



Melbourne Knowledge Week 2022

Evaluation - Summary

Event: Melbourne Knowledge Week

Date: 9-15 May 2022

This report is a summary of the evaluation of the Melbourne Knowledge Week event. A full report is available.

Event description

Melbourne Knowledge Week (MKW) is an annual festival that brings Melburnians together to explore and discuss, to share ideas, to challenge assumptions, and to spark new ways of thinking. Across seven days, the broad program of events included workshops, performances and interactive exhibits of which FLEET participated in the latter. FLEET's interactive display used the mobius strip, jumping rings, Van der Graff machine and a build-a-circuit kit for kids (and adults) to experiment with and build different circuits. We had up to three FLEET volunteers (four on weekends) managing the exhibit at any time to engage with the public.

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.
- 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 is an estimate of the number of people that visited the FLEET exhibit.

Weekday (Mon-Frid): 25-30 people per day

Weekend (Sat-Sun): 90-120 people per day

Similar to the 2021 MKW event, a significant element of the public engagement was the quality of each engagement. The shortest conversation with any member of the public was about 5 minutes. The longest was at least 30 minutes with most being about 10 minutes. In-depth conversations were most prevalent on the weekend days. Any conversation covered the motivation for FLEET's research, the varied research problems that underpin the research, the research itself and the social implications of FLEET's research.

Most of the audience were adults, though on the weekends a lot of families with younger children (<10 years) came to the event. This year, there were no organized school groups at



the event, though two small groups of secondary students visited the exhibit that were in the city for other reasons.

Key engagements

- Melbourne Lord Mayor, Sally Capp, and three councillors visited the FLEET exhibit
- Channel 31 TV interviewed Jason Major for a segment in Ch31 programming.

Key findings

- The public had zero or only low awareness of the increasing energy use of digital technologies. Once aware of the problem, the public had a relatively high concern, which is a similar finding to the 2021 MKW survey.
- The role of ESG (Environment, Social and Governance) was a key concern in the context of FLEET research and how it might be applied.
- A sustainable digital future was the ultimate outcome that people sought, though it had to come via responsible innovation.
- People thought critically about FLEET research at FLEET's research problem.
- Dialogue was important to facilitate acceptable research and sustainable outcomes
- Volunteers gained a new perspective and understanding of the public as an audience that enabled more effective communication. They saw value in communicating with the public. There was reinforcement that their research has value and meaning.

Evaluation

To evaluate Melbourne Knowledge Week the following pre- and post-evaluation tools were developed:

- A short pre-evaluation, two-question survey
- Mind map
- Notes on conversations with the public
- Online exit survey

Pre-evaluation

A two-question survey was used to assess public awareness and concern about the increasing energy demand of digital technologies, the problem motivating FLEET research. The survey results indicated the public visiting the FLEET exhibit typically had zero or low awareness of the increasing energy use of digital technologies. Once aware of the problem, the public had a relatively high concern with most people being moderately or extremely concerned about the increasing energy consumption of digital technologies.

Mind map and observation notes

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.

FLEET wrote the following comment to trigger a discussion and start a mind map: Digital technology uses a lot of energy.



People visiting the FLEET exhibit were asked to think about and contribute their thoughts on the comment following their engagement with the FLEET exhibit. Because the themes that emerged in the mind map also emerged in the observation notes, the two data sets were integrated.

Two core themes emerged from the mind map and observation notes: The role of ESG (Environment, Social, & Governance), and Research and Development. A secondary theme, dialogue, was also important and closely linked to the contributions in the core themes. The outcome that all mind map participants were targeting was a sustainable digital future. In nearly every contribution to the mind map and what was recorded in the observation notes there is evidence of critical thought that is based on concerns about the research into low-energy electronics and the implications of any technology that might be commercialized from such research. See Figure 1 below.

