Challenge Based Learning for Social Innovation

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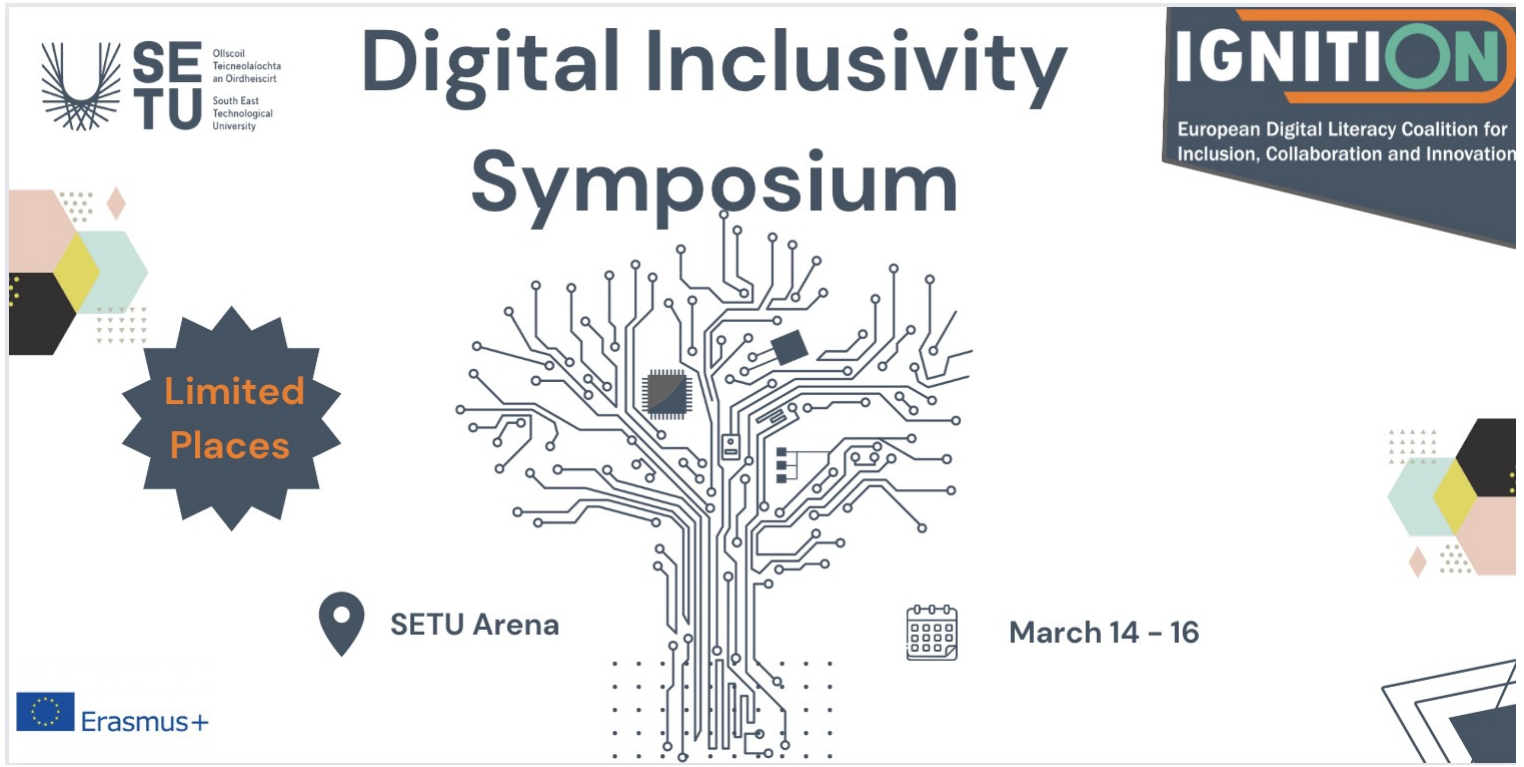


About me

- Former secondary school science teacher
- MSc Business Management/ PhD in Entrepreneurship Education
- Worked in DCU, Dublin & PNU, Riyadh for 10 years – now UL
- Work with startups and innovation depts (open innovation, entrepreneurial teams, education)
- Large class teaching & pedagogy

OPEN SOURCE VOLUNTEERS • COVID-19 EMERGENCY KIT •
Team OSV

Opening Round
EAGUE 3
SENEGAL
SWAZILAND
AZERBAIJAN
TAJIKISTAN

Previous CBL/Hackathon Experience

- Have participated as mentor or judge at 50+ online/offline Hackathons (Techstars, corporate, SW Dub Women).
- Created Irelands largest annual Unversity hackathon series (DCU Hack4Change)
- Published works on the efficacy of hackathons and their pedagogical importance
- Large international research project underway (Expected 2000 respondents)

November 18, 2020

DCU'S LIFE PROGRAMME: INSIGHT INTO AN AWARD WINNING BUSINESS AND ENTREPRENEURSHIP MODULE

What is Social Innovation?

- The creation of new ideas displaying a positive impact on the quality and/or quantity of life (Pol and Ville, 2009, p. 884).
- Innovation that is driven by the social needs of its intended rather than profit-seeking.

- A fitting pedagogy should foster socially aware students; who have both critical and systems thinking skills, **empathy** and an appreciation for human behaviour, and who can leverage innovative competencies to develop **solutions** for positive social impact (Lyons and Bender, 2023).
  - Orientations of system thinking, co-creation, and sustainability (Wang et al., 2022).
  - "transformative ambition" (Unger, 2015, p. 233-34)

What is Social Innovation Education?

…a collaborative and collective learning process for the empowerment and socio/political activation of students to drive positive change no matter their professional pathways. SIE builds students' competences to identify opportunities for social value creation, to form collaborations and build relationships and take innovative action for a more democratic and sustainable society.

(Kalemaki et al. 2021, p.390)

Challenge Based Learning as a Vehicle for Social Innovation

What is Challenge Based Learning?

An experience where the learning takes place through the identification, analysis and design of a solution to a sociotechnical problem.

