



Workshop on Design Thinking for Students and Teachers at Nanyang Girls' High School

Design Thinking Workshop

This Presentation can be Found Online at:



http://www.nygh.sg/lower_secondary_science/design_thinking.pdf
www.NYGH.sg → [Lower Sec. Science](#) → [Design Thinking](#)

Design Thinking Workshop



What is Design Thinking?

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What is Design Thinking?



- [Microsoft – Make What's Next.](#)

Video: 2 mins.

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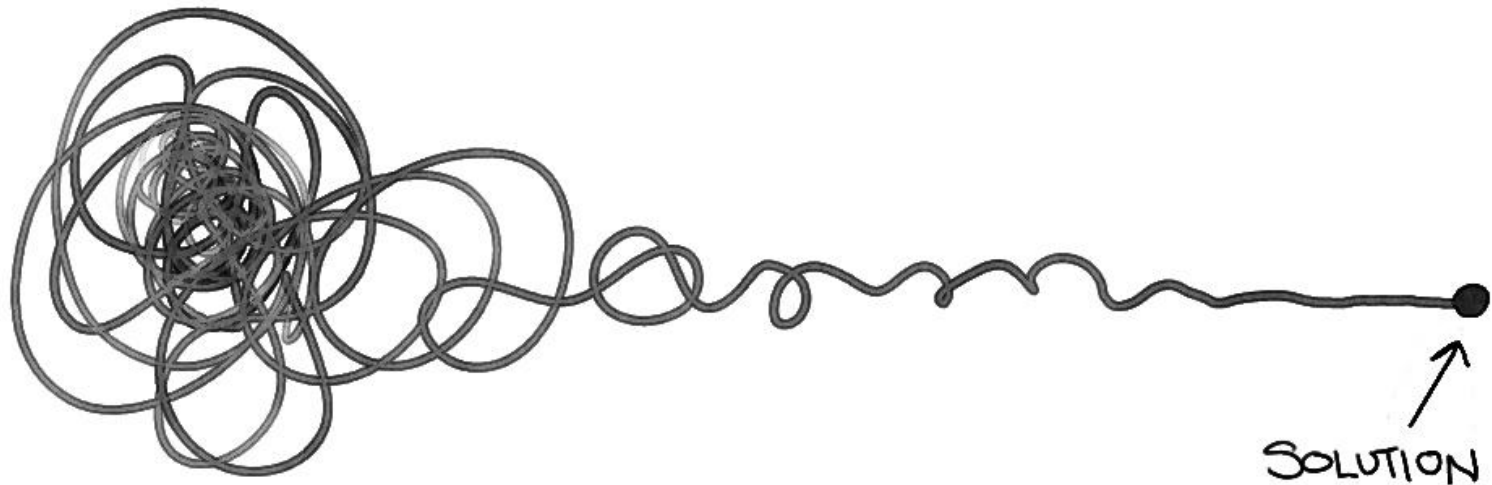
What is Design Thinking?

- Design thinking provides a way to think about creative work. It starts with *empathy*, working to really understand the problems that people are facing, before attempting to create solutions.
- Design thinking is *human centred problem solving*, with an emphasis on collaboration, creativity and empathy. The key to the process is empathising with the user's needs to solve the problem.
- You do not need to be very creative to succeed at design thinking, it is a *structured process* that you can learn.

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What is Design Thinking?

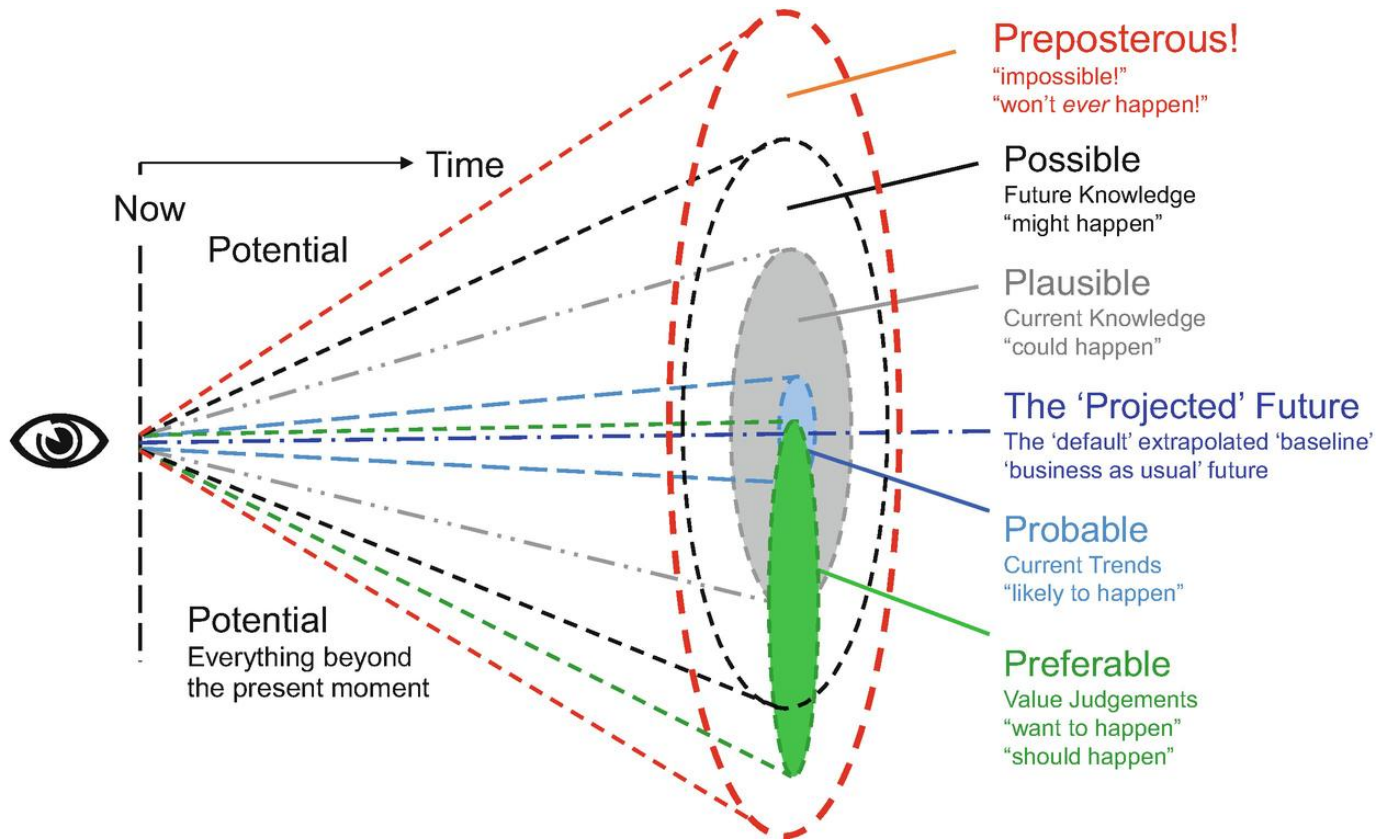
- A human centred, prototype driven, design process.



