How Design Thinking, Project Based Learning & innovation focused STEM programmes are informing contemporary learning environments

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CONTEMPORARY LEARNING ENVIRONMENTS
CONTEXT FOR CHANGE


LEARNING HAS CHANGED

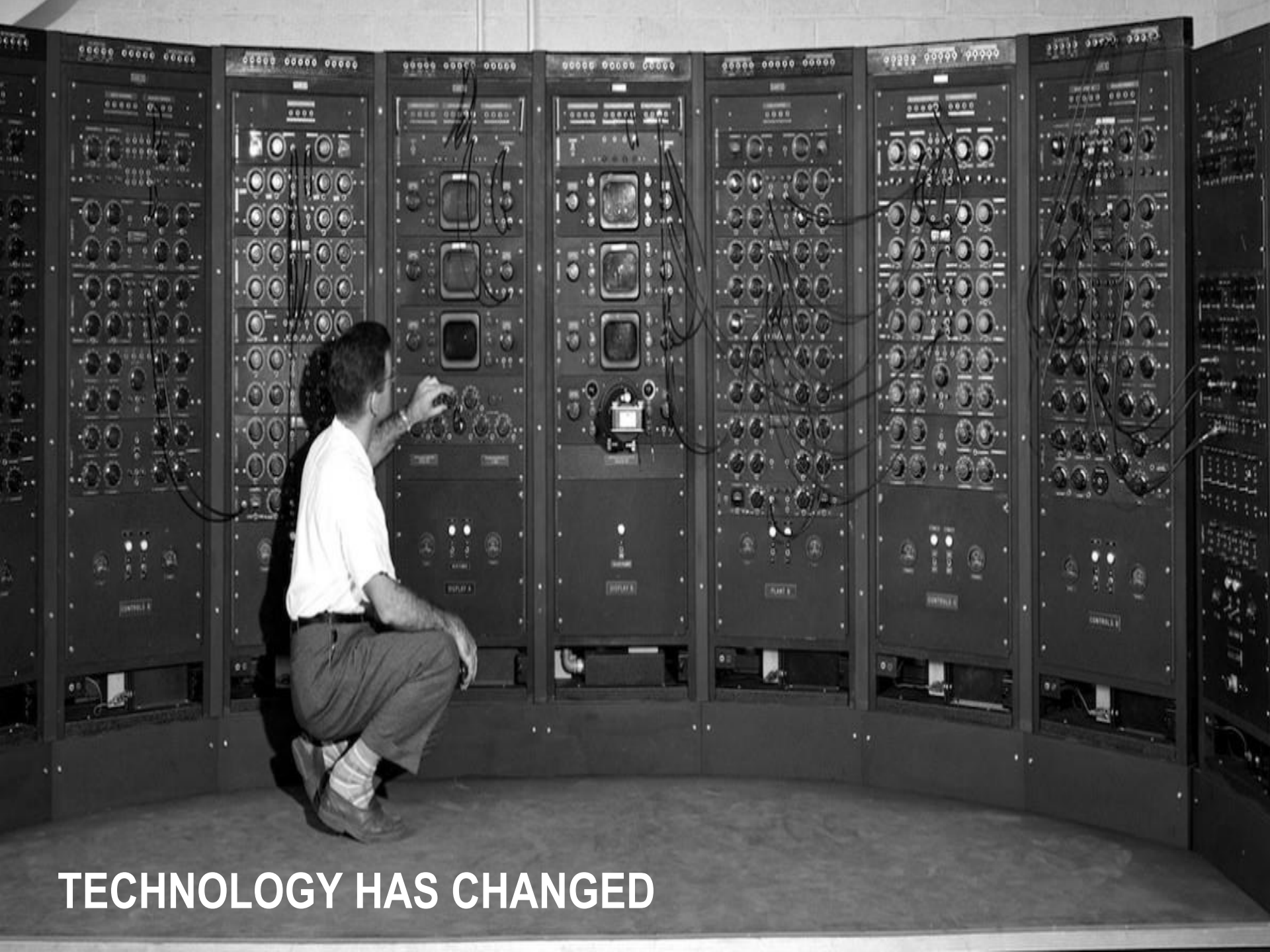
NEW LEARNING ENVIRONMENTS

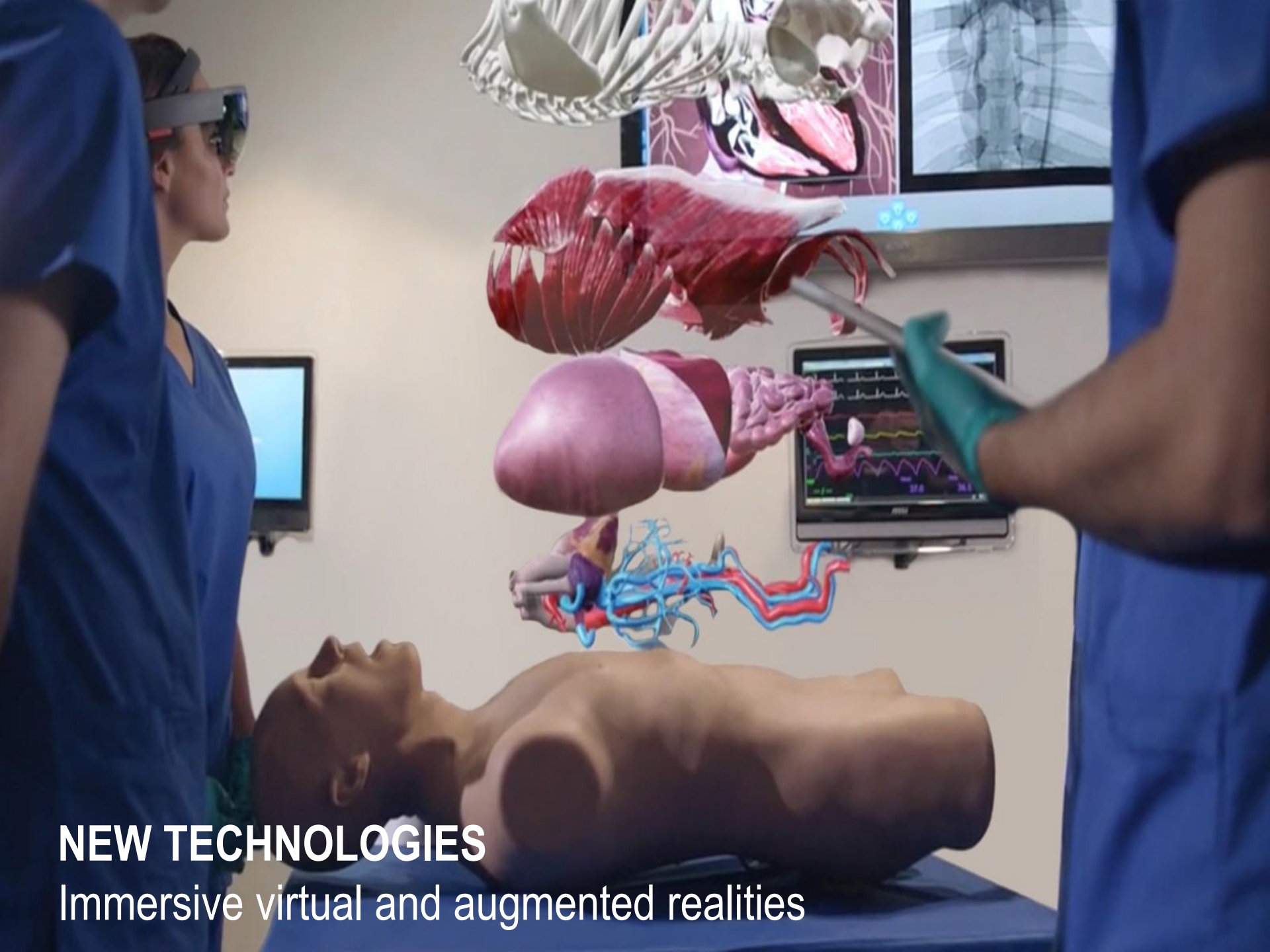
Collaboration, engagement and technology