The learning experience is typically multidisciplinary, takes place in an international context and aims to find a collaboratively developed solution, which is environmentally, socially and economically sustainable.

(Malmqvist, Rådberg, and Lundqvist 2015, 87)

Elements of CBL

- Stakeholders from discrete domains, acting in a collaborative capacity (co-creation) (Garay-Rondero et al. 2019; Membrillo-Hernández et al. 2018)
- A focus on urgent sustainability and social issues (Garay-Rondero et al. 2019).
- Process focus more than output focus (Gallagher & Savage, 2020).
- Authenticity: engagement in real-world challenges (Conde et al. 2017, 252)
- Technology supported and enabled experiences (Gallagher and Savage, 2020)

Spectrum of CBL options

Level of embeddedness

Icebreakers	Engaged workshops	Modules	Programmes
Classroom activities	Hackathons	Certificates	
	Applied projects		

There are a range of entry points into challenge based learning

Spectrum of CBL options

Level of embeddedness

Icebreakers

Classroom activities

Engaged workshops

Hackathons

Applied projects

Modules

Certificates

Programmes

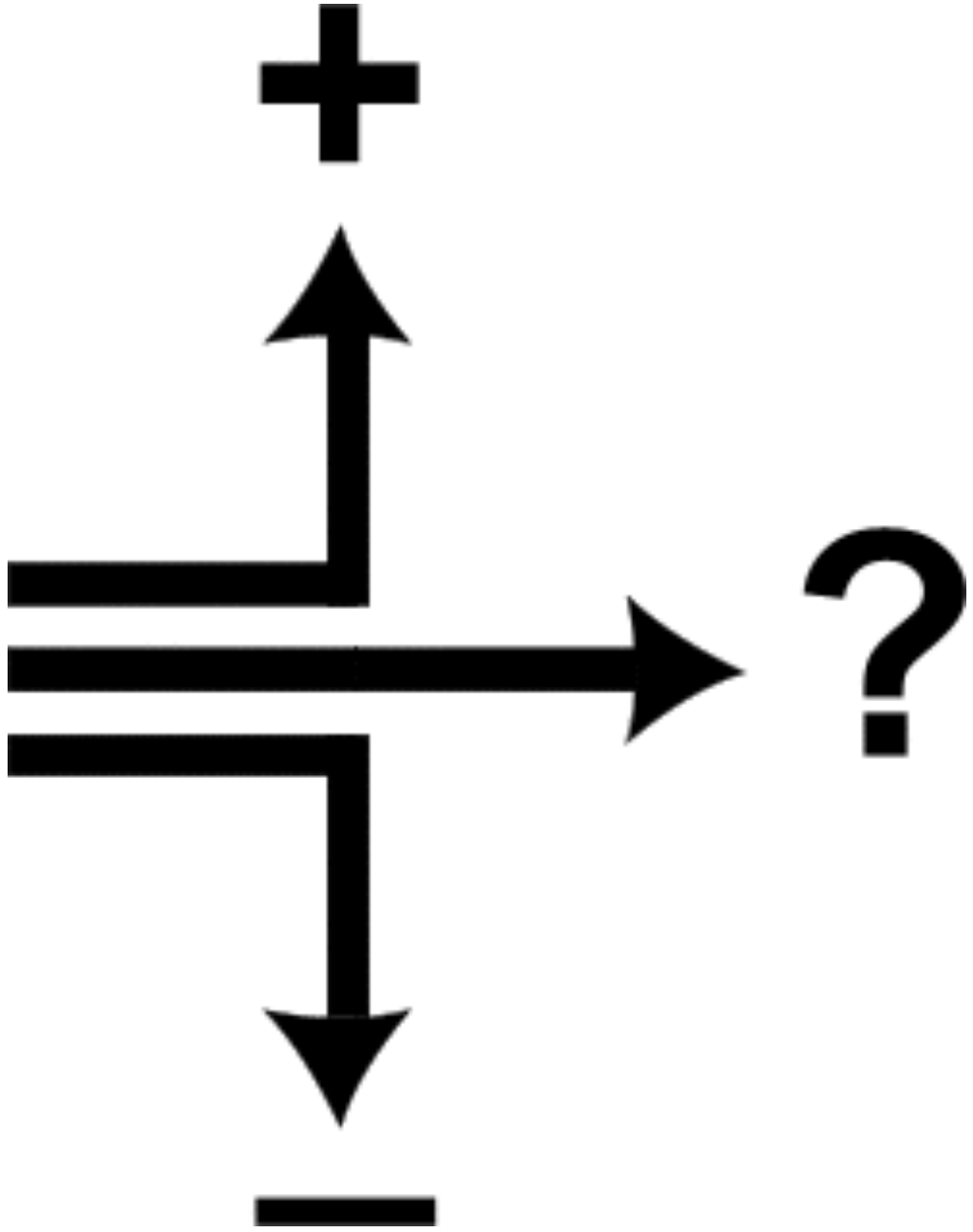
There are a range of entry points into challenge based learning

“All cars must be painted yellow by law”

3 minutes to **“Discuss…how will this change things”**

P.M.I.

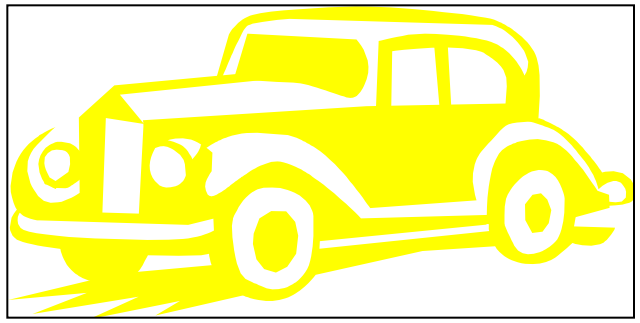
Plus, Minus, Interesting



Law Enforcement

Drivers

Children



Manufacturers

Elderly People

“All cars must be painted yellow by law”

Animals

Environmentalists

Spectrum of CBL options

Level of embeddedness

Icebreakers

Classroom activities

Engaged workshops

Hackathons

Applied projects

Modules

Certificates

Programmes

There are a range of entry points into challenge based learning

We need students to immerse themselves

The way they consume is different

They need to feel they can contribute to something larger than themselves

What is a hackathon?