- Creative confidence – *make the world a better place!*
 - Ask the essential question: “*How might we...?*”

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What is Design Thinking?

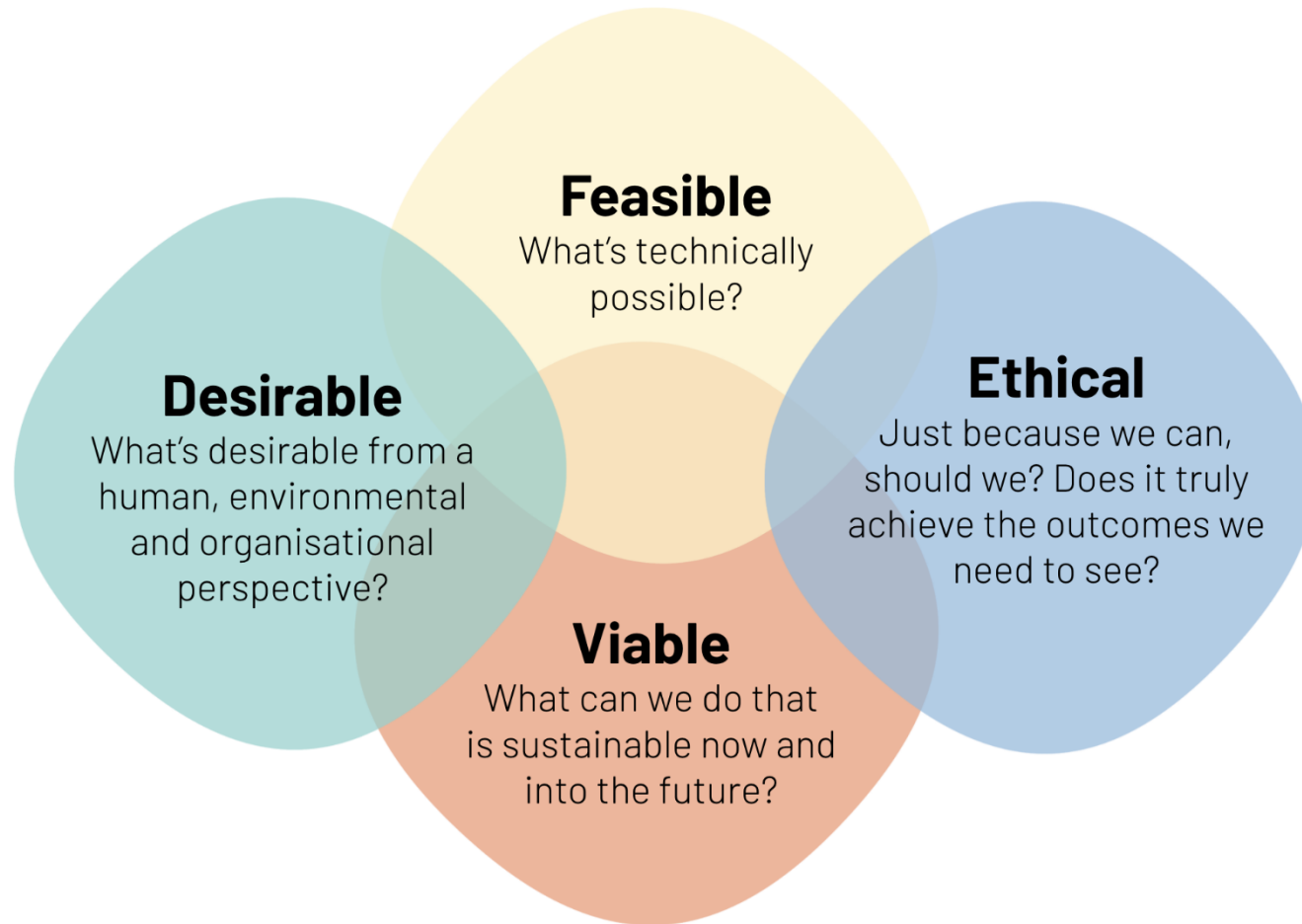


- Design a better future, design a better world.
 - There are many possible futures.

© Joseph Voros (2007)

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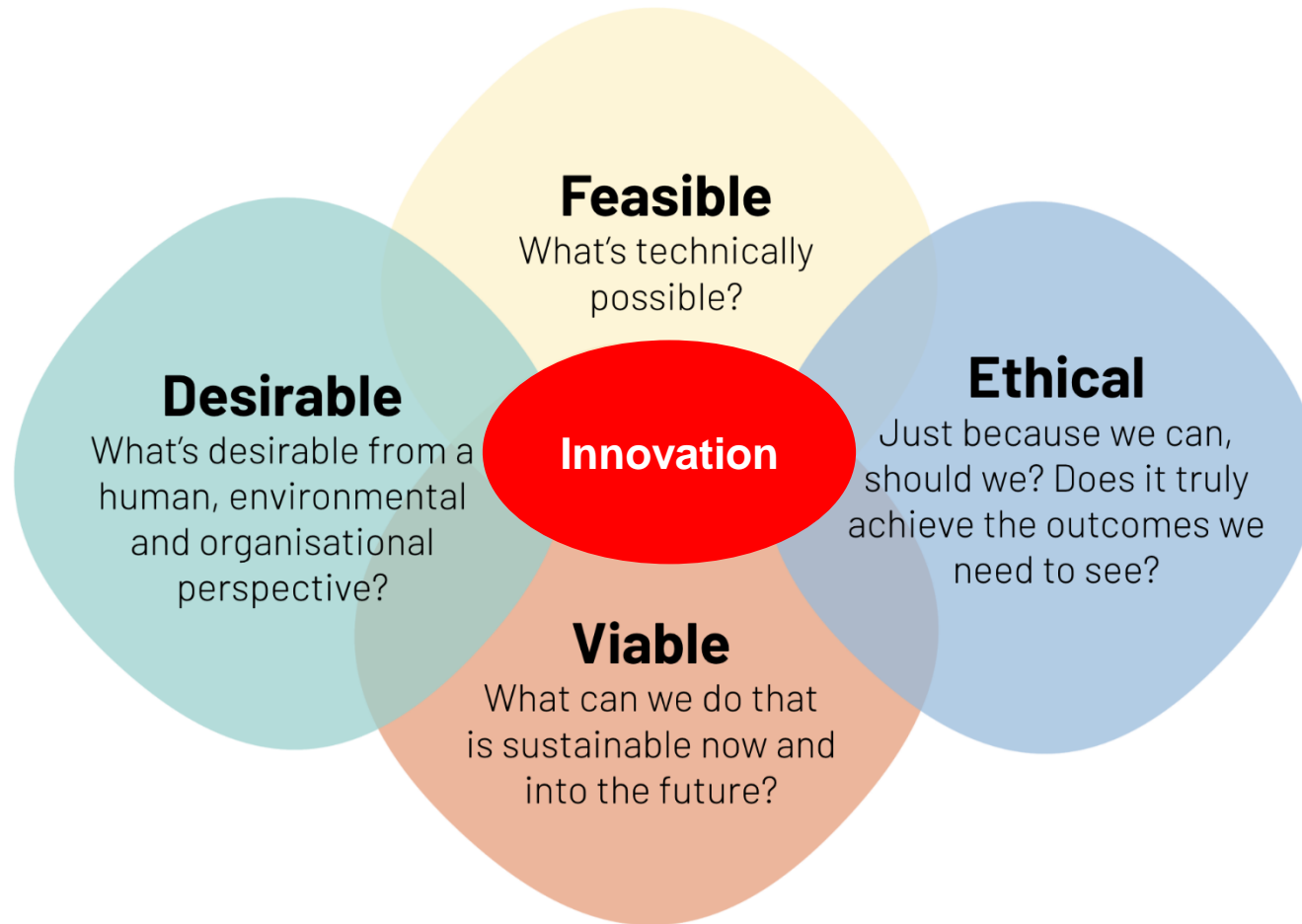
What is Design Thinking?