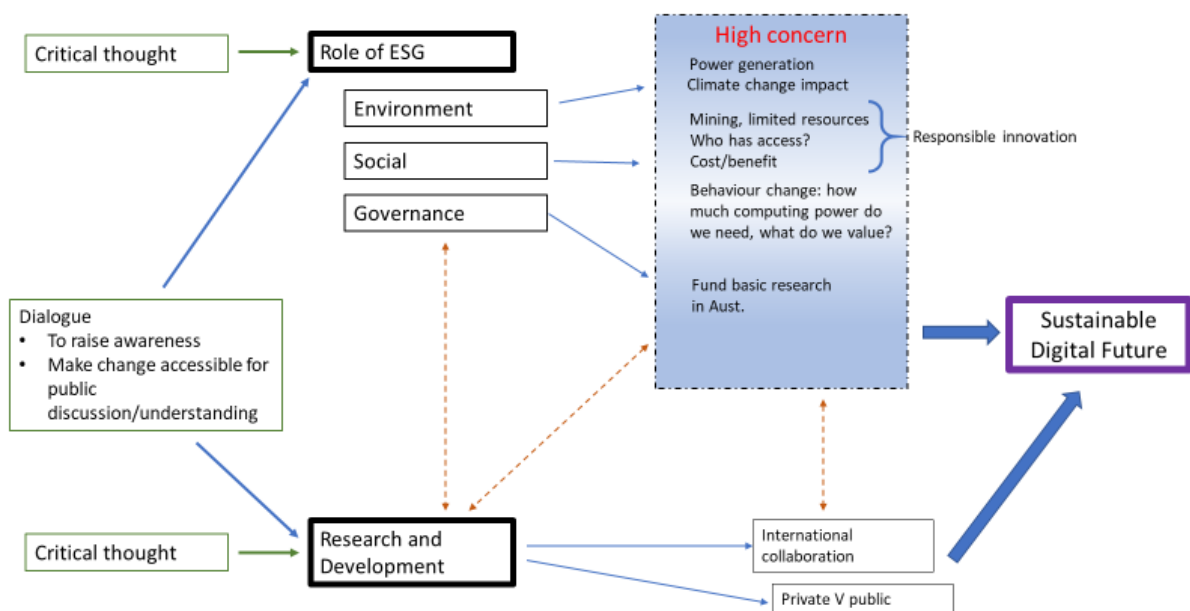


Figure 1 Model of themes and concepts that emerged from the 2022 Melbourne Knowledge Week Mind Map and observation notes

Exit survey

An online exit survey that asked participants six questions was conducted with 22 members of the public. The six questions are below. I provide a brief overview of the analysis of questions 2-5. A detailed analysis is in the full report.

Exit survey 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. Public money spent on research that could reduce the energy used in digital technologies is well worth spending.

Question 2. The responses to this question were grouped under the following six themes:

- **Scientific effort:** people recognized and placed some value on the scientific efforts to develop tech that could have a positive impact on the energy efficiency of digital technologies.
- **Remembering Cool tech/research:** People considered the research as “cool” or their recollection was of a specific technology such as the superconductor or topological insulators.
- **Remembering some science:** Respondents recalled some science such as how magnetic locks work, or that resistance = heat.
- **Environmental concerns – digital energy consumption:** Responses reflected the concern about the increasing energy consumption of digital technologies and the potential environmental impacts of this.
- **Social concerns – responsible innovation:** Recognition that any research needs to be considered alongside its potential social cost.
- **ARC fundamental research recognition**

Question 3. There was strong agreement among the public that their experience with FLEET changed their understanding of society’s use of digital technology. See Figure 2.