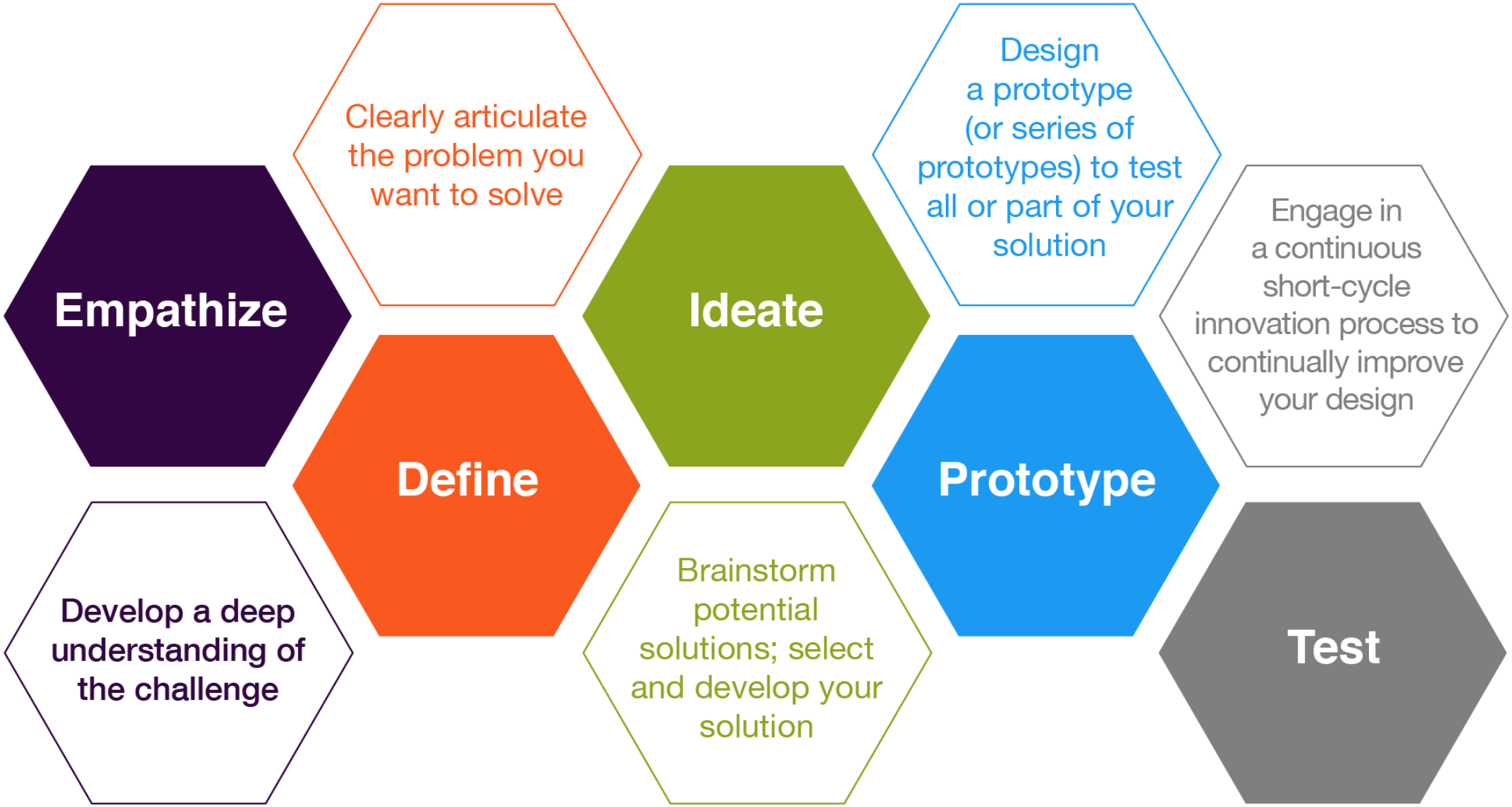
A hackathon is a live event where participants commit to a problem or project in a short-form intensive working group (Čović & Manojlović, 2019).

They engage students, employees, or citizens in collaborative challenges, devising innovative solutions which may lead to the creation of new start-up ventures.

Hackathons are intended to be experiential, active, and filled with expert and peer interaction.

What is a Hackathon?

- Derived from the words '**hack**' and '**marathon**'
- Initially hackathons were used in the IT community where programmers, project managers, and designers collaborated intensively on software projects to co-create novel solutions (Kienzler & Fontanesi, 2016).
- Increasingly, they are being used as a method of engaging students, employees and citizens in collaborative project events – many to create start-ups or innovative corporate ideas, or to consider wicked/complex problems.



The Explainer: What Is Design Thinking?
https://www.youtube.com/watch?v=_WI3B54m6SU

International Examples of Note

HACKMIT 2021

Famous student innovation hackathon based in MIT. Admissions puzzle to enter. Check out their resource list.

- **Amazon Sustainability:** Publicly available datasets on sustainability
- **City Bike API:** Bike sharing data
- **Data.gov:** Hundreds of datasets related to sustainability and its benefits
- **Envirofacts:** API to access EPA environmental data in U.S. EPA databases
- **EPA:** Data repositories from the United States Environmental Protection Agency (EPA)
- **Google Sustainability:** Data sources and modeling capabilities
- **Microsoft:** Open source tools and API to support sustainability and environmental science
- **OECD:** Datasets on environmental data and sustainability
- **Planet OS:** Data catalog of weather, climate, and environmental data

NASA INTERNATIONAL SPACE APPS CHALLENGE

The event is held annually at the beginning of October in over 320 various locations for 48 hours. The goal is to address real-world problems about space and earth using NASA's free and open data. In 2021, NASA had 28,000 participants from 162 countries, with over 2,500 projects from 28 challenges.