- What the user *wants* is not always the same as what the user *needs*!

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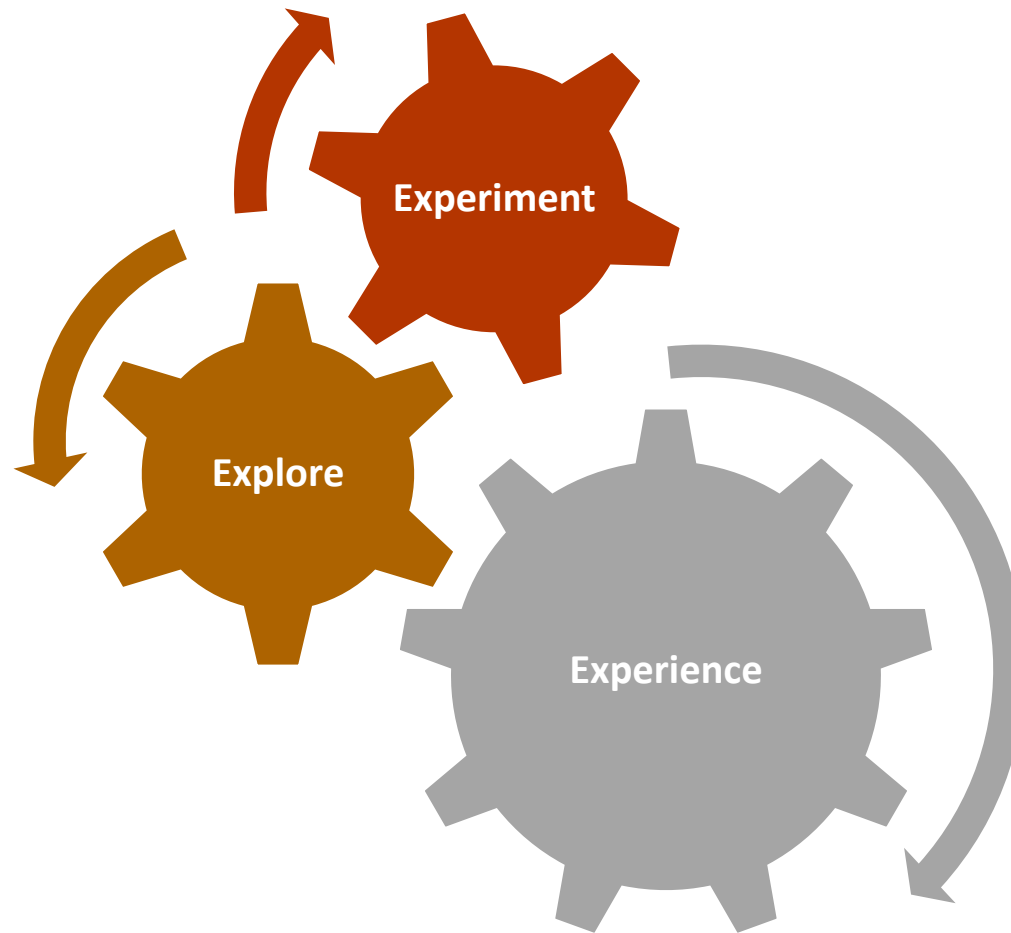
What is Design Thinking?



- What the user *wants* is not always the same as what the user *needs*!

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What is Design Thinking?



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What is Design Thinking?

E.D.I.C.T.

Empathise	Define	Ideate	Create	Test
<ul style="list-style-type: none">• Learn about your audience or customer.	<ul style="list-style-type: none">• Think about what will help your audience or customer live a better life.	<ul style="list-style-type: none">• Ideate ideas on improving what you have chosen.	<ul style="list-style-type: none">• Think about how to show your ideas of improvement to others.	<ul style="list-style-type: none">• Test the extent to which your idea meets the needs of your audience or customer.

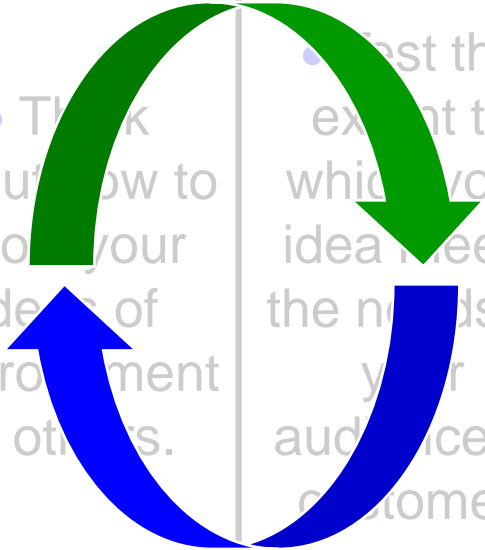
- **Note:** You may find that in some versions of design thinking, some of these sections are merged together.

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What is Design Thinking?

E.D.I.C.T.

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What is Design Thinking?

- Creative Thinking

- Creative thinking involves encountering gaps, paradoxes, opportunities, challenges, or concerns, and then searching for meaningful new connections by generating:

- Many possibilities.