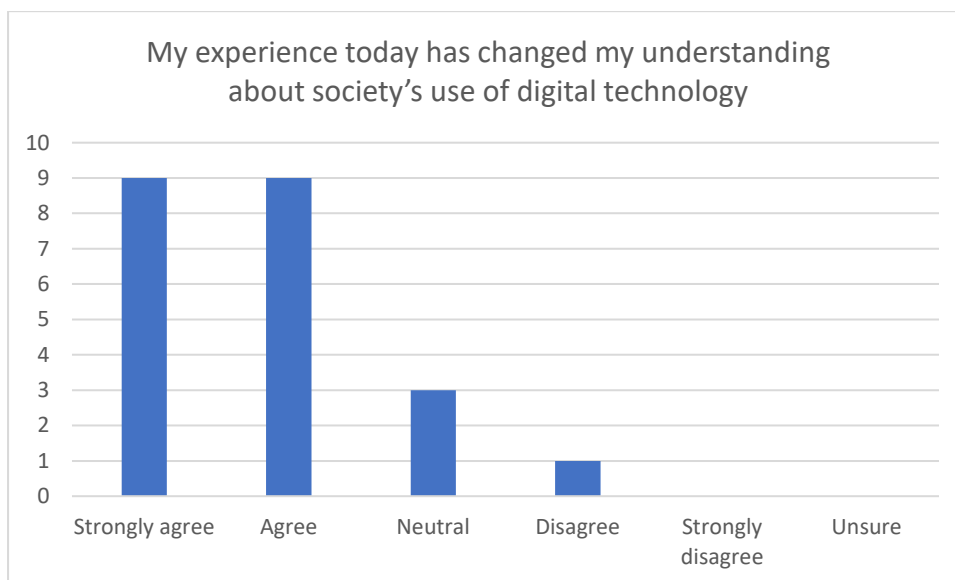


Figure 2. Responses to survey question, My experience today has changed my understanding about society’s use of digital technology

Question 4. The majority of survey respondents think that low-energy technologies will have some impact on their lives. See Figure 3.

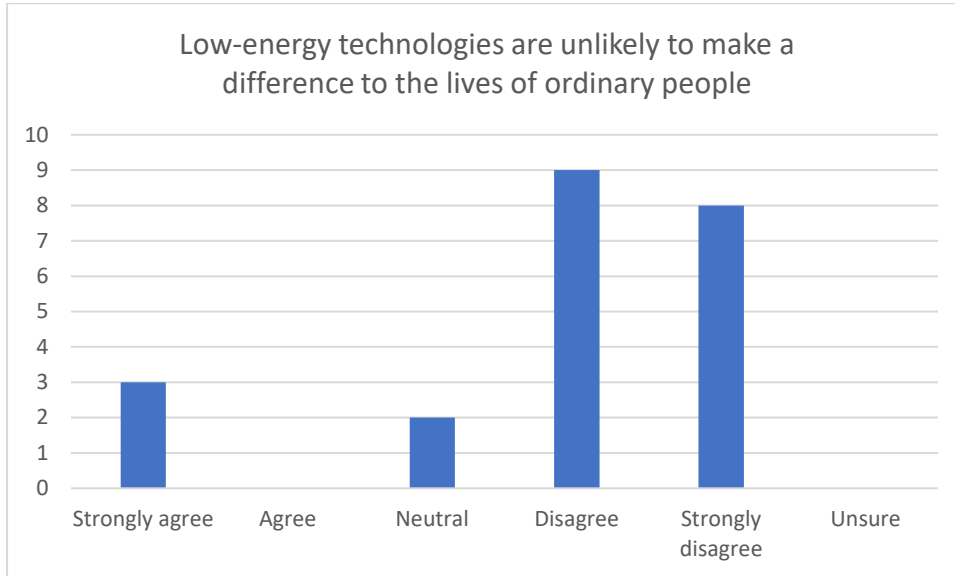


Figure 3. Responses to survey question, Low-energy technologies are unlikely to make a difference to the lives of ordinary people

Question 5. The majority of respondents disagree with the idea there is always a technological solution to problems such as the energy consumption of digital tech. See Figure 4.

