

BENDIGO
TECH
SCHOOL

STEAM learning with local partnerships

Achieving authentic STEM
education through industry and
community partnerships.



Ben Jenkinson
Director, Casey Tech School

Robbie Philpott
Head of Programs, Bendigo Tech School



LA TROBE
UNIVERSITY



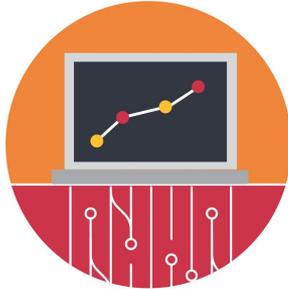
Tech Schools Victoria



10 Tech Schools



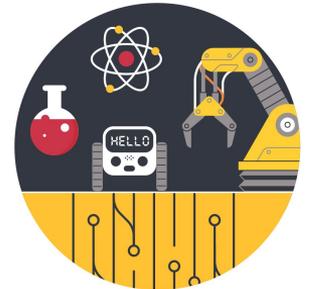
9 Tertiary Hosts



\$AUD 128 M
startup investment



120,000 students

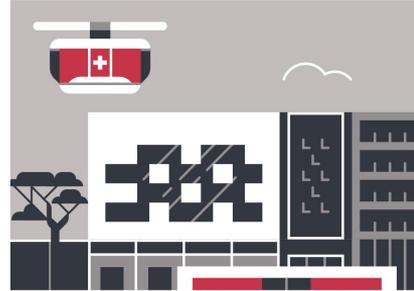


STEM Specialisation
connected to industry

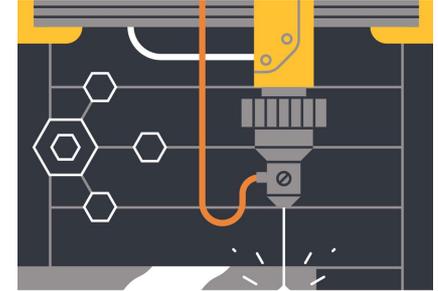
Industry Partnerships based on future jobs growth:



Food and Fibre



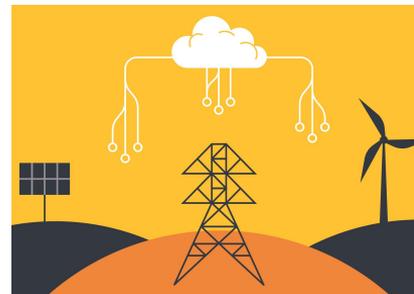
Health and Medical
Technologies



Advanced
Manufacturing



Transport, Construction, and
Defence

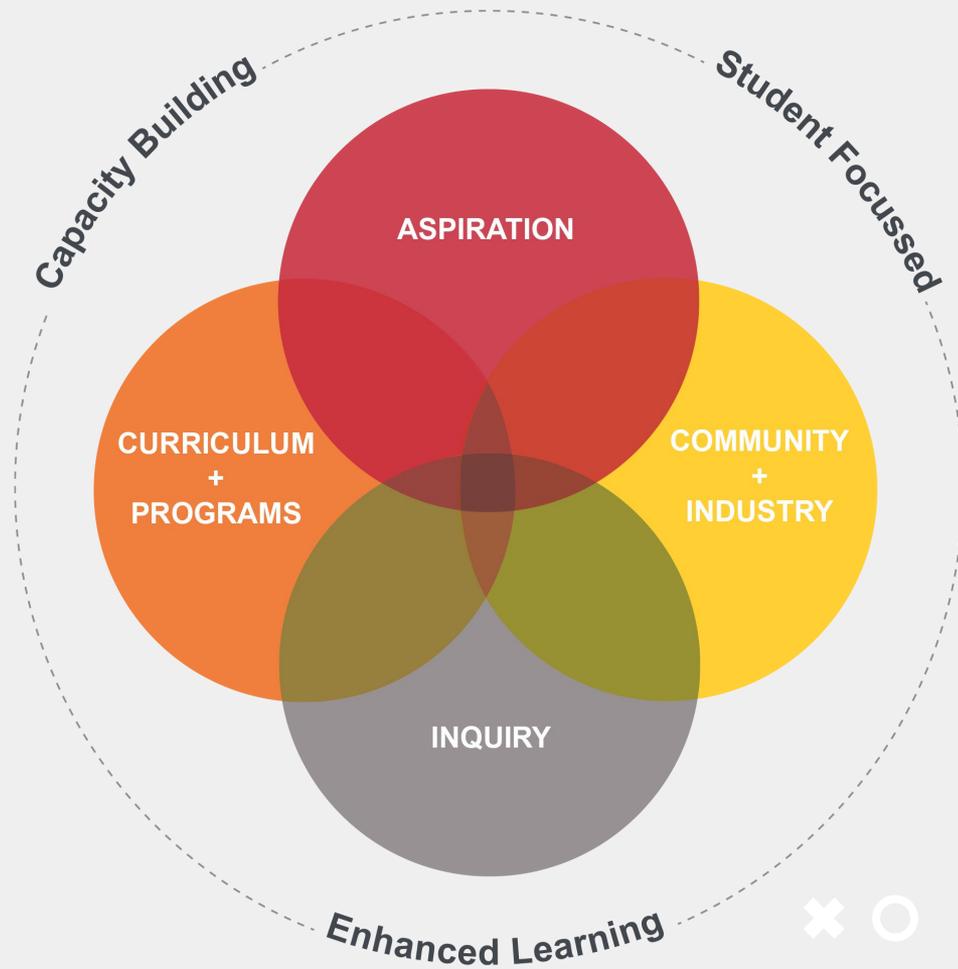


New Energies



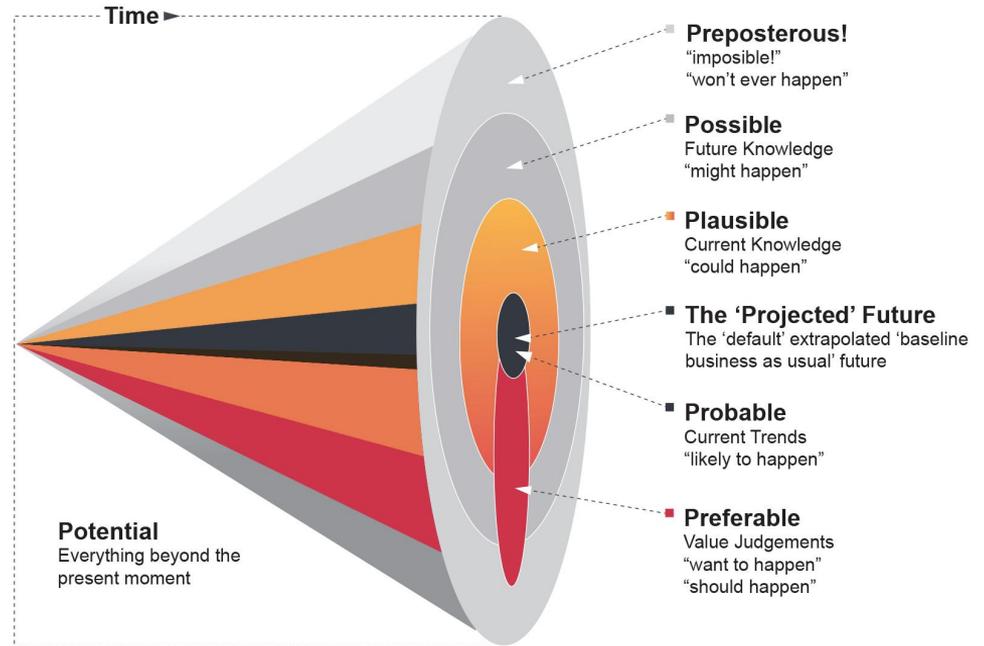
Professional Services
and Community

Tech Schools' Learning Model



Flexible programs | future-proofing:

- Predicting the future accurately can be difficult, shaping it is more difficult
- Industry insight informs program foci
- Iteration and creativity are actively promoted
- Learning comes from surveys, feedback and reflection
- PhD on Tech Schools, at La Trobe University (Aimé Sacrez)



BENDIGO
TECH
SCHOOL

2019 Housing Co-Design Workshop



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THE
EDUCATION
STATE



VICTORIA
State
Government



Housing Co-Design Workshop

The goal of today is to introduce you to the **Design Thinking Method** we use here at the Bendigo Tech School, **draw upon your expertise in Bendigo's housing sector** and challenge you to **come up with some creative solutions to potential housing problems.**

We hope to then get some of these problems you have encountered and **present these to students in a future Tech School program.**

YES, WE WILL BE USING "LASERS".