- Varied possibilities (from different perspectives).

- Unusual or original possibilities.

- Details to expand or enrich possibilities.

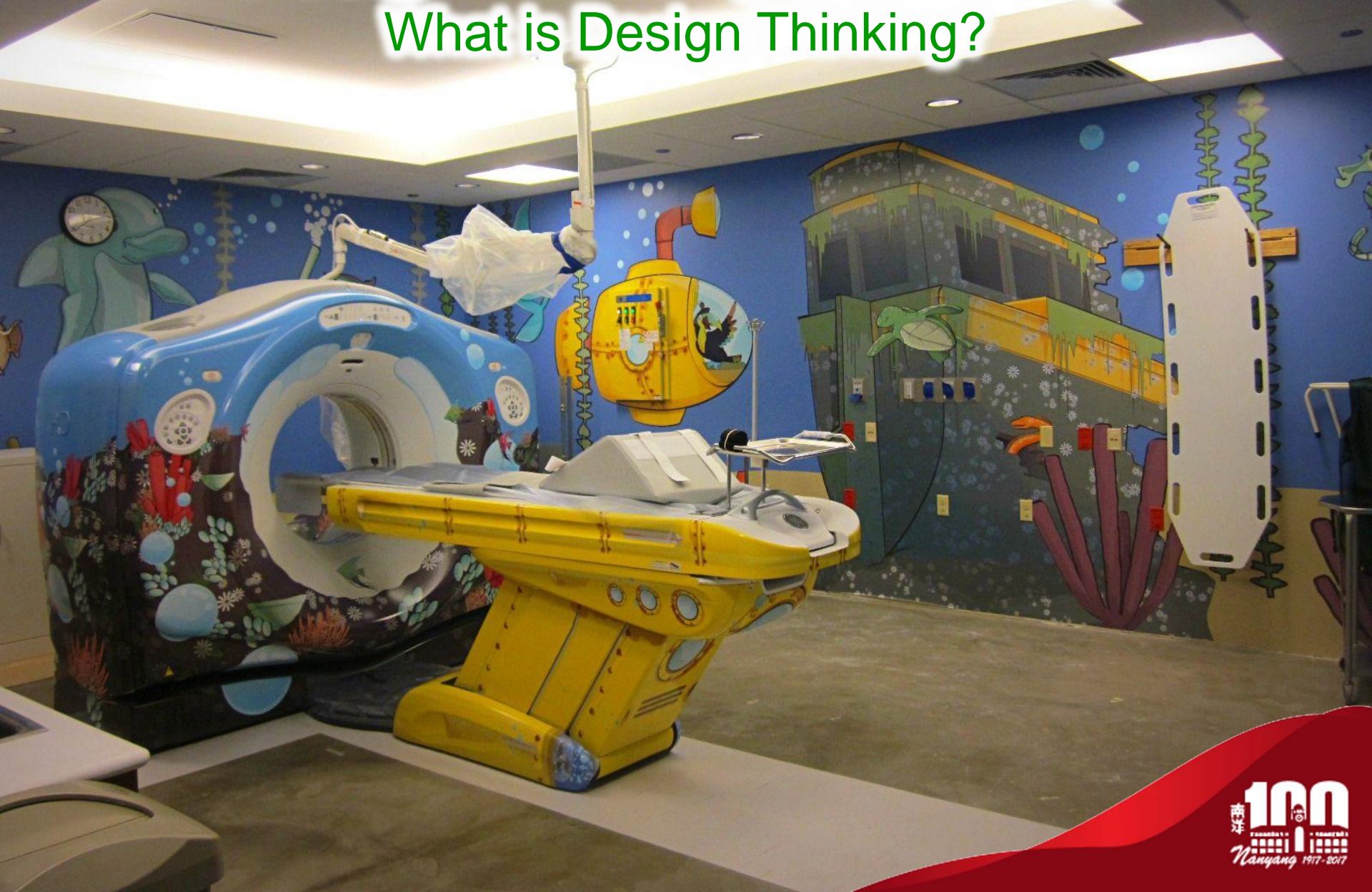
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What is Design Thinking?

- Critical Thinking
 - Critical thinking involves examining possibilities carefully, fairly, and constructively, and then focusing thoughts and actions by:
 - Organising and analysing possibilities.
 - Refining and developing promising possibilities.
 - Ranking or prioritising options.
 - Choosing or deciding on certain options.

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What is Design Thinking?



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What is Design Thinking?

From Terrifying to Terrific: Industrial Designer Redesigns MRI Scanner to Delight Children Instead of Scare Them

- For industrial designer Doug Dietz, witnessing the trauma of the young patients was more than he could bear. He first saw the horror it caused one child when he designed an MRI scanner for the University of Pittsburgh Hospital.
- In partnership with GE Healthcare and the University of Pittsburgh Hospital, Dietz redesigned the rooms with the MRI scanners to feature *adventure* environments that excited kids, rather than scared them.

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What is Design Thinking?



Video:
5 mins.
10 sec.

- GE Healthcare teams up with childhood experts to redesign the diagnostic imaging experience.

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What is Design Thinking?



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What is Design Thinking?

- Before buying a new car, potential customers will first want to take the car for a test drive.
- *Mini Singapore* hired local creative agency *Kinetic* to design an original marketing campaign that encouraged potential customers to take one of their cars for a test drive.

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What is Design Thinking?

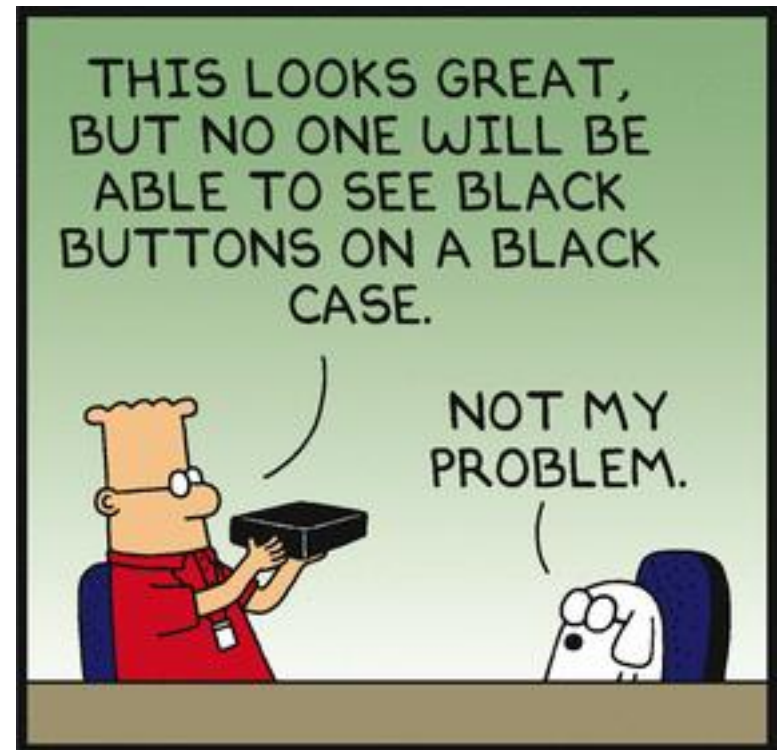


Video:
1 min.
30 sec.

