theme prioritized, as their first thought, a technological solution to the problem. The solutions included the use of more renewable energy, or for research into novel technologies such as using the waste heat from computing as an energy source. Nuclear was also a definitive option for one person. Three student comments were placed in a sub-theme: Valuing FLEET research. These students considered the development of low-energy electronics important to reduce energy consumption. The caveat here is that such students may merely be repeating what they heard rather than applying critical reflection to the issue

Visitor responses

Use more solar energy

- and wind

Renewable energy

Nuclear energy is most efficient and safest power option. One pellet of uranium = 17,000 tonnes of coal power effectively.

Can heat loss [from resistance] be used more efficiently

-can we collect the wasted energy, the heat (year 7 student)

Solar

Hydropower

The need for regenerative energy

Use wind energy or the energy of water and erosion

Catalysts - Hydrogen/nitrogen power generation

Data centres/Quantum computing

-Need for green surplus renewable energy

We need to rethink our future

-we need to use renewable energy more

-nuclear power? Solar, hydro electricity?

-solar panels kills birds

I believe that digital tech will outrun the production of energy and we will need energy efficient materials to conserve energy (student)

Electricity price rise [as a consequence of increasing energy consumption of digital tech].

Renewable energy becomes a must with rapidly decreasing amount of non-renewable electricity left. Billionaires store coal/oil and sell for gigantic amounts in the future which contributes to energy crisis.

Sub-theme: Valuing FLEET research



With our ever-growing reliance on technology, such as computers, finding a way of making them more efficient is extremely important to reduce our total consumed power (student)
I think the idea [energy efficient electronics] is very useful and we must save lots of energy (student)

I think the idea [making digi-tech use less energy] is very good

Theme: Resetting our digi-tech values (N=20 – 24.5%)

Following their engagement with FLEET, people raised questions about our reliance on digital technologies and questioned how we value them. There was some concern about the perceived prevalence of unnecessary digital technologies that catered to personal desires rather than societal needs. This prompted the call for a rethink on how we value digital technology.

Visitor responses

It is important [but] you do not really need it to survive

Limit the amount of use [of digi-tech]

Overworking, screen time – impact of increased computation on us?

Less reliance on technology

What do I do digitally that doesn't need to be digital?

Let's talk face-to-face instead of social media

Is it [digi-tech] a need or want?

Technology isn't necessary for survival

Not sure why we continue to depend on digital technology for everything and want it to do more and more for us, all things we can do for ourselves anyway.

Consider how I can personally reduce my use of energy while research goes into new forms of energy production.

Over consumption of social media

Digi-tech is a great innovation but we use too much. Do we really need all this? What is really essential. Digi-watches that monitor our health and dial 000 are essential

Can we survive without digi-tech? Would it really be that bad? [to not have it]

We need to rethink our future

-we need to use renewable energy more

-nuclear power? Solar, hydro electricity?

-solar panels kills birds

Cloud computing Bitcoin - Bitcoin is a wasteful, advanced Ponzi scheme

Be healthy. Be careful with technology

To put your screen time to less time to not waste energy (student)

Theme: Digi-tech is everywhere (N=9 – 11%)

These comments appear to reflect the acceptance that digital tech is embedded into every aspect of our lives. While not explicit, it is implied that the ubiquitous presence of digital technology results in the consumption of large amounts energy. One comment connected to these references calls for the need for green surplus renewable energy. A reference to data centres likely reflects a poster we had on display that quantified the large amount of energy data centres use.



Visitor responses

Lighting up the world

- Buildings
- Structures
- Cities
- Homes

Screens are everywhere, phones, computers, train timetables, ordering systems.

Data Centres

- Quantum computing
- Need for green surplus renewable energy

Theme: Environmental concerns – damage to environment?? (N=20 – 24.5%)

Under this broad theme, different sub-themes emerged related to people's explicit concerns about the environmental effects of digital technology. These sub-themes were concerns about the source of materials used to develop digital technologies, including batteries – are they sustainable, non-toxic, recyclable; the source of energy itself – is it renewable/sustainable; and behaviour change around how we use energy – we need to reduce our use of/reliance on digi-tech to reduce energy consumption. Some people in this sub-theme questioned how their own use of such technologies affected the environment.

Visitor responses

Sub-theme: Source of materials

What do we have to mine to make the digital technologies?

- not just the battery, but all components

What is sustainability/toxicity of material you work with?

Recycling is the future

- eg e-waste and recovery of raw materials
-

Sub-theme: Source of energy

Not an issue re: the amount of energy used, but where the energy originates from [is]

Concerned about the amount of energy used and where it comes from

- type of energy

In the growth of tech we use more electricity

Our planet has finite resources

- agree

It must be sustainable

- agree

- sustainability question-finite
-

Sub-theme: Seeking behaviour change/questioning behaviour

Stop using so much energy.