WORKING HAS CHANGED

NEW WORKING ENVIRONMENTS

Innovation, enterprise and co-working hubs


TECHNOLOGY HAS CHANGED



NEW TECHNOLOGIES

Immersive virtual and augmented realities

CONTEMPORARY LEARNING ENVIRONMENTS
CHANGING THE LANGUAGE

Contemporary learning environments **challenge traditional spatial concepts:**

“Class”
- twenty five students

“Room”
- fully enclosed space

“Spaces”
- built or natural environment, internal or external

“Settings”
- purposeful and supportive

Across **contemporary learning environments,** the nature and type of **spaces** and **settings** has evolved:

- **Ideate** spaces
- **Creative** studios
- **Prototyping** labs
- **Innovation** hubs
- **Simulation** environments
- **Social** learning settings

These new student centred learning settings provide:

- **Agility** and **flexibility**
- High levels of **transparency** and **physical connectivity**
- Seamless access to **technology**
- Multiformat and **multi-mode functionalities**
- Purposeful **furniture, joinery** and **resources**

ENGAGEMENT – EDUCATORS AND INDUSTRY

COLLABORATION & CO - DESIGN

Authentic engagement across **educators, designers and industry** is **essential** and **instrumental** in the **briefing** and **design process:**

- promotes development of a **shared, informed** and **co-created project vision** and **outcome**

- emphasis on identifying **opportunities** offered through contemporary **pedagogical frameworks** and **authentic experiences**

Industry participation is essential in visioning these new environments to **encourage real world connectivity:**

- reflects increasing focus on **collaborative, interdisciplinary learning, research** and **working practices**

Promotes partnerships:

- valuable **knowledge exchange** between **education** and **industry**

Leadership, expertise, diversity and **creativity** is embedded within an expanded project planning team - balancing **design** with **educational thinking** and **industry acumen**:

- encourages **innovation** and **inter-disciplinary** thinking
- **balance** and **diversity** across real world expertise
- supports exploration of new **spatial solutions** and **functionalities**

DEAKIN UNIVERSITY

Centre for Advanced Design in Engineering Training (CADET)

Geelong, Australia

AU$55m project co-funded by **Deakin University** and the **Australian government**

Undergraduate and **Post Graduate:**

- Civil, Mechanical, Electrical, Mechatronics and Industrial Design, Sports and Medical Technologies

