


I would like to acknowledge the Traditional Custodians of the lands and waterways.

We are meeting today on Peek Wurrong Country. I pay my respects to Elders past, present and emerging, and recognise the traditions of teaching, learning and knowledge production that have taken place on this site long before Deakin University was established here.

Present and emerging Indigenous peoples have a stake in Digital Technologies research and development and rich systems of knowledge to contribute.

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Australia Awards


VR-haptics for STEM learning

A research and development collaboration between
School of education
School of Engineering


Funded by the Telematics Trust


Mr Dilshan Bataduwaarachchi




Dr Van Thanh Huynh



Ms Kristin Walsh



A/Prof Julianne Lynch



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What is Haptics?



“Haptics is that subsystem of non-language communication which conveys meaning through physical contact.”

Source: Oxford Languages via Bing



NOUN (haptics)

- The perception of objects by touch and proprioception, especially for non-verbal communication
- The use of technology that simulates the sense of touch and motion

ADJECTIVE (*haptic*)

- Relating to the sense of touch, and the perception and manipulation of objects using the senses of touch and proprioception
- “Haptic feedback devices create the illusion of substance and force within the virtual world.”



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Real-world applications of VR-haptics

Australia's largest research team in systems modelling and simulation, providing practical solutions and commercial-ready products for aerospace, rail, automotive, defence, security and health sectors.

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Research questions:

- What benefits might a VR-haptics platform bring to STEM learning in schools?
- What features are needed in a VR-haptics platform to be suitable for supporting classroom STEM learning?
- What are the main barriers to using VR-haptics to support STEM learning in schools?
- How might VR developers and teachers work together to design appropriate VR platforms?

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Design-based collaborative research

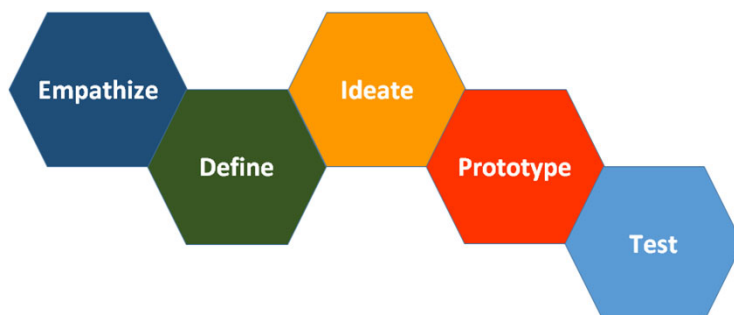
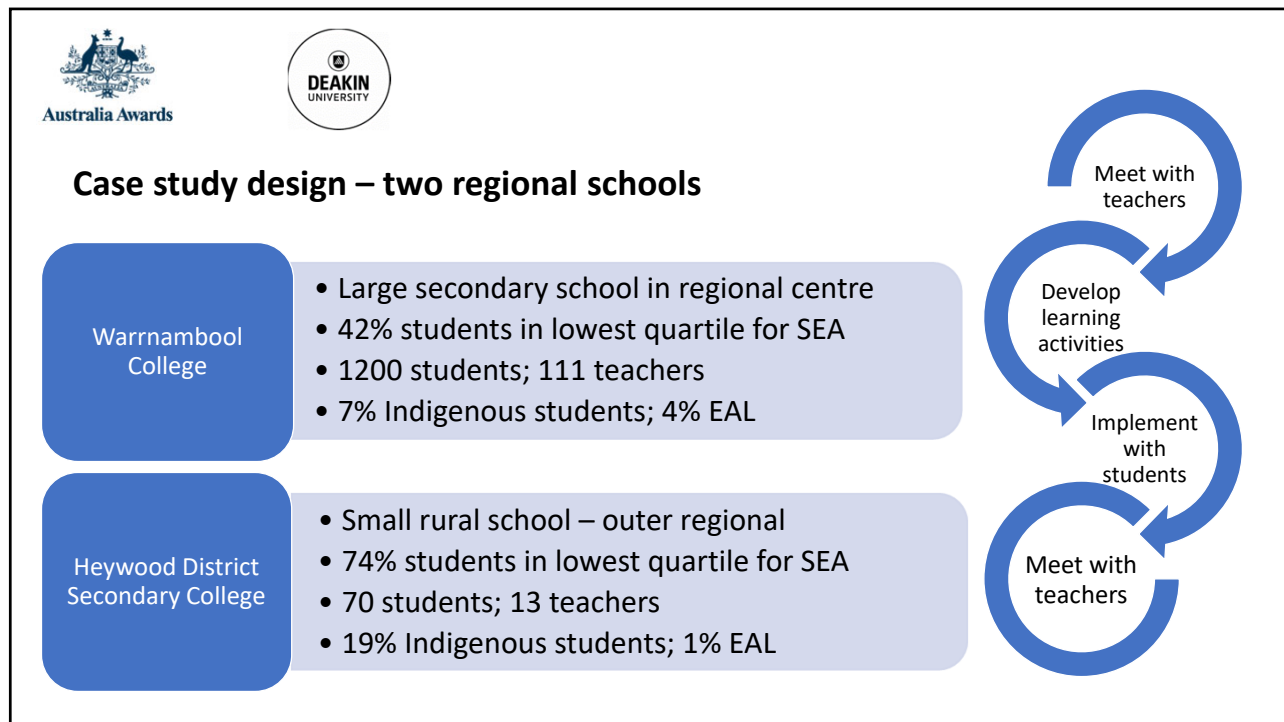