Founded in 2014, HackZurich rapidly became Europe's largest and most prestigious Hackathon. Every year, 600 international participants, selected from a global pool of 5500 applications, representing several elite universities from more than 85 countries, are invited to Zurich. Here these tech talents develop highly innovative web-, mobile- and hardware applications during a 40-hours hackathon in teams of 2 to 4 people.

VIENNA TICKETHON

Citywide or community based hackathons engaging citizen innovation are growing. E.g. In Vienna Wiener Linien – the public transport operator leveraged a hackathon to get a digital ticketing prototype, and in doing so – buy-in/engagement from the public and media.

The event drew over 30,000 people from across the EU and saw 2,164 project submissions related to various areas of the pandemic. Here's a breakdown of how the projects were spread:

Health and life - 899 projects
Business continuity - 381 projects
Remote working and education - 272 projects
Social and political cohesion - 453 projects
Digital finance -- 76 projects
Other challenges - 83 projects

117 finalists and winners were selected and attended the later EUvsVirus Matchathon (22-25 May) and Demo Day (21 May), where they were matched with investors, accelerators and venture capitalists.

Example: Embedded Hackathon in Module

- 1st year enterprise education module for business students.
- 7.5 ECTS, yearlong.
- 650+ students annually.
- Team taught. Experiential & blended – created to be hybrid
- Developed using best practices from entrepreneurship education research
- Created using the Entrecomp framework
- Peer-reviewed by leading experts incl. Prof. Candida Brush (Babson)
- Co-created with an industry advisory board

Aiming to build entrepreneurial and innovative self-efficacy and competencies in a broad student base.

Lets see one in action:

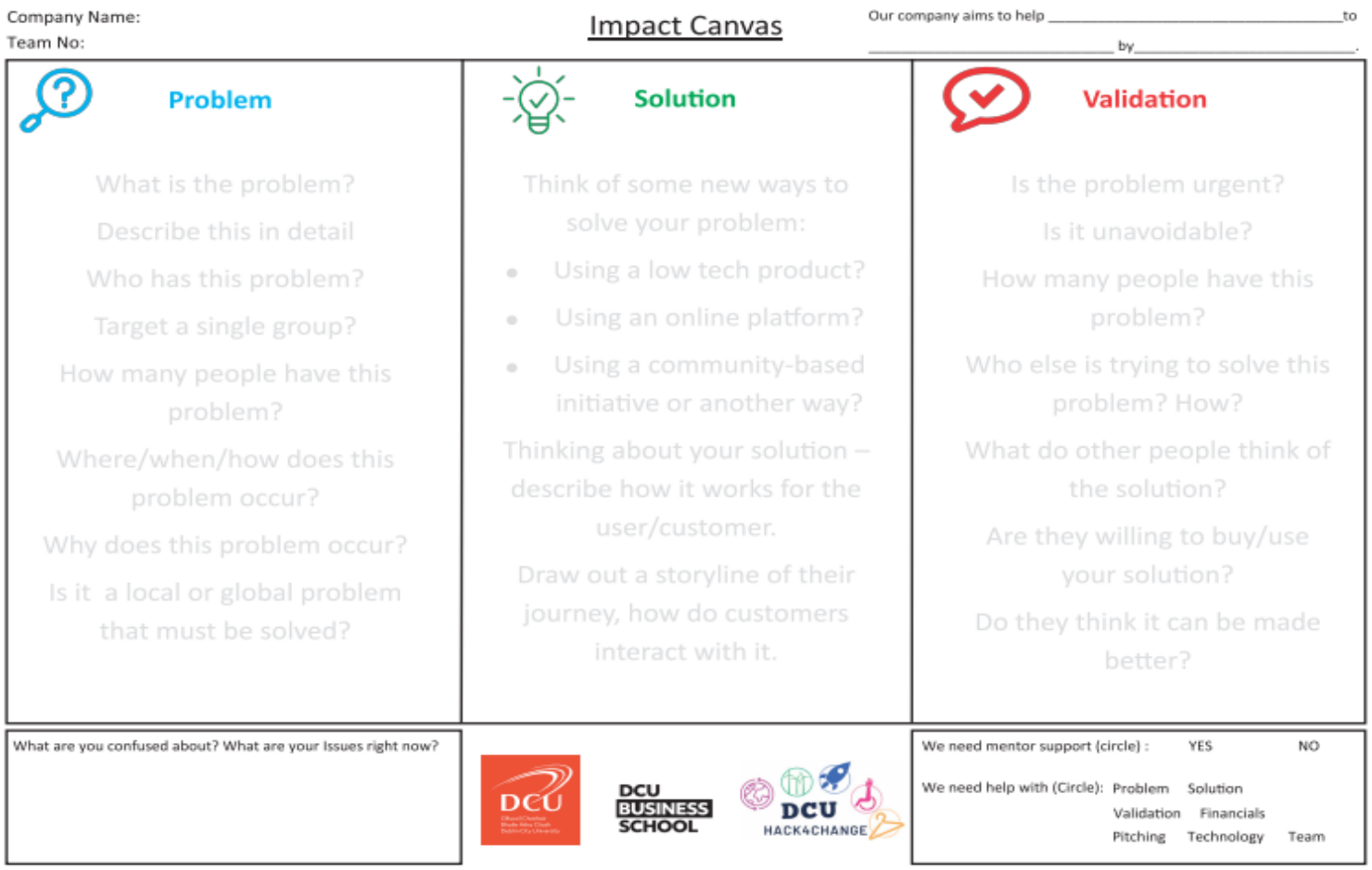
Hackathon Format

- Form Teams
- Analyse Theme, Topic or **Problem**

- Brainstorm/Ideate
- Devise a **Solution**

- Receive feedback and mentorship
- Develop concept and try to **Validate** it

- Develop presentation
- Pitch to judges!



Company Name:
Team No:

Impact Canvas

Our company aims to help _____ to _____ by _____.

Problem

What is the problem?
Describe this in detail
Who has this problem?
Target a single group?
How many people have this problem?
Where/when/how does this problem occur?
Why does this problem occur?
Is it a local or global problem that must be solved?