Where will your input go?



0
2

The input we get from you today will help us develop new programs for students. These programs will present students with similar challenges you face and give them the opportunity to develop their own creative solutions to them.

We have also been fortunate to continue to work with industry professionals such as yourselves and present some completed student projects for feedback which has been very empowering for everyone involved.

Where will your input go?

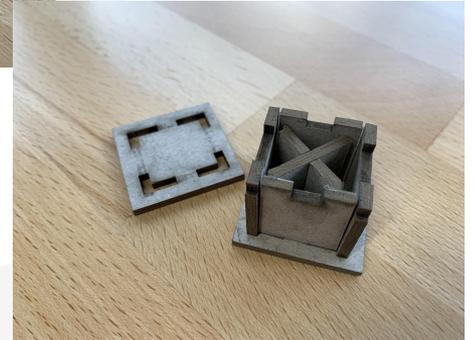
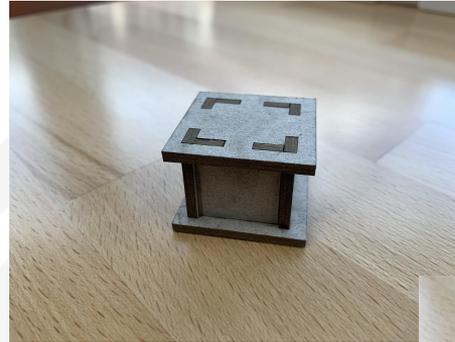
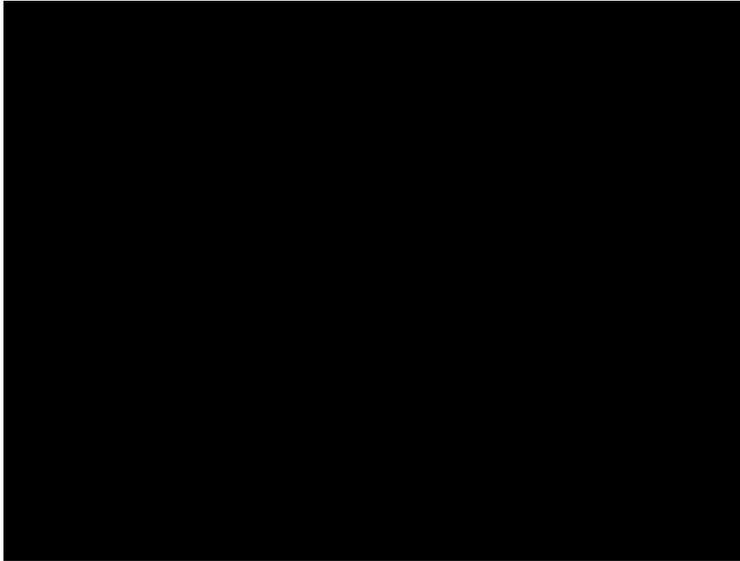


2.1

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We have also been fortunate to continue to work with industry professionals such as yourselves and present some completed student projects for feedback which has been very empowering for everyone involved.

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2.2

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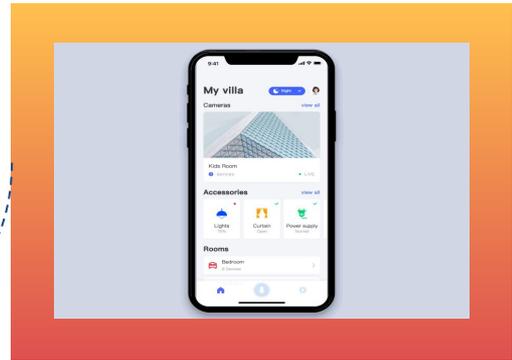
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Housing Hotspots