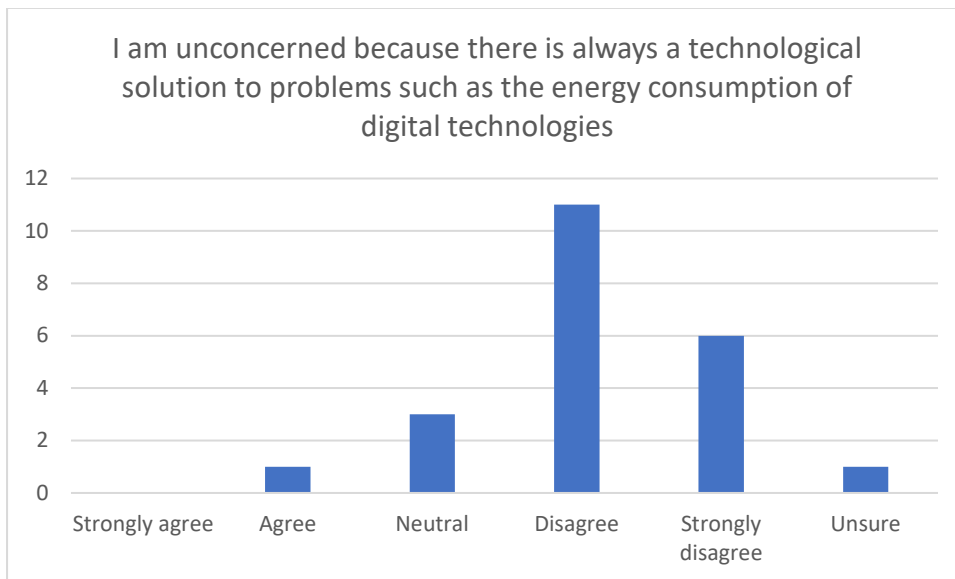


Figure 4. Responses to the survey question, I am unconcerned because there is always a technological solution to problems such as the energy consumption of digital technologies

MKW Impact

While FLEET only engaged with about 300-350 people over the period of Melbourne Knowledge Week, each engagement was of high quality relative to achieving our objectives. Nearly all conversations with visitors were in-depth and examined not only FLEET research, but the implications and perceived value of the research.



FLEET

ARC CENTRE OF EXCELLENCE IN
FUTURE LOW-ENERGY
ELECTRONICS TECHNOLOGIES

With the exception of achieving in students a greater interest and awareness of physics, FLEET achieved all of its other objectives. Most people that visited the FLEET exhibit were previously unaware of the increasing energy consumption of digital technologies and the implication of this. In the exist survey, mind map and observation data, visitors overall reported awareness and concern for the increasing energy consumption of digital technologies; there appears to have been an impact on visitors' understanding of society's use of digital technology; visitors thought critically about the implication of this problem and research such as FLEET's that is trying to develop technologies to help solve the problem, for instance visitors revealed a strong social concern that any technology must have social acceptance, but that science is not the only solution to the problem. There was an appreciation for what FLEET was trying to achieve, even if for a lot of people there were questions about ESG.

There were insufficient students that visited the exhibit to understand if we had an impact of student appreciation and awareness of physics. We have raised this in feedback to the City of Melbourne because we think this is a good excursion opportunity for schools and with planning we could develop materials and activities for students to do while visiting event.

FLEET had nine volunteers helping over the week of the event and three completed a survey to evaluate their experience relative to FLEET's objective for the event. The themes that emerged strongly reflected those from the 2021 volunteer survey analysis. FLEET volunteers gained a new perspective and understanding of the public as an audience that enabled more effective communication. They saw a value in communicating with the public. There was reinforcement that their research has value and meaning and all volunteers that responded reported they perceive such experiences improved their communication skills.

Caveats/Limitations

As noted already the public survey response was low and alone it is not a strong indicator of impact, but it supports and strengthens the other evaluation data used.