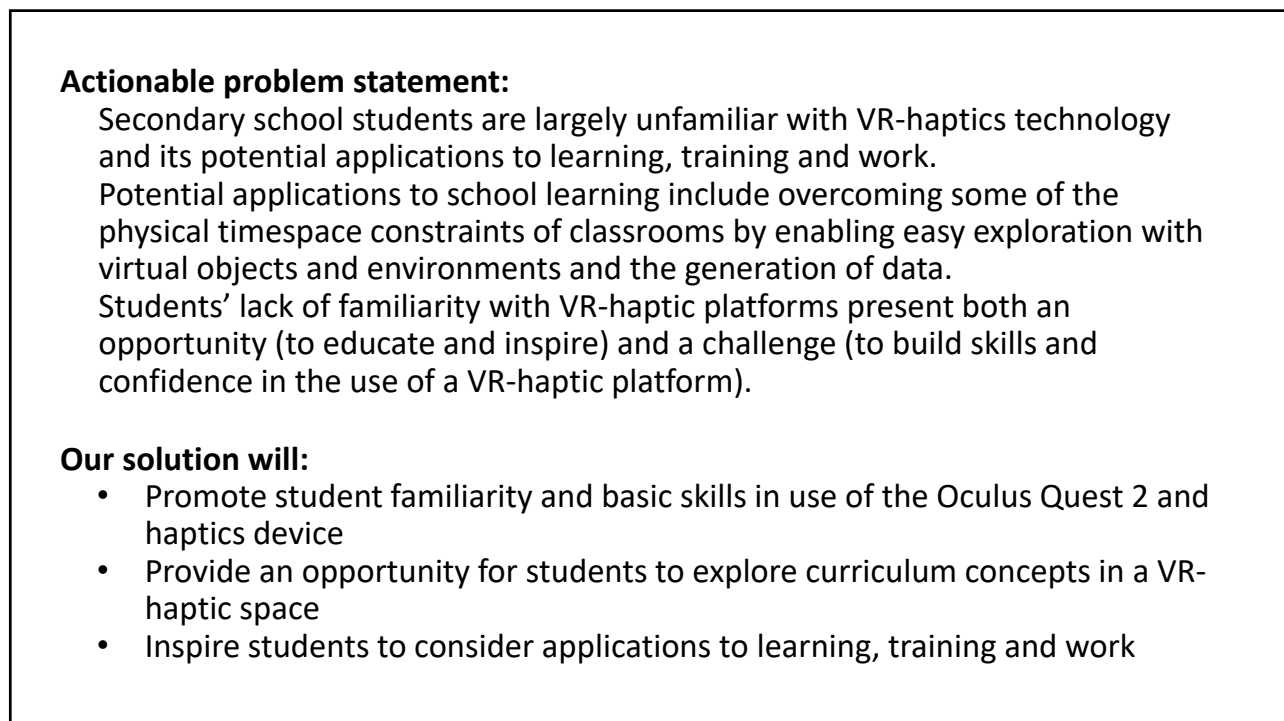
Figure 1. Stanford Design Thinking Model (adapted from Plattner (2010))