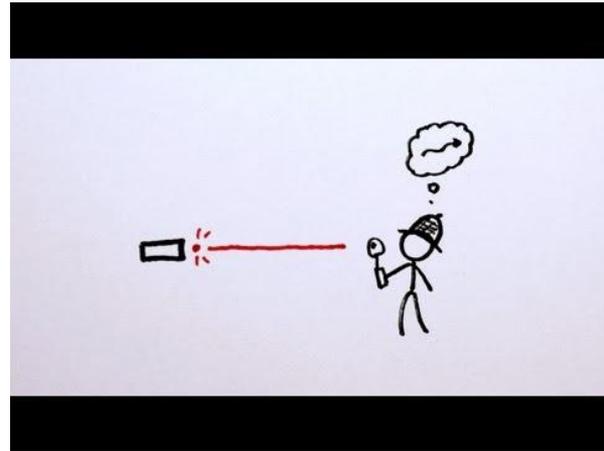
Areas we would like to develop a potential Tech School program include:

- **Energy efficiency** (energy consumption required by people using the building)
- **Sustainability of housing construction** (materials and town planning focus)
- **Designing living spaces for different user groups** (promoting independent living; e.g. in the elderly, differently abled, etc.)





Lasers!





A Little Smart House Challenge

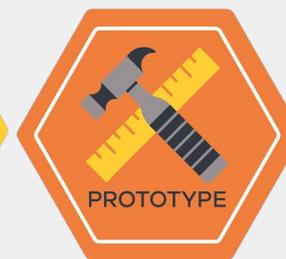
LittleBits are modular snap-together Bits that each serve a certain function. It's pretty hard these days to pull apart gadgets and see how they work, but with LittleBits, you can make your own gadgets. They are:

- **MAGNETIC:** The Bits snap together with magnets, providing a simple and intuitive user experience.
- **MODULAR:** Every Bit works with every other Bit, even across kits.
- **COLOUR CODED:** Each Bit is color-coded by its function (power, input, output and logic) in the circuit.

In this challenge we want you to use some (or many!) of the functions of the LittleBits and create your own smart home gadget. An automatic door opener using motion detection?, or the classic 'clapper'



YOUR NAN'S SMART HOME IN 1985.



Design Thinking.

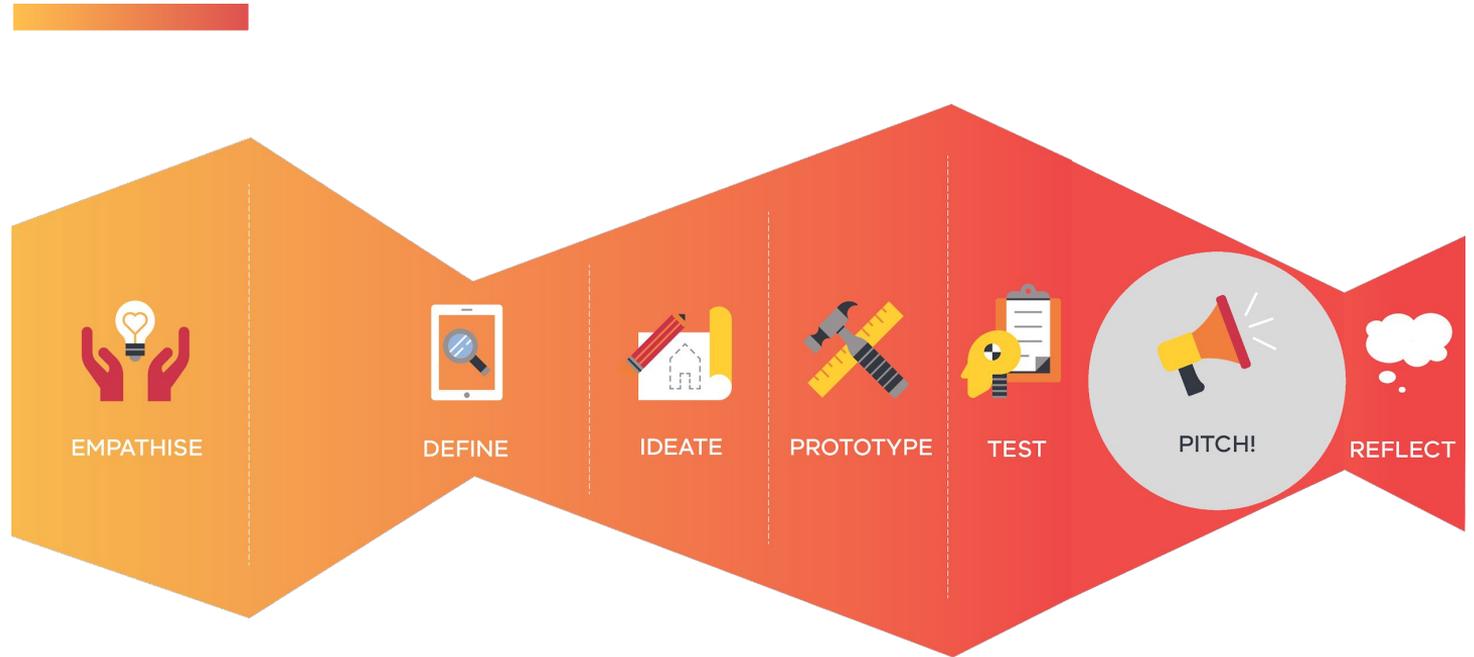
Design Thinking is a way of thinking and working we use here at the Tech School. At its simplest, design thinking is a creative, team-based problem-solving process that encourages failure and is driven by empathy.