We need to save water and everything that is special to you and the one that you know is important.

Only use energy when you need to

I think that we need to save as much energy as we can. Devices use so much energy and we need to save it [energy] (student)



How much is my job affecting the environment?

Too much technology will ruin the environment

Hyperaware about energy consumption of digi-tech. Concerned about this on many levels, personal use and large units such as the Dept of Defence.

Theme: Outliers (N=3 – 3.7%)**Visitor responses**

AI

Increasing efficiency [of devices] is important to save electricity bills

Digital technology uses and contains a lot of energy. Because it contains lots of energy and power that creates its energy

Theme: General agreement that digi-tech uses lots of energy (N=3 – 3.7%)**Visitor responses**

I agree

I agree

Correct. Yikes!

Theme: Just cool science (N=3 – 3.7%)**Visitor responses**

Amazing – superconductors

Interesting

I think this discovery could be incredibly useful in the future – the discovery is the material that saves energy

Theme: Unspecific concerns? (N=2 – 2.4%)

These comments express general concerns and questions about the energy consumption of digital tech

Scary! What are the future implications?

Have we enough energy?



Appendix 2. FLEET volunteer responses to a survey to understand the impact of outreach for FLEET members.

FLEET volunteer survey, FLEET member responses and coding.

| Survey question | Volunteer response | Initial coding [Focussed coding] |
|--|---|--|
| 1. The big picture: In the context of the value you got from volunteering at Sydney Science Trail, can you tell me about your experience? (A deliberately broad and open question to try find a breadth and depth of perspectives) | <p>The experience was great, I got to learn to demonstrate the Mobius strip superconducting experiment and show it to general public.</p> <p>As it was already my second time volunteering here, my experience tells me it is always fun to interact with general public and observe their expressions to levitating superconductor and superconductor running on the Mobius strip.</p> | <p>Finding the experience great [Enjoyment in engagement]</p> <p>Getting to learn how to operate the superconductor</p> <p>Continuing to find the experience fun Finding it fun to interact with the public Enjoying watching expressions on people’s faces when they see the superconductor [Validation, affirmation]</p> |
| 2. How did volunteering at Sydney Science Trail contribute to your skill set as a scientist? (ie here I am talking about your skills beyond the 'lab bench' or research you do) | <p>I personally didn’t know much about superconductors – now I am more informed. I also enjoyed interacting with the public and explaining them about my work.</p> <p>Increases my public speaking skills and handling crowd (keeping them engaged)..</p> | <p>Becoming informed about the superconductor Enjoying the interaction with the public Enjoying explaining her research [Enjoyment in engagement]</p> <p>Improving their public speaking and communication skills [Learning transferable skills]</p> |



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| <p>3. What did you learn about the public's perspective on FLEET's or your own research?</p> | <p>The public was interested in FLEET and my own research</p> <p>I like when somebody asks what's the application of your research? Where will you use it? I understand not every physics research have any direct application like particle physics but working in a field like 2D materials have potential research translation impacts, makes me feel proud of my research. And then to see, their positive response to my answer adds to my motivation. Though, no hard feelings for other research areas as I do like working in particle physics as well 😊 .</p> | <p>Learning that the public are interested in their own research [Validation, affirmation]</p> <p>Enjoying questions about the value of their research [Validation, affirmation]</p> <p>Appreciating being able to engage the public on the real-world applications, the potential of their research to have real value Feeling proud to be involved in research with real translational potential Being motivated about their research by positive feedback from the public [Validation, affirmation]</p> |
| <p>4. How, if at all, did this awareness of the public's perception of FLEET/your research make you think about the role of communication/engagement and how you communicate to others outside your area of research expertise?</p> | <p>I liked to be able to communicate physics concept with simple words and ideas.</p> <p>Every outreach experience teaches me a better way to explain few things to general public. As long as I feel that the people I am talking to, are paying attention to what I am showing or talking about, I feel happy as I</p> | <p>Enjoying finding simple ways to explain physics [Learning transferable skills]</p> <p>Learning better ways to explain physics to the public [Learning transferable skills]</p> <p>Feeling happy when he has an engaged public Feeling he is doing a good job when they</p> |



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| | think I am doing a good job. | are successfully engaging their audience [Validation, affirmation] |
| 5. Any other comments you have about the event generally - its value for FLEET, ability to engage with the public, not enough/too many volunteers, more interactive stuff needed...etc | I think it was overall well-organized. | |