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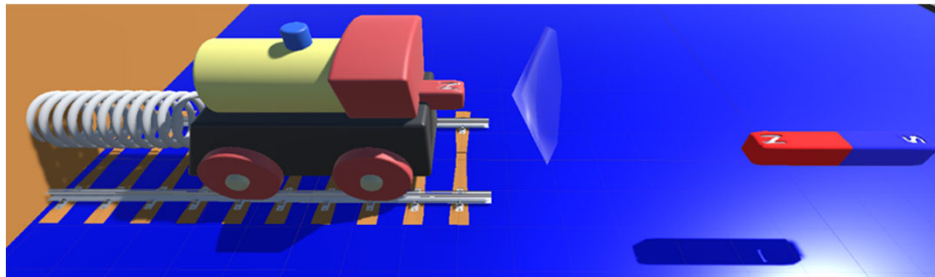
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Inside the VR-haptics platform



ACTIVITY 1 : ATTRACTION AND REPULSION FORCES

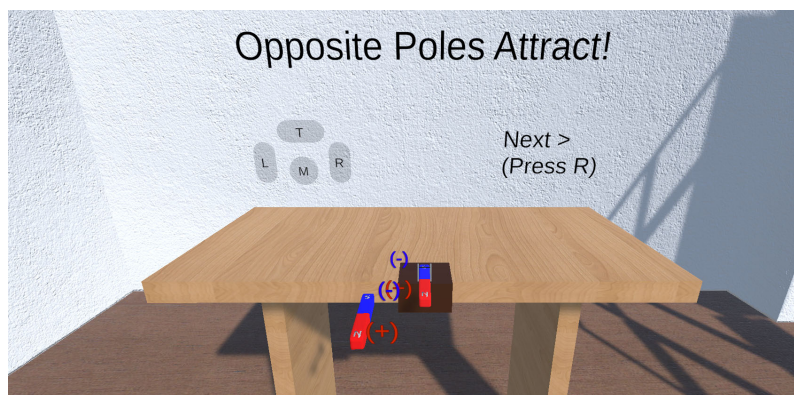
Magnet activity – Become familiar with the vr-haptics equipment by exploring attraction and repulsion

ACTIVITY 2 : INVESTIGATING THE PULL FACTOR OF DIFFERENT MAGNETS

Magnet – cart – spring activity

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Activity 1: Attraction and repulsion forces



LIKE forces repel	OPPOSITE forces attract
++	+ -
--	- +

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Activity 2: Rating the *pull factor* of magnets

Step 2 of 3:
Bring the bar magnet towards the train to move it using the *repulsion force*.

M - Change Magnet Press T to go to Step 3 >>

?

Highest: -
Middle: -
Lowest: -

Magnet in Use: **A**

Repulsion Force = 0.0 N

L M R

MAGNET	REPULSION FORCE (N)	RATING (Strongest, Middle, Lowest)
A		
B		
C		

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Questions and discussion



- jlynch@deakin.edu.au
- v.huynh@deakin.edu.au
- dilshan.bataduwaarachchi@deakin.edu.au
- krissy.h@deakin.edu.au

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