Solution

Think of some new ways to solve your problem:
- Using a low tech product?
- Using an online platform?
- Using a community-based initiative or another way?

Thinking about your solution – describe how it works for the user/customer.
Draw out a storyline of their journey, how do customers interact with it.

Validation

Is the problem urgent?
Is it unavoidable?
How many people have this problem?
Who else is trying to solve this problem? How?
What do other people think of the solution?
Are they willing to buy/use your solution?
Do they think it can be made better?

What are you confused about? What are your Issues right now?

DCU
DCU BUSINESS SCHOOL
DCU HACK4CHANGE

We need mentor support (circle) : YES NO

We need help with (Circle): Problem Solution Validation Financials Pitching Technology Team

Hackathon Format

Many also have aspects to entertain, inspire and appease participants, such as:

- Guest speakers
- Mentors with relevant experience
- Prizes
- Merch and/or meals/snacks
- Press/social media presence (to create a buzz)

The duration of a hackathon can vary from one day, a weekend, 48-hours spread over 3 days, or for prolonged periods such as a semester (Cobham et al., 2017; Kienzler & Fontanesi, 2016).

This has provided me with a very different perspective on entrepreneurship and opened up a whole new area of business that I never even knew existed.

Isabel Sinnott

This hackathon was intense, engaging and collaborative where we were inspired to create concepts that could be turned into ventures. Faria Salma Samia

I left DCU that day feeling inspired. Tara Sleightholme

How did we come up with the challenges?

What Topics Did the Students Work On?

For our 2021 hackathon we came up with over 300 topics related to social issue themes nominated by students. Students voted for their favourite 10 topics and were allocated to teams based on their selections. Here were the topics that made the Top 102.

Student nurses are heroes - pay them!!
Stress reduction
Social anxiety post-covid: Making friends
Social anxiety post-covid: Leaving home
Smart cities
Sleep disorders
Sign language for all
Save the bees!
Reintegration for ex-prisoners
Recycle properly
Recording the joy of post-lockdown for future generations
Racial discrimination in hiring/recruitment
Protecting our beaches
Preparing for extreme weather
Politics and the climate crisis - the need for urgency
Pizza boxes are garbage
Opinions based on algorithims - social media
Only people with money can afford to care about fast fashion
Only girls care about fast fashion
Online delivery packaging
Nursing homes and lonliness
More sustainable flying
Microplastics - tiny but terrible
Making the sneaker game more sustainable
Making takeaways more sustainable
Learning about other cultures
Keeping an excercise regime is hard!
Is the Forbes list good for mental health?
Irish tourism - how to repair our 'cead mile failte'
How to reignite interest in sports?
How to park electric scooters
How can sports continue to function?
How are people exercising?
Homelessness in Ireland
Have club sports changed?
Guiding youths from disadvantaged areas away from crime
Grow your own
Globally, ¼ of young women between 15-24 will not finish primary school
Global equity in the vaccination rollout
Food and nutrition, changing attitudes?
Far from home - the challenge of moving abroad for school/work
Exercise and emotional wellbeing
Empathy building: Technology enabled
Emergency response in climate disasters
Eating disorders

Why dont we all use more solar?
What parts of online learning would you keep?
What is direct provision?
We all deserve a party!!!
Water - the most valuable commodity
VR and sport - what next?
Universities and paper-waste
Understanding nutritional information
Understanding mindfulness
TikTokTikTok: social media and our lost time
The stigma around depression
The shift to EV worldwide
The housing crisis in Ireland
Technology and the aging population
Team sports for all
Sustainability guilt - its hard to be perfectly sustainable
Support Local

Mental health and climate anxiety - what can we do?
Making tree-planting cool
Making thrift stores more effective
Can our stepometers make us money?
Transport issues for those with accessibility needs
We treat tents like fast fashion
Going viral - why do people want to be influencers?
Celebrating neurodiversity
Bike theft prevention
Autism-friendly classrooms
Accounting in the future
Sustainable farming practices
Reducing our food waste
Reducing the student carbon footprint
Anger Management.
Addiction
Breaking the glass ceiling
Can our stepometers make us money?
Transport issues for those with accessibility needs
We treat tents like fast fashion
Going viral - why do people want to be influencers?
Celebrating neurodiversity
Can we use more plant-based materials?

Drug & alcohol abuse
Domestic violence
Do we check who made it?
Do graduates want to work remotely in the future?
Dealing with presentation/public speaking anxiety
Coping with social media
Coping with freedom post-lockdown
Cooking over Ordering-in
Concerts in the post co-vid era
Childhood obesity
CEO to worker pay gaps are shocking!
Celebrating cultural diversity
Will health habits change?
Bridging the gap between developed and developing countries
Body dsymorphia
Are uniforms a good idea?
Going vegan!
Fake news distress
Do footballers promote fast fashion?
Ditch the car
Inform ourselves: Global Crisis
Inclusive Festivals

ie/rois-in-novation/home

1. Why don't we all use more solar?
2. What parts of online learning would you keep?
3. The importance of pronouns
4. Water - the most valuable commodity
5. VR and sport - what's next?
6. TikTokTikTok: social media and our lost time
7. The shift to Electric Vehicles worldwide and in our villages
8. The housing crisis in Ireland affects us all
9. Sustainability guilt - it's hard to be perfectly sustainable
10. Social anxiety in the era of 24/7 digitisation
11. Smart cities for evolving citizens
12. Sign language for all
13. Save the bees!
14. Protecting our beaches
15. Racial discrimination in the workplace
16. Preparing for extreme weather
17. Increasing awareness about fast fashion
18. Nursing homes and loneliness
19. **WILDCARD:** We can do better! [Open-ended]
20. Irish tourism - how to repair our 'cead míle fáilte'
21. Far from home - the challenge of moving abroad for school/work
22. Exercise and emotional wellbeing
23. Feeling safe on our streets
24. Empathy building: Technology enabled
25. Body dysmorphia is a critical issue
26. Making concerts & festivals energy-efficient
27. Sustainable farming
28. Transport issues for those with accessibility needs

Student example

- Team topic: “Fast Fashion”.
- They chose to focus on: Christmas Jumpers
- Solution: Festive iron-on transfers for regular jumpers to avoid purchasing jumpers for the Xmas party.