It goes a little like this. Before even thinking about solutions, you must **empathise** with the person or people who will use whatever you develop. This means putting yourself in the end user's shoes and **defining** what they need through experience.

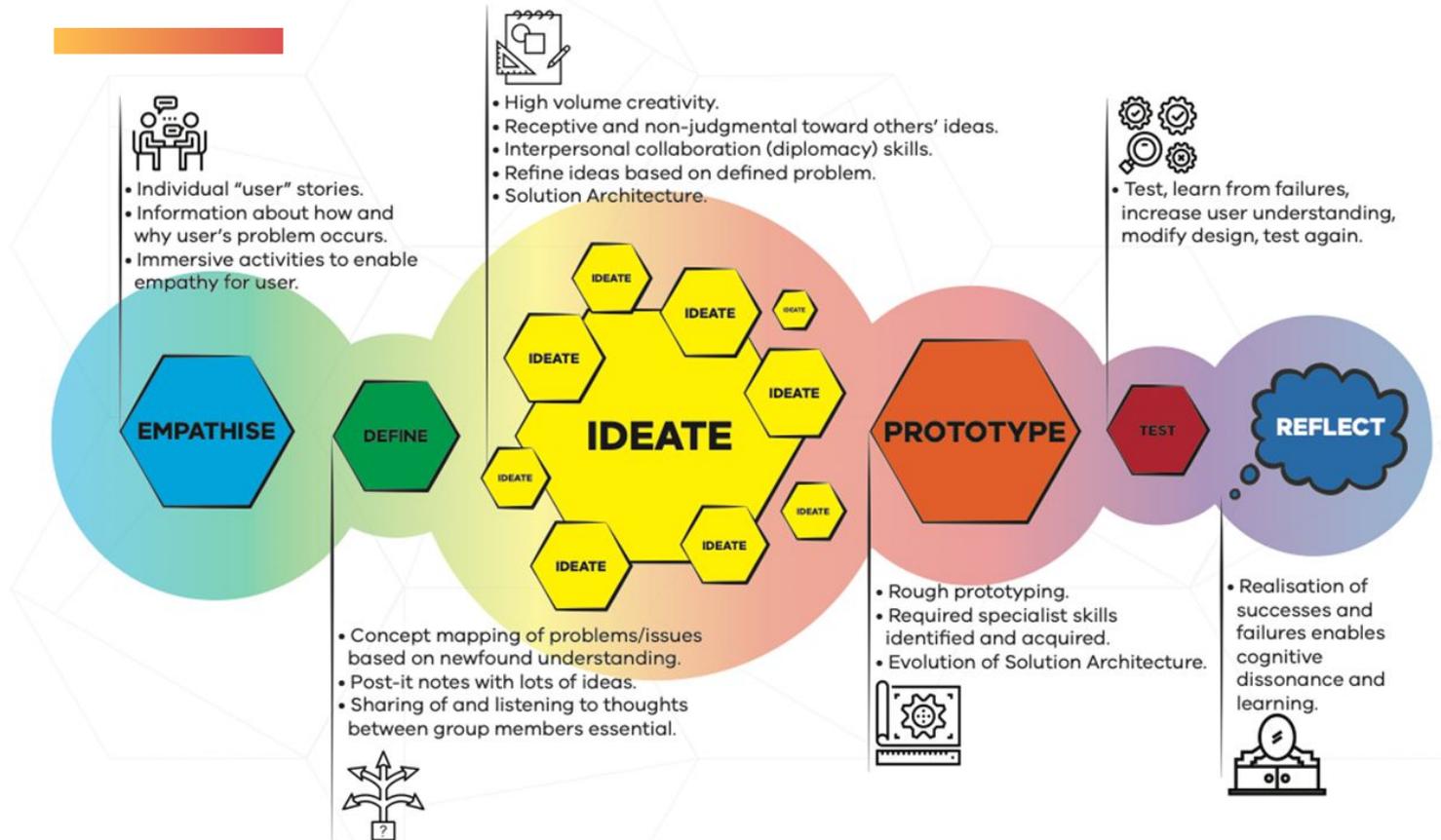
Then comes the fun stuff. Team members chime in with **ideas**, no matter how weird or wild. From this rich pool of creative juices, cheap **prototypes** of a few of the most promising ideas are built to **test** with target users.