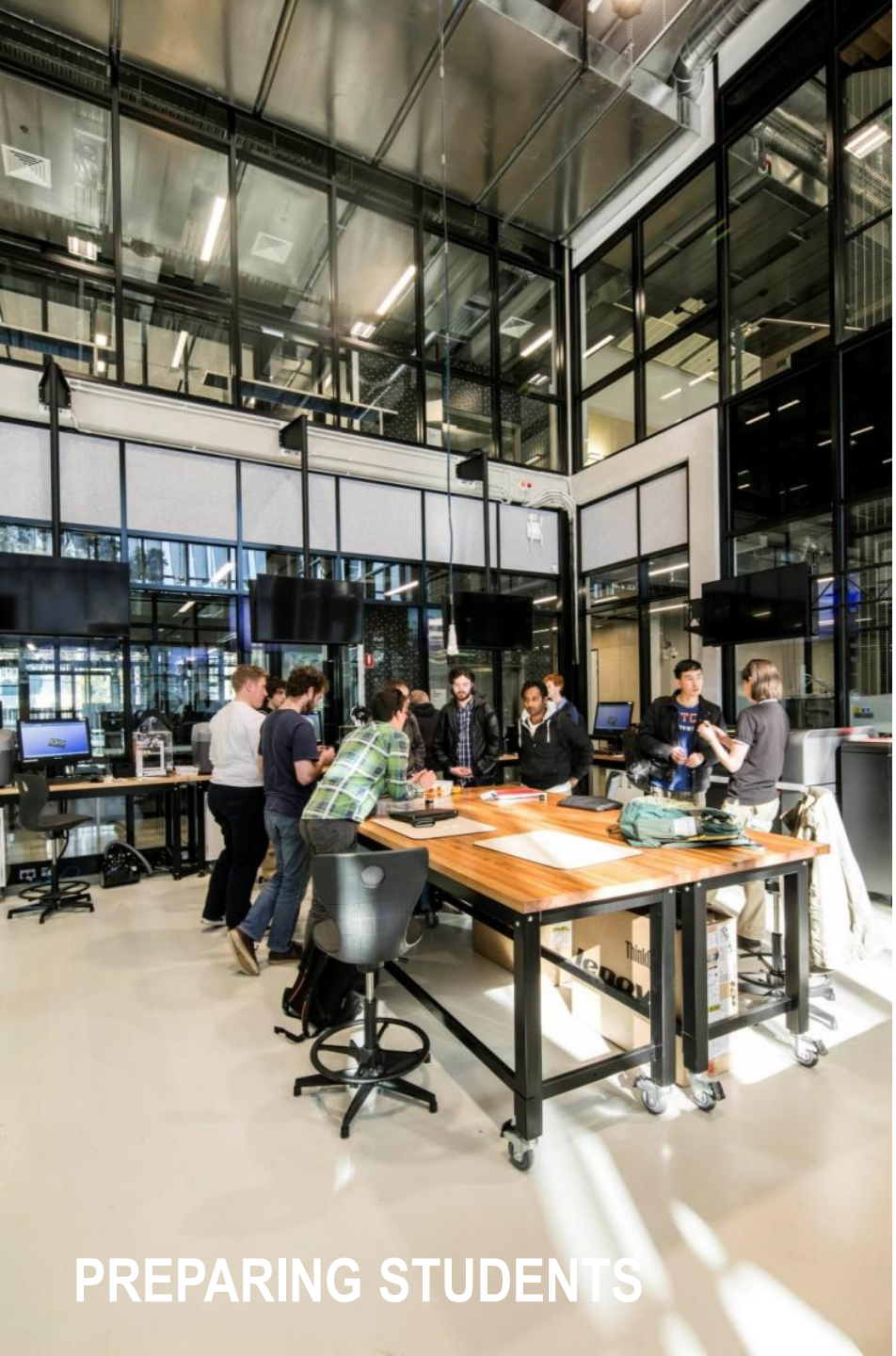
Research:

- Sustainable Infrastructure
- Advanced Design Manufacturing
- Engineering Education

Innovation central to great **engineering** – critical role of **design** in this process

Engineering education in Australia has traditionally been more aligned to **science** than **design**

With **traditional manufacturing** in decline, how will industry respond **- are engineering graduates being prepared for** a **digital revolution** in manufacturing?



A **contemporary engineering curriculum** responds by adequately **preparing students**

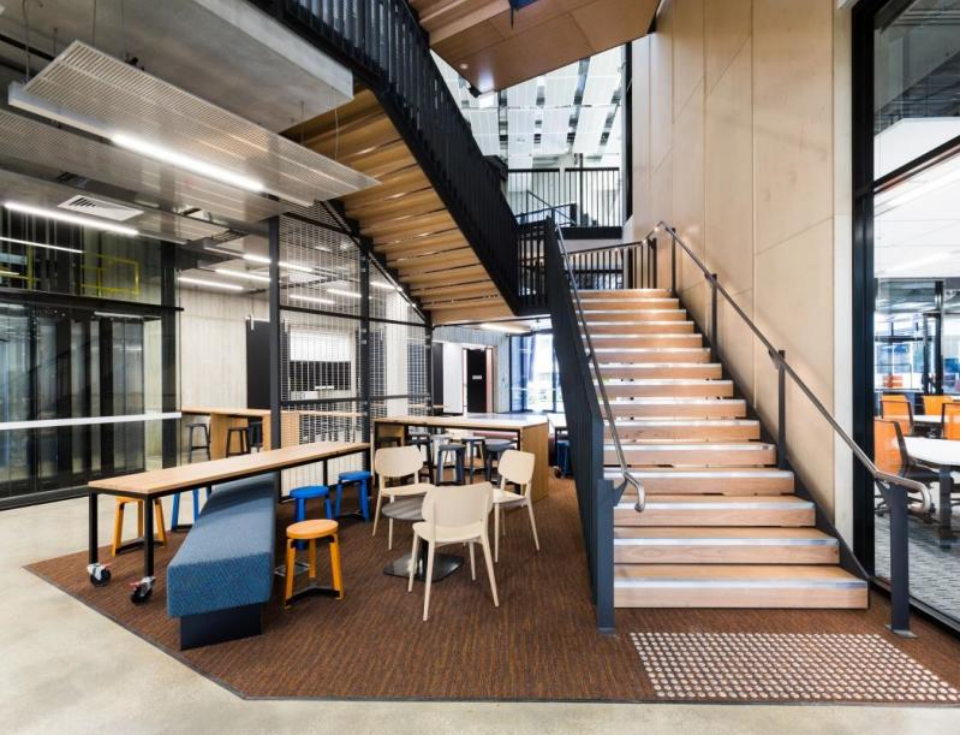
- Dealing with **problems** and **identifying solutions** is an **essential** quality for engineers
- **Framing** and **diagnosing** the problem is the **most important,** yet generally overlooked
- Requires **communication** and **collaboration** in **team based** project environments

CADET LEARNING MODEL

A design focused, engineering learning model – **“Project Oriented Design Based Learning”**

- Students work in **small interactive groups** to solve **real world engineering problems**, as they would in professional teams

- **Learning model** supports students navigating a path from **idea through design, modelling** and high tech **manufacturing**



Physically, it was essential to enable **visual** and **physical connections** across **horizontal** and **vertical** spaces:

- Vertical movement strategically located to support **informal interactions**

Through glazing and layering of functional spaces, CADET promotes **connectivity:**

- evidencing activities and projects, showcasing learning and research

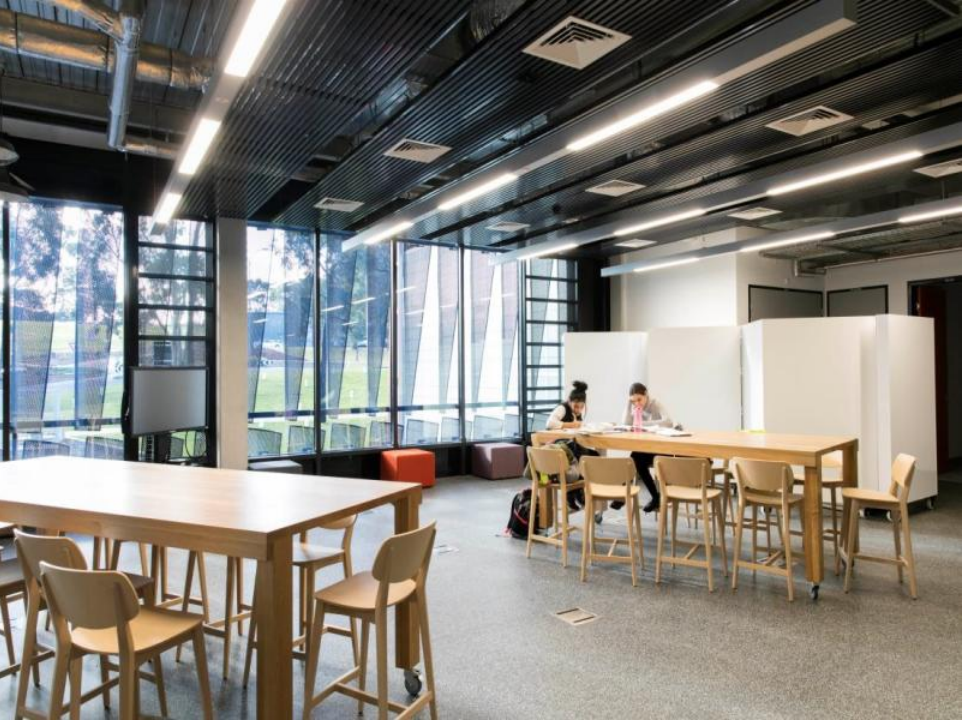

OPEN & CENTRAL VERTICAL CONNECTIONS