The more defined the problem, the more specific the solution can be

Even as an online event – it can be done!

So what's next?

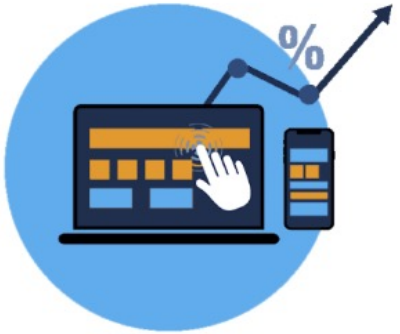
Hackathon Research Project Underway

- Studying the effect of different forms and formats of hackathons on student experiences of the university, climate change anxiety and entrepreneurial tendencies
- Expected 1500 student responses
- Contact roisin.lyons@ul.ie

Publications, Proceedings & Reports

- Lyons, R., Brown, M. & Donlon, E. (2021). Moving the Hackathon online: reimagining pedagogy for the Digital Age. Distance Education in China, 8, 60-70. DOI:10.13541/j.cnki.chinade.2021.08.007.
- Lyons, R. (2021). Escaping the Zoombie Mentality - Tools for the Online Entrepreneurial Classroom. Presented at 3E Conference – ESCB Entrepreneurship Education Conference. May, 2021.
- Lyons et al. (2021) Conducting an Enterprise Hackathon. Report created for DCU Teaching and Learning Committee.
- Harney, B., Pearce, A., Hovelja, T., Dziewanowska, K., & Lyons, R. (2020). Entrepreneurial Talent Management Development through Pedagogical Innovation: Three International Case Evaluations., In Black, K. and Warhurst, R (Eds.), Organisation Studies and HRM: An Educators Handbook.