- [We Tow, You Drive.](#)
- Designed by Singapore-based creative agency Kinetic.

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What Design Thinking is **Not**...



- Dilbert © Scott Adams.

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Can I please have
an actual example
of the design
thinking process at
NYGH?

Nanyang Girls...

- Women of Character
- Empowered Learners
- Agents of Change

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Overview of the Design Thinking Process

- Nanyang Girls' High School 2016 – Sec. 1 Interdisciplinary Studies (*the first and original *SPICE*):

a) Garden to Table

b) The Built Environment

- Scenario:

It is the year **2036** and Nanyang Girls' High School has won the prestigious *Sustainable School Award*. Your group has been nominated to make a model of the school and present it at a national exposition to illustrate the concept of *sustainability* to the general public.

*Serving People through Innovation Creativity and Enterprise

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Overview of the Design Thinking Process

1 - Empathise

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Overview of the Design Thinking Process

1 - Empathise

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Overview of the Design Thinking Process



2 - Define

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Overview of the Design Thinking Process

3 - Ideate

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Overview of the Design Thinking Process

4 - Create



4 - Create

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Overview of the Design Thinking Process



5 - Test

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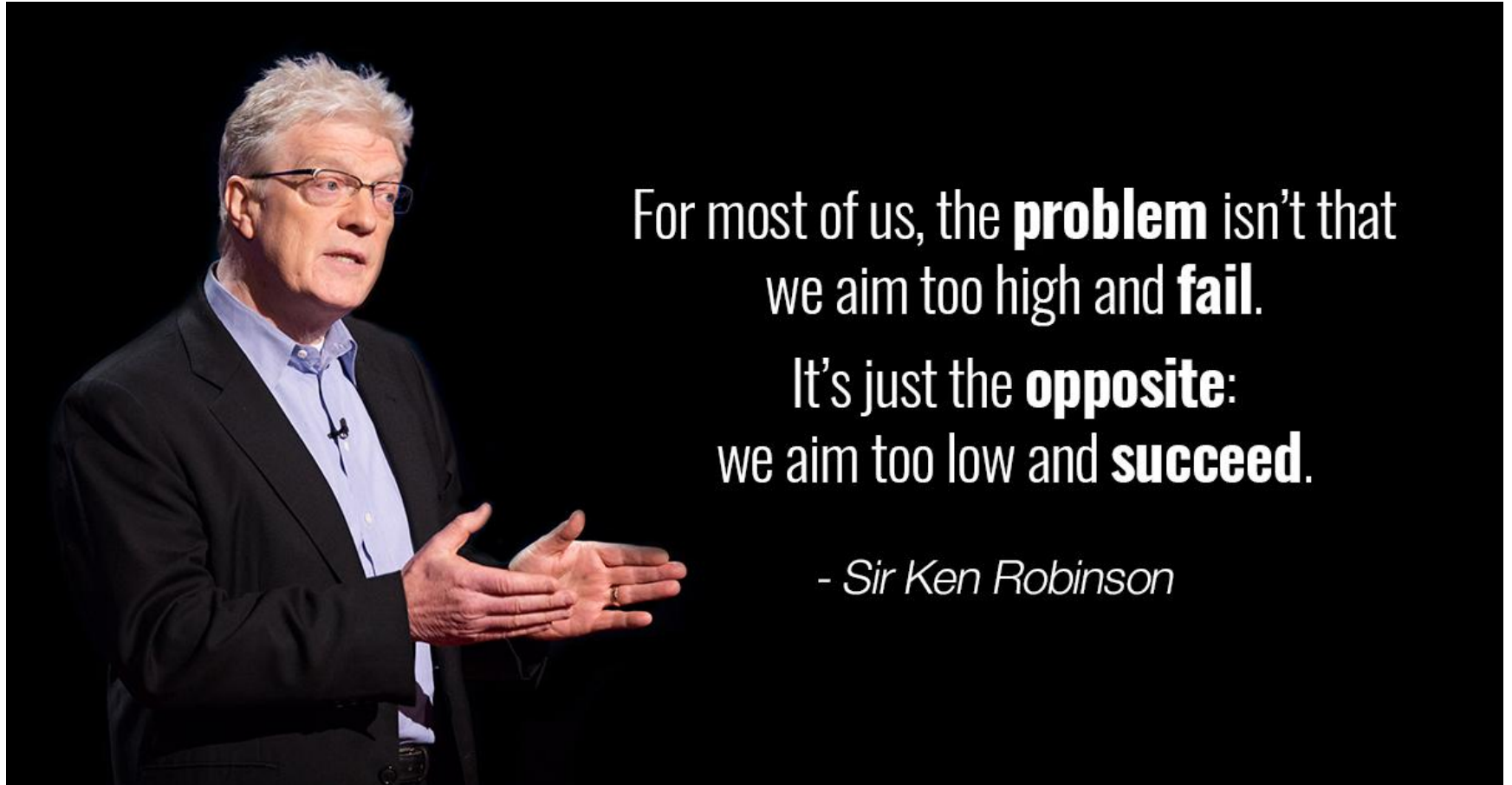


Before we begin,
please be willing to
take risks and
make some
mistakes!

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For most of us, the **problem** isn't that we aim too high and **fail**.

It's just the **opposite**: we aim too low and **succeed**.

- *Sir Ken Robinson*

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Taking Risks and Making Mistakes

- For this activity, you will need to work in pairs.

1. Stand up and find a partner.

2. Face you partner.

3. Count to three, alternating backwards and forwards from one person to the next.

One – Two – Three – One – Two – Three – One – Two...

☺ Celebrate every time you make a mistake!

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Taking Risks and Making Mistakes



One

Two

Three



Design Thinking Workshop

Taking Risks and Making Mistakes



One

Two

Three

One

Two

Three



Design Thinking Workshop

Taking Risks and Making Mistakes

4. Now, instead of saying “one”, snap your fingers.
 5. Now, instead of saying “two”, clap your hands.
 6. Now, instead of saying “three”, stamp your feet.
- ☺ Celebrate every time you make a mistake!