Did anyone do a process similar to this in the LittleBit Challenge?
Let's have another go at doing this right now!

Design Thinking Pedagogical Framework



Design Thinking Pedagogical Framework





Empathise

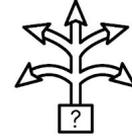
Start by gaining empathy for your user. To empathise, you: **Observe** - View users and their behavior in the context of their lives.

Engage - interact with and interview users through both scheduled and short 'intercept' encounters. **Immerse** - Experience what your user experiences.

Research Notes:



Define a **Problem Statement**



My user:

Needs a way to:

Because:

An easy way to gain empathy is to have a conversation and ask open ended questions. First get to know your user (hobbies, movies, music?). Then start to try and gain more info relevant to the challenge, ask 'Why?' often

As we don't have a user for you to interview today, we have some user briefs for you to read through. Use this space to note anything you discover that is relevant when you research your topic on the Internet..

This is your unique statement of the problem as informed by the empathy of your user. It should feel like a problem with tackling! The 3 S's of a Problem Statement: Short, Specific and Stylish!







Empathise

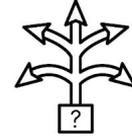
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59

59



Ideate

Ideate is the mode of your design process in which you aim to generate radical design alternatives. The goal of ideation is to explore a wide solution space – both a large quantity of ideas and a diversity among those ideas. From this vast depository of ideas you can build prototypes to test with users.

Sketch at least 5 **radical** ways to meet your user's needs.



Create solutions to the new challenge you have identified.
GO FOR VOLUME - This stage is quantity not quality.
DON'T BE RESTRAINED BY REASON OR LOGIC! - Maybe for one of your solutions you need to come up with a time-machine or magic.
Come up with as many ideas as possible!



3:00



3:00

Mo.S.Co.W



 <p>Must Have</p>	 <p>Should Have</p>
 <p>Could Have</p>	 <p>Won't Have</p>

59

59



Iterate based on feedback.

Ideate is the mode of your design process in which you aim to generate radical design alternatives. The goal of ideation is to explore a wide solution space – both a large quantity of ideas and a diversity among those ideas. From this vast depository of ideas you can build prototypes to test with users.

Reflect & refine or generate a new solution.



Take a moment to consider what you have learned about your user, and about the solutions you generated, hopefully you have a deeper understanding of your user. From this new understanding of your user and his or her needs, sketch a new idea (or iterate on a previous one)



3:00



Build (Prototype)

Prototyping is getting ideas and explorations out of your head and into the physical world. A prototype can be anything that takes a physical form – be it a wall of post-it notes, a role-playing activity, a space, an object, an interface, or even a storyboard.

Design & Draw your solution!



Create solutions to the new challenge you have identified. **GO FOR VOLUME** - This stage is quantity not quality. **DON'T BE RESTRAINED BY REASON OR LOGIC!** - Maybe for one of your solutions you need to come up with a time-machine or magic. Come up with as many ideas as possible!



Pitch | Communicating



Talk the Talk

Everybody in almost every job needs to be able to communicate effectively, but it also helps greatly to be able to tailor your communication to elicit specific responses or actions (a.k.a: get what you want!)

1. Who is your audience?



2. What do they want?



How will you appeal
to your audience
- what is your hook?



Head



Heart



Stomach



Other?