Using technology



No-Code

PARKROYAL

Katie Mahon

- http://craftivist.ie/about-me/

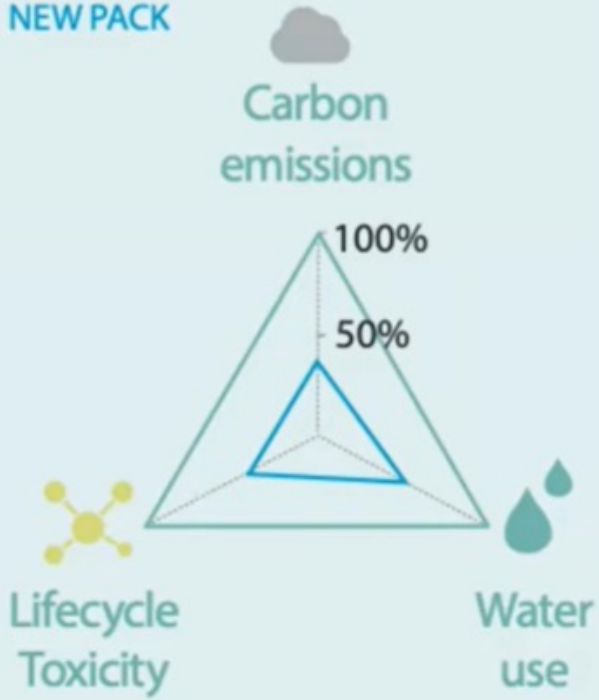
FSC
www.fsc.org
FSC™ N003028

The mark of responsible forestry

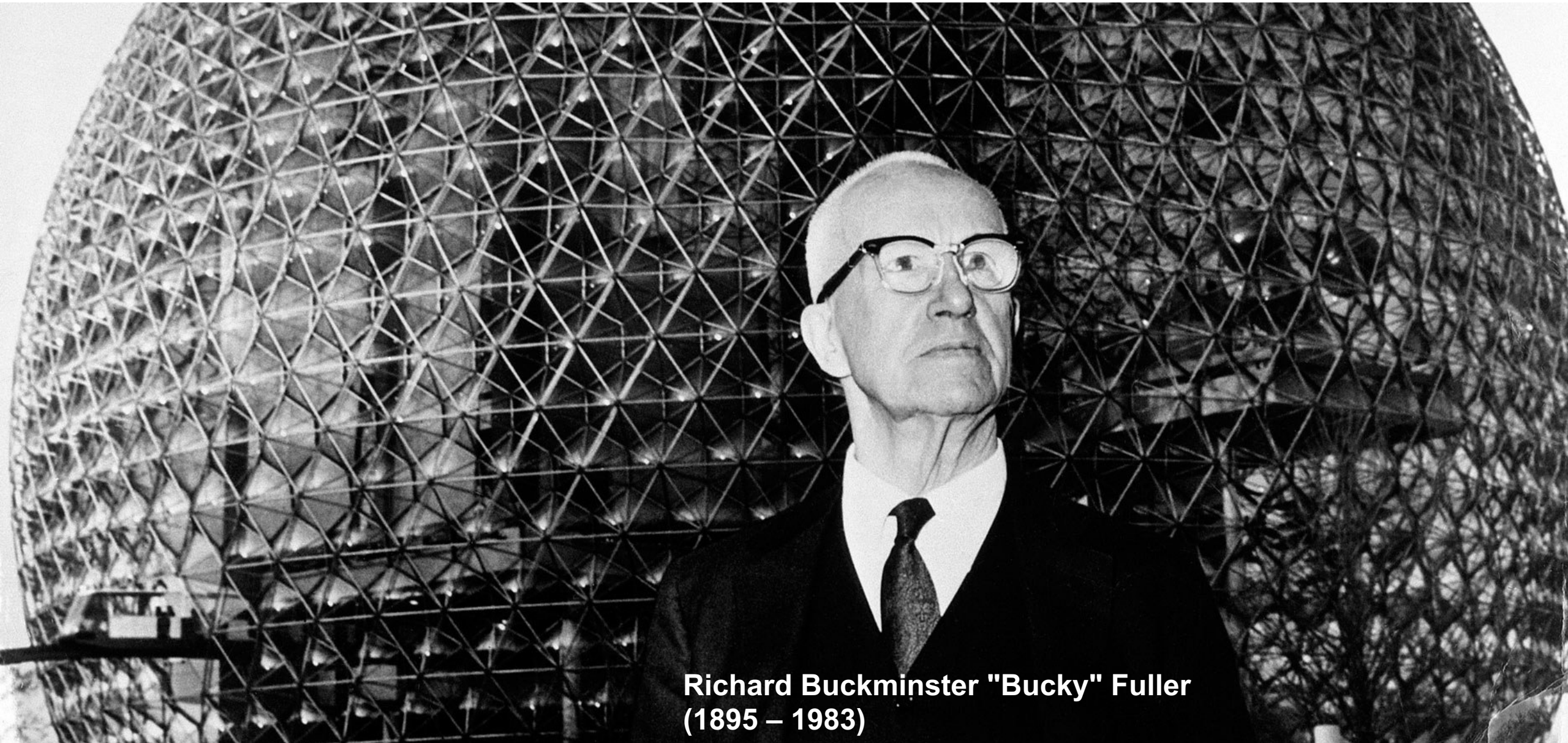
IMPACT ASSESSMENT

— OLD PACK

— NEW PACK



We are called to be architects of the future, not its victims.



Richard Buckminster "Bucky" Fuller
(1895 – 1983)

@rolyonz

For some teaching resources and ideas, scan here!

Thank you

UNIVERSITY OF LIMERICK
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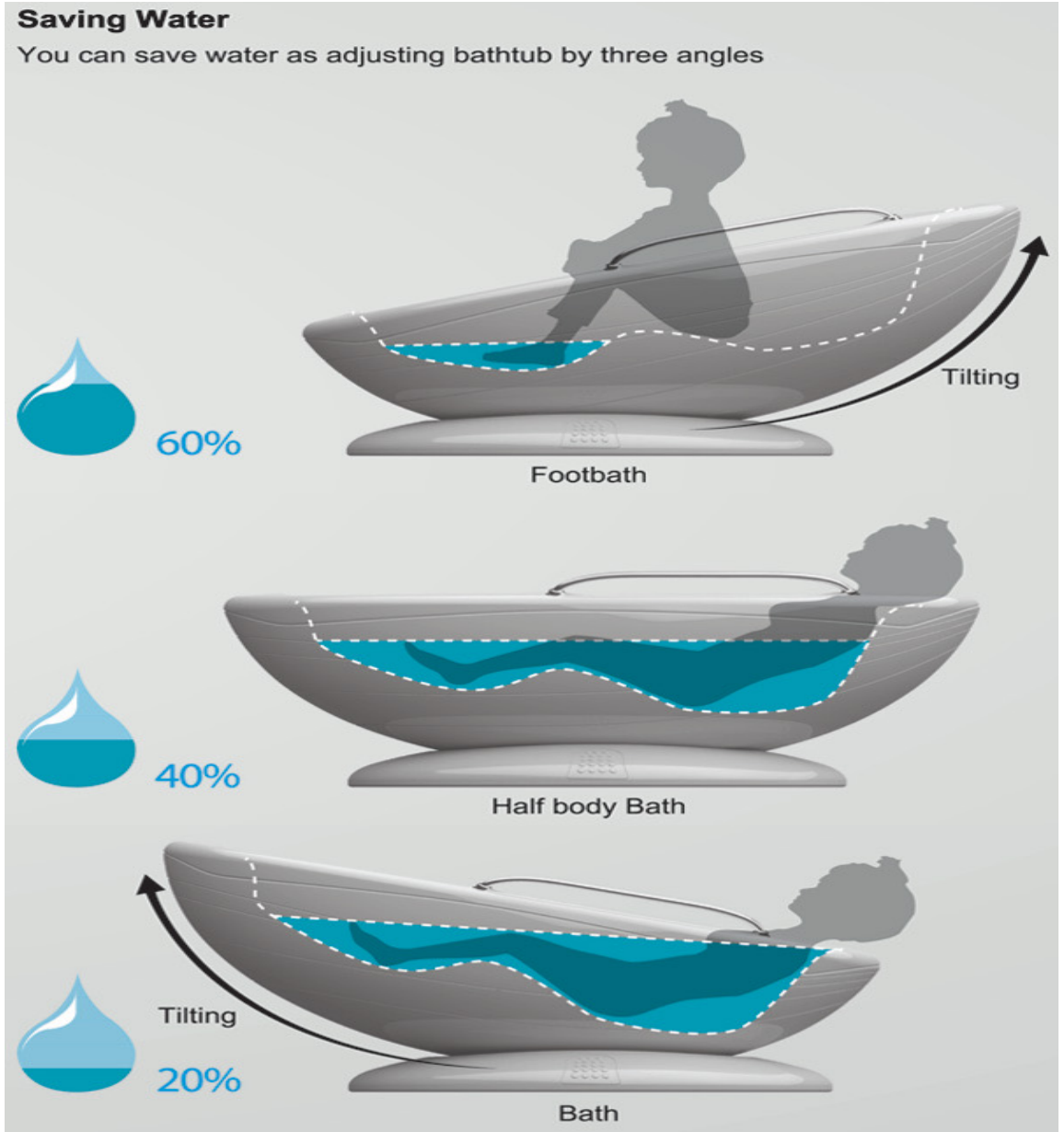
One more challenge!

Ineffective water use in our daily lives

Your turn

EXAMEN DE ADMISIÓN
3 DE MARZO
AIRE
ACCIÓN
UTEC
AGUA
UTEC PRESENTS:
THE FIRST BILLBOARD THAT PRODUCES
DRINKING WATER OUT OF AIR

Your turn


Saving Water
You can save water as adjusting bathtub by three angles
Tilting
60%
Footbath
40%
Half body Bath
Tilting
20%
Bath

3 LITRES PER DAY
sciarball

What are the challenges in using hackathons?