Questions:

- Did the activity become more easy or more difficult?
- Did you feel more comfortable or less comfortable making mistakes as the activity progressed?

Design Thinking Workshop



What are the
Five Key Stages
in Design
Thinking?

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Five Key Stages in Design Thinking

E.D.I.C.T.

Empathise	Define	Ideate	Create	Test
<ul style="list-style-type: none">• Learn about your audience or customer.	<ul style="list-style-type: none">• Think about what will help your audience or customer live a better life.	<ul style="list-style-type: none">• Ideate ideas on improving what you have chosen.	<ul style="list-style-type: none">• Think about how to show your ideas of improvement to others.	<ul style="list-style-type: none">• Test the extent to which your idea meets the needs of your audience or customer.

- **Note:** You may find that in some versions of design thinking, some of these sections are merged together.

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Stage One:
Empathise

- Learn about your audience or customer through observation and interview.

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Stage One – Empathise – Interview

- Who are you designing for?
- What are their *aspirations* and their *problems*?
- It is easy to miss things that you are not looking for:
 - Be a *tourist*.
 - Be an *alien*.
- Spot things that everyone else takes for granted and ask questions to draw-out new information.
- The most important thing when conducting an interview is to hear what is *not* being said. Expression. Body language.
 - Interview for *discovery*, not to validate an existing point-of-view.

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Stage One – Empathise – Interview

- Interviewing – closed questions and open-ended questions.
- *Closed questions* result in short or single word answers. They are often used in interviews to obtain factual / demographic data. Examples of closed questions include:
 - What is your age?
 - What time do you wake-up?
 - Do you like ice-cream?
 - Do you prefer to play badminton or tennis?
 - Where were you born?

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Stage One – Empathise – Interview

- Interviewing – closed questions and open-ended questions.
- *Open-ended questions* provide the interviewer with rich and meaningful information about the user. This information gives insights into the user's *pain points* and *needs*. Examples of open-ended questions include:
 - Tell me more about that?
 - What do you mean?
 - What do you like to do for fun?
 - Why would you want to do that?
 - Tell me about a time that you...
 - What irritates / annoys you?

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Stage One – Empathise – Interview

- Get into groups of four to six people.
- You will work together and go through one cycle of design thinking.
- Firstly, you will interview someone from another group about their time management.
- Ask questions to probe any issues or problems that they face managing their time throughout their day.
 - Within your group, there should be two people conducting the interview and two people taking notes.
- Time – 20 minutes.

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Stage Two:
Define

- Think about what will help your audience or customer live a better life.

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Stage Two – Define

- Empathy Map for Interview.
- The *say / do* section of the map is for direct quotes and observations the interviewer sees and hears.

Say / Do	Think / Feel
Emma says that she is often late for school – anxious expression.	

Design Thinking Workshop

Stage Two – Define

- Empathy Map for Interview.
- The *think / feel* section of the map is where one infers and assumes things about the user based upon data in the *say / do* section. It is alright to make assumptions.

Say / Do	Think / Feel
Emma says that she is often late for school – anxious expression.	

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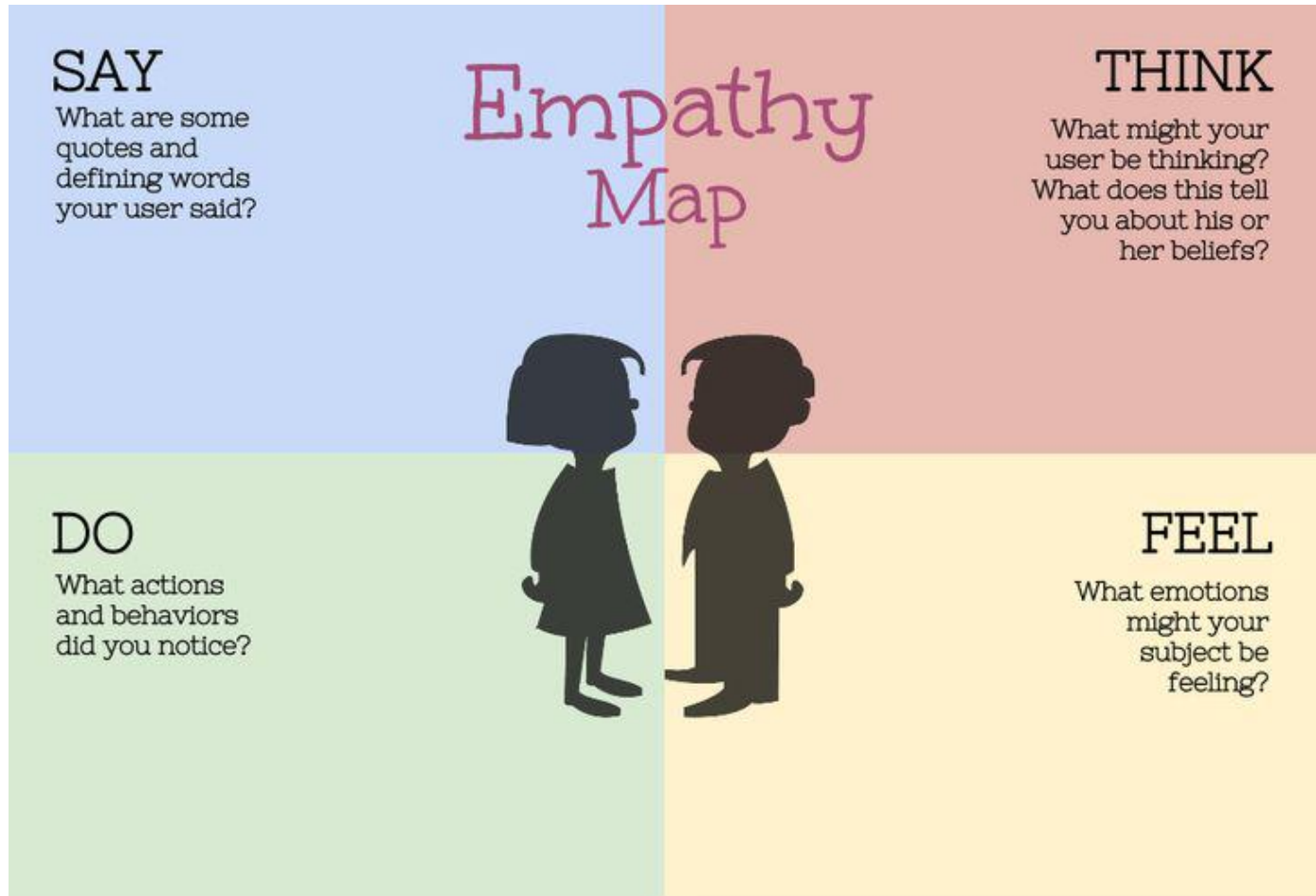
Stage Two – Define

- Empathy Map for Interview.
- The *think / feel* section of the map is where one infers and assumes things about the user based upon data in the *say / do* section. It is alright to make assumptions.

Say / Do	Think / Feel
Emma says that she is often late for school – anxious expression.	Maybe concerned that she will get into trouble if this happens too often.

Design Thinking Workshop

Stage Two – Define





Design Thinking Workshop

Stage Two – Define

Construct a User Persona

What is a user persona?

A user persona is a description of the person that you are designing a product / solution for. The Design Thinking process begins with building empathy with your target user and identifying exactly what they need from the product / solution you are designing. A user persona is generally based upon primary research (interview / observation / survey) and incorporates the needs and goals of your target audience.

Design Thinking Workshop

Stage Two – Define

Construct a User Persona

Why create a user persona?

Understanding the needs of your user(s) is essential to developing a successful product / solution. Well defined personas will enable you to efficiently identify the needs of your user. Knowing your audience will help influence the design and features of your product / solution, thus making your product / solution more useful.

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Stage Two – Define

What to Include in a User Persona



Biography

Goals

Motivations

Frustrations
(pain points)

Unmet
Needs

Design Thinking Workshop

Stage Two – Define

What to Include in a User Persona

- Biography / Personality

A short paragraph that describes the *user's journey*. If possible, include some of the *user's history* leading to the current situation.

Design Thinking Workshop

Stage Two – Define

What to Include in a User Persona

- Goals

- A *task* that needs to be *completed*.

- A *life goal* that needs to be *reached*.

- An *experience* that needs to be *felt*.

- Motivations

Motivations are the reasons behind your user's specific actions. *Goals* are what your user wants to do, and *motivations* are the reasons why.

Design Thinking Workshop

Stage Two – Define

What to Include in a User Persona

- Frustrations (Pain Points)
 - The *challenges* this user would like to avoid.
 - *Obstacles* that prevent the user from achieving their goals.
 - *Problems* with the available solutions.
 - Your target user's *pain points* should influence your design decisions more than anything else.

Design Thinking Workshop

Stage Two – Define

What to Include in a User Persona

- Unmet Needs

What the user *needs* is different from what the user *wants*. A *need* is something that is necessary for a system or process to work effectively. A *need* is something that is important rather than something that is just desirable (*want*). Sometimes a user is unaware of what their own *needs* are. Through the process of Design Thinking, these *needs* are identified and connected to possible solutions.

Design Thinking Workshop

Stage Two – Define

Journey Map



Design Thinking Workshop

Stage Two – Define

Journey Map

- A *journey map* is a visualization of the process that a person goes through in order to accomplish a goal.
- Journey mapping is a process that provides a holistic view of the user's experience by uncovering moments of both frustration and delight throughout a series of interactions.
- Done successfully, it reveals opportunities to address the user's pain points, alleviate fragmentation, and, ultimately, create a better experience for the user.

Design Thinking Workshop

Stage Two – Define









Journey Map

- In its most basic form, journey mapping starts by compiling a series of user actions into a timeline. Next, the timeline is fleshed out with user thoughts and emotions in order to create a narrative. This narrative is refined and condensed, ultimately leading to a visualization.
- Imagine the journey a student takes from the moment they wake-up in the morning to the moment they reach home in the evening. Who / what do they interact with along the way? What are their pain points?

Design Thinking Workshop

Stage Two – Define

Journey Map – a day at school

Activity / Task	Wake-up	Arrive at School	Meet Friends	1 st Lesson	Recess	2 nd Lesson	CCA	Return Home
Doing / Thinking	Trying to focus	Anxious	Happy	Worried concern	Hungry	Stressed	Happy	A little anxious
Feeling								
Pain Points	Tired from late night	Being late for school	None	Forgot textbook or notes	Long queues	Exam today!	None	Work to do for tomorrow
*Possible Solution	Learn to prioritise	Set alarm	NA	Check timetable	Pack snacks	Study buddy	NA	Learn to prioritise

*Proposing solutions is not important at the moment, these are just given as examples. Generating ideas for solutions will be done later during *brainstorming*.

Design Thinking Workshop

Stage Two – Define

- Construct an *empathy map*, *user persona* or a *journey map* for the interview that you have just conducted.
- While constructing the *empathy map*, *user persona* or *journey map*. think carefully about what was said and the person's body language. What are the main issues that the person is facing?
 - Time – 20 minutes.

Design Thinking Workshop



Stage Three:
Ideate

- Ideate ideas on improving what you have chosen.

Design Thinking Workshop

Stage Three – Ideate

- Create a *needs statement organiser* about the person who you interviewed.

Describe Your User...	...Needs A Way To...	...Because

Design Thinking Workshop

Stage Three – Ideate

- Create a *needs statement organiser* about the person who you interviewed.

Describe Your User...	...Needs A Way To...	...Because
1. Hard working Emma...	...organise her life...	...she is very busy.
2. Caring secondary school student...	...prioritise her responsibilities...	...she has a lot going on in her life.
3. Active and busy teenager...	...eliminate distractions...	...she finds it hard to say “no”.
4. Unorganised and busy Emma...	...remember homework assignments...	...she wants to be great at everything.

- Try to generate 15 items.

Design Thinking Workshop

Stage Three – Ideate

- Create a *needs statement organiser* about the person who you interviewed.

Describe Your User...	...Needs A Way To...	...Because
1. <i>Hard working Emma...</i>	...organise her life...	...she is very busy.
2. Caring secondary school student...	<i>...prioritise her responsibilities...</i>	...she has a lot going on in her life.
3. Active and busy teenager...	...eliminate distractions...	<i>...she finds it hard to say "no".</i>
4. Unorganised and busy Emma...	...remember homework assignments...	...she wants to be great at everything.

- Try to generate 15 items.

Design Thinking Workshop

Stage Three – Ideate

- Create a *needs statement* about the person who you interviewed.

..... needs a way to because

• Hard working Emma *needs a way to* prioritise her responsibilities *because* she finds it hard to say “no”.

- Create a *needs statement table* about your user. The table should be at least 15 items long.
- From the needs statement table, create *three* key *needs statements* for your user.

Design Thinking Workshop

Stage Three – Ideate

- The needs statement test.
 - a) Read your needs statement and ask the question, are there more than 50 potential ways to meet this need?
Is it generative / productive?
 - b) Read your needs statement and ask the question, does my needs statement describe 2 people or 200 people?
Is it specific enough?
 - c) Read your needs statement and ask the question, if my user's best friend read this needs statement, would they immediately know who you were describing?
Does it resonate?
- Time – 20 minutes.

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Stage Four:
Create a
Prototype

- Think about how to show your ideas of improvement to others.

Design Thinking Workshop



Before we begin Stage 4, here are some tips about brainstorming.

Design Thinking Workshop

Brainstorming

- Yes... ..*but* and Yes... ..*and*

1. Form a group of four-to-six people.
2. Stand or sit in a circle facing each other.
3. You are going to spend three minutes planning a party.
 4. Identify the person who is going to start round one.
 5. This person should make a suggestion for the party, e.g., “We should have balloons”.
6. Another person will reply with a reason why this is *not* a good idea, e.g. “*Yes, but* the balloons will pop”.

Design Thinking Workshop


Brainstorming

We should
have
balloons!




Design Thinking Workshop

Brainstorming



We should
have
balloons!



*Yes, but the
balloons will
pop!*

- Continue for two minutes.
- How is your party?

Design Thinking Workshop

Brainstorming

- Yes... ..*but* and Yes... ..*and*

7. Identify the person in your group who is going to start round two.
6. This person should make a suggestion for the party, e.g., “We should play party games”.
8. Another person will reply with a reason why this *is* a good idea, e.g. “*Yes, and* the winners can have prizes”.

Design Thinking Workshop


Brainstorming

We should
play party
games!




Design Thinking Workshop

Brainstorming



We should
play party
games!



*Yes, and the
winners can
have prizes!*

- Continue for two minutes.
- How is your party?

Design Thinking Workshop

Brainstorming

- Be accepting of other people's ideas.
 - Withhold your judgements.
 - Build on the ideas of others.
 - Seek opportunities.
 - What is possible?
 - How will you build it?

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Brainstorming

- Instead of talking, students can draw or write their ideas on sticky notes. This allows all students to contribute to the brainstorming stage, even students who are usually quiet.
- This also prevents talkative students from dominating the discussion.

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And some tips
about creativity.

Design Thinking Workshop

Creativity

S. C. A. M. P. E. R.

Design Thinking Workshop

Creativity

S. C. A. M. P. E. R.

S – Substitute

What might you use or do
instead?

Design Thinking Workshop

Creativity

S. C. A. M. P. E. R.

C – Combine

What things might be combined or synthesised to form new ideas?

Design Thinking Workshop

Creativity

S. C. A. M. P. E. R.

A – Adapt

What might be changed or
used in a different way?

Design Thinking Workshop

Creativity

S. C. A. M. P. E. R.

M – Modify / maximise /
minimise

What might be made larger
or smaller?

Design Thinking Workshop

Creativity

S. C. A. M. P. E. R.

P – Put to another use

How might something be
used or applied in a new or
different way?

Design Thinking Workshop

Creativity

S. C. A. M. P. **E.** R.

E – Eliminate

What might be deleted? What might you do without?

Design Thinking Workshop

Creativity

S. C. A. M. P. E. R.

R – Reverse

Look at the problem in the opposite way – what could be restructured?

Design Thinking Workshop

Creativity

S. C. A. M. P. E. R.

Substitute

Combine

Adapt

Modify / **M**inimise / **M**aximise

Put to another use

Eliminate

Reverse

Design Thinking Workshop

Stage Four – Create a Prototype

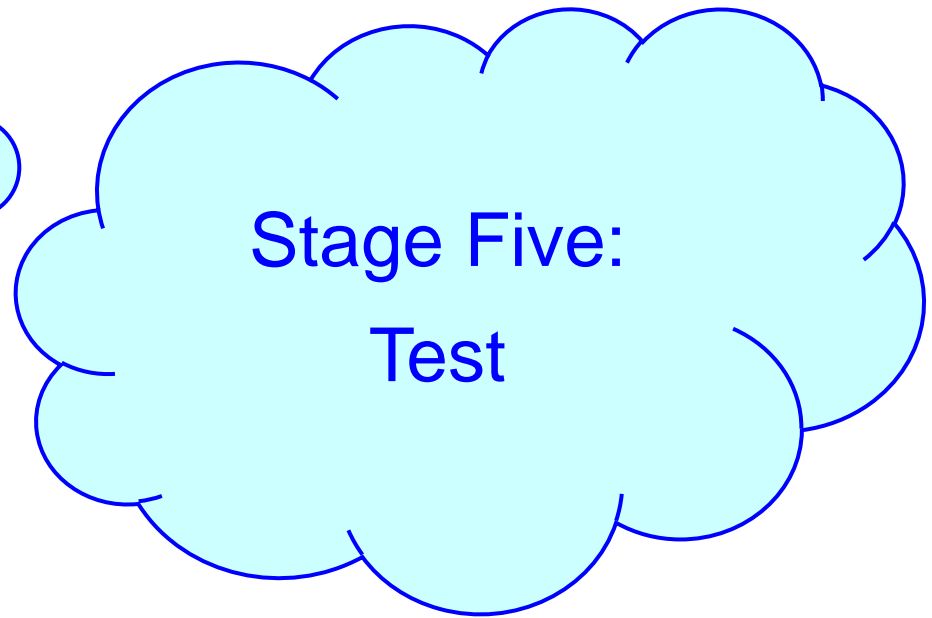
- Another way of generating ideas for a prototype is to ask “*How might we...?*” questions.
- For example, with reference to the previous case study, we could ask, “How might we help Emma prioritise her responsibilities?”
- Another question that we could ask is, “How might we help Emma to politely say ‘no’ to people when she does not have the time to help them?”
 - One more question could be “How might we help Emma feel better about herself when she has to say ‘no’ to helping other people?”

Design Thinking Workshop

Stage Four – Create a Prototype

- Make is when everything becomes tangible. You build prototypes – things your user can interact with – so that you can find out early on what works. The mind-set that supports make is learning from failure.
- Use the materials provided to construct a solution(s) to the problem(s) that you identified your customer is concerned about.
 - Time – 30 minutes.

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- Test the extent to which your idea meets the needs of your audience or customer.

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Stage Five – Test

- Invite your user (the person that your group interviewed) to return to your group and explain to them:
 - a) What you have made for them.
 - b) How they use it.
 - c) Why you thought that it would be of use to them.
- The *testing stage* is also a *learning stage* for the designer. Take the opportunity to listen to the user's feedback. If there is time, you could incorporate their feedback into a second or third prototype to test.
 - Time – 10 minutes.

Design Thinking Workshop



This is the end
of the workshop.
What questions
do you have?

- Please take some time to ensure that the room is clean and tidy. Thank you!



I expect to pass through
this world but once.
Any good, therefore, that I
can do or any kindness I
can show to any fellow
creature, let me do it now.
Let me not defer or neglect
it for I shall not pass this
way again.

Stephen Grellet



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Design Thinking
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