4. How will you get it?

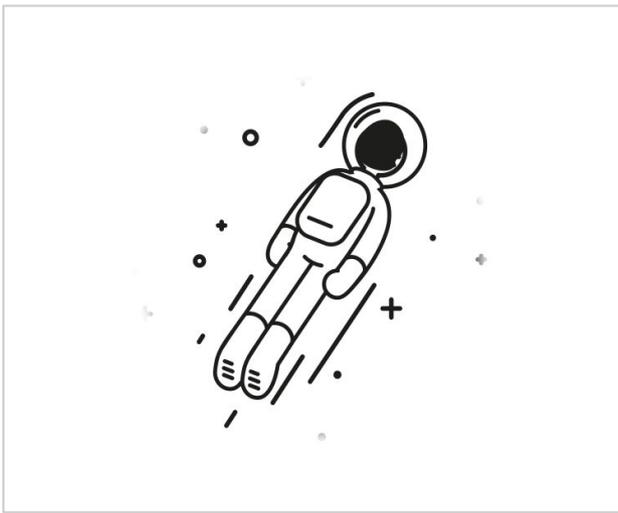


3. What do you want from your audience?



COUNTDOWN / STOPWATCH / TIMER

02:00

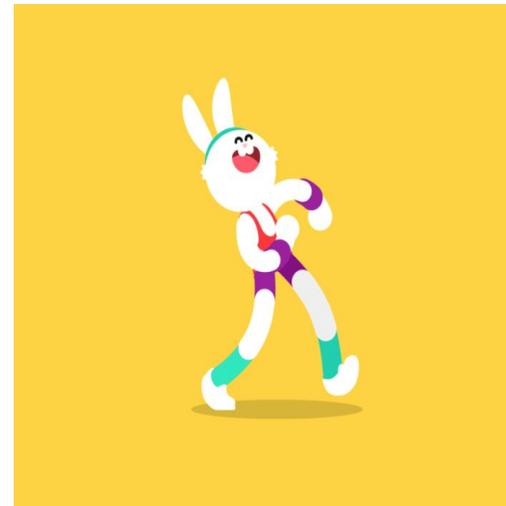


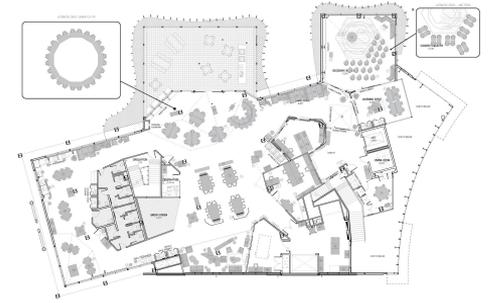
Tech Talk - Illustrator

A lot of the **Advanced Manufacturing** equipment we have here may look technical, but to create designs for them it is actually as easy as printing a document on a printer...as long as you know the correct button to press and the correct words to use. The word for today is **Vectors**!

Vectors use mathematical equations and geometric primitives (points, lines, and shapes) to create art that is clean, camera ready, and can be scaled infinitely, without any loss of quality or fidelity.

...but that sounds complicated, so, let's have a play with some instead.





BTS Climate Challenge

One quick way to test a houses efficiency is by monitoring temperature. Heat and cooling loss through gaps, weak insulation, leaks and other means can cost a lot of money. We want you to make sure Bendigo Tech School is running as efficiently as possible.

Using an array of thermal imaging infrared cameras, we want you in your teams to document areas around the Tech School (Staff offices are off limits. BTS staff will accompany you into any other room. Also, any space where another class may be running).

Take note of the temperatures in the areas you are scanning and also any abnormalities you may find (leaks, air gaps, too hot / cold?)

Optional

Note: As you will be working with real portable lasers, maturity is required. DO NOT point the sensors at anyone's face, doing so will result in us contacting your school and you will be required to leave this space.



Time for some Reflection

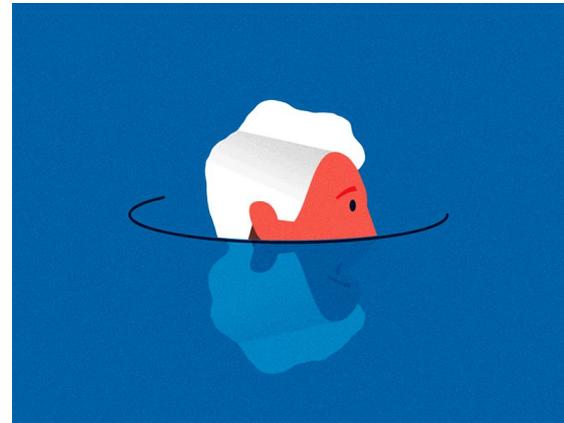
The final bit.

We have had a quick and concentrated few hours of thinking, empathising, ideating, designing and prototyping. A lot of what we did over this afternoon was about testing and failure. Trying new things, seeing what worked, and learning from what didn't.

Now we want to change gears a bit, slow down, and reflect a bit

- What did you do?
- What did you try?
- What worked? (both prototyping and groupwork)
- What didn't?

It is important that we take this final stage seriously, do our best, and share our reflection with the rest of the class as the takeaways you get from this will help shape future projects you work on here at the Bendigo Tech School



Reflect.

As a team we want you to reflect on how you worked through the Design Thinking Process today, what were the choices you made? where did you struggle? where did you flourish?.. We then want you to share this experience with the rest of the class, so take your time and work through the steps below. Finally, we want you to share your solution (and prototype) with the class to get their feedback - will they agree that it is a viable solution or one that needs more iteration?



Empathy

How did your group decide on which user to help?



Define

How did your group decide what was the most important issue to try and solve?



Ideate

What were some of your ideas?, how did your group decide on your final idea?

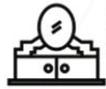


Prototype

How did your group work together in this process?, did you assign roles?

And finally, do you think you were successful in potentially solving your user's problem? What would you go back and do again if you could.

Reflect.



Reflective writing.

Gibbs' Reflective Cycle encourages you to think step by step (*each step informs the next*) about the phases of an experience or activity you have completed.

 **Final evaluation & Action Plan**
What would you do differently next time?

 **Description**
What happened?

 **Feelings**
What were you thinking and feeling?

 **Conclusion**
What have you learnt
What else **could** you have done?

 **Analysis**
Can you explain **why** things happened like they did? (*why did something go wrong or right?*)

 **Evaluation**
What was good & bad about the experience?



BENDIGO
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Thank you!

**Please fill out
this short
survey...**



STUDENT rebrand.ly/.....

INDUSTRY rebrand.ly/.....



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Thank you!

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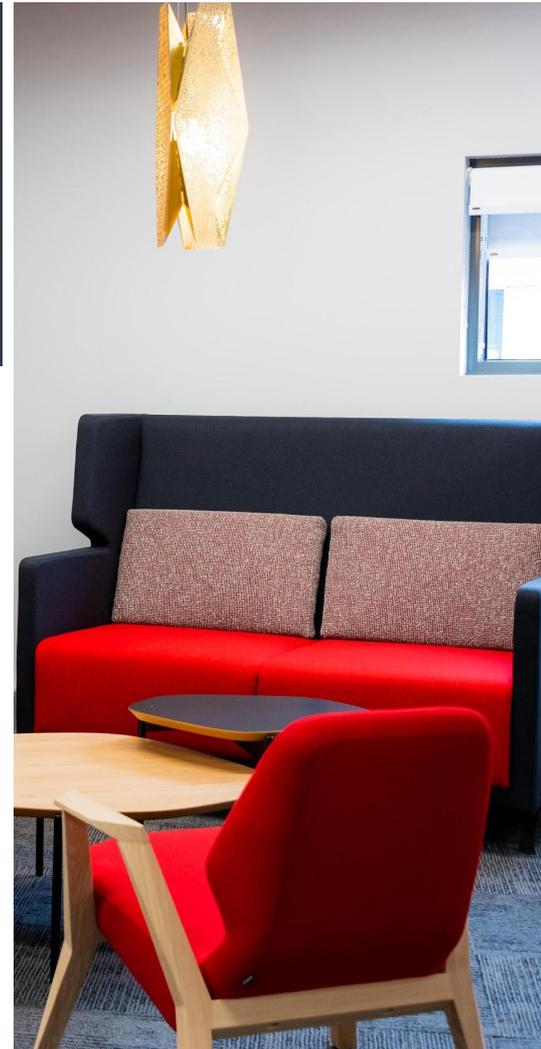


Virtual Reality Tour



Please join us for a 360 VR tour on the Bendigo Tech School

Visit: <https://rebrand.ly/btstour>





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Design Thinking resource: <https://bit.ly/3199SfC>

VR Tour: <https://rebrand.ly/btstour>



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