There are reasons to be sceptical

- They are costly to run and use a lot of time, resources and social capital (contacts)
- They can be reliant on a core teacher as champion – not sustainable
- They are fast-paced and use impromptu pitching techniques – which can make students anxious/lost/frustrated
- They are ‘live’ so multiple things can affect them (like pandemics and losing voices!)
- They may give participants a false sense of the complexity involved in start-up and solving innovative challenges

Consider the tone of the event

- Competitions and “Winners” for solutions to complex problems may be flawed.
  - *In social care Ed. participants found the competitive element detracted from the educational experience. (Cwikel and Simhi, 2022).*

- Be authentic – have the theme permeate the event
  - *E.g. A theme of inclusivity needs to have speakers from multiple diverse backgrounds*
  - *Sustainability hackathon – use recycled items!*

Inclusivity & Student welfare

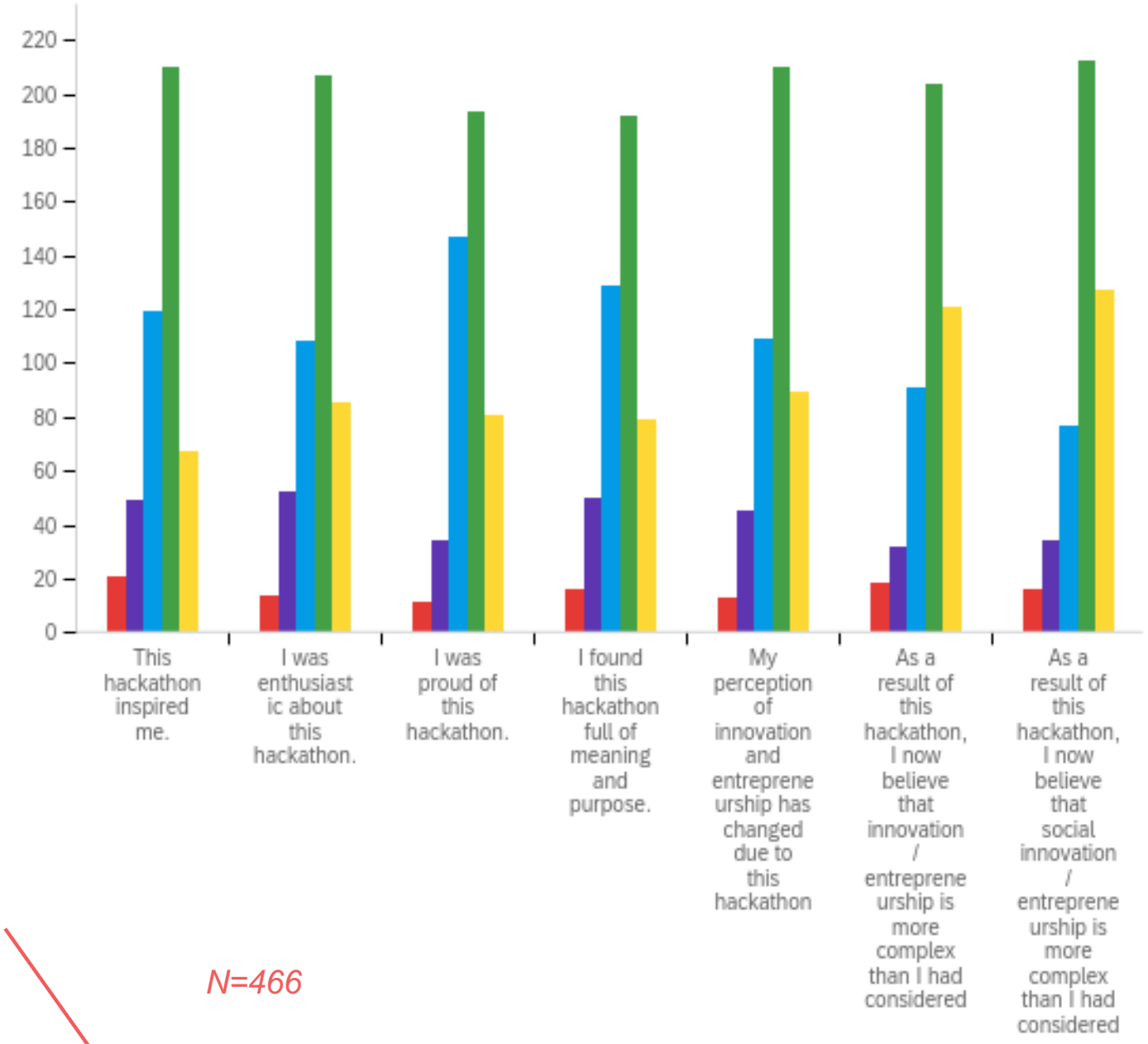
- Be aware that some topics may be triggering for students – prepare them
- Presentation anxiety post-covid is real
- Students with autism need to be considered in these large format groupwork situations (add quiet rooms)
- For large class contexts, build in some alternate deliveries (present as a conversation to one judge rather than a pitch in front of class)

Some early indications

Hackathons are immersive, yet accessible

They embrace hybrid learning methodologies

Are experiential and can be meaningful



N=466

A novel experience for students but also bounded

Before Hackathon	Mean	After Hackathon	Mean	Change
I was knowledgeable about the theme/social issue.	3.18	I am now […]	4.17	0.99
I could place myself in the shoes of someone who has had very different life experiences than me.	3.4	I can now […]	4.12	0.72
I understood how economic, political, cultural, technological and environmental forces impact current global issues and problems.	3.54	I now understand	4.14	0.6
I was knowledgeable about other communities and their problems.	3.47	I am now […]	4.13	0.66
I had been exposed to ideas about how the world could be organized in the future to better address some of the worlds major global problems and issues.	3.45	I feel exposed	4.13	0.68
I understood how social enterprises worked.	3.19	I now understand	4.19	1
I understood the process of coming up with a viable business idea.	3.55	I now understand	4.22	0.67
I was good at working collaboratively in a group.	3.91	I am now […]	4.26	0.35
I was good at presenting an idea to a group of people or a panel of judges.	3.32	I am now good	3.91	0.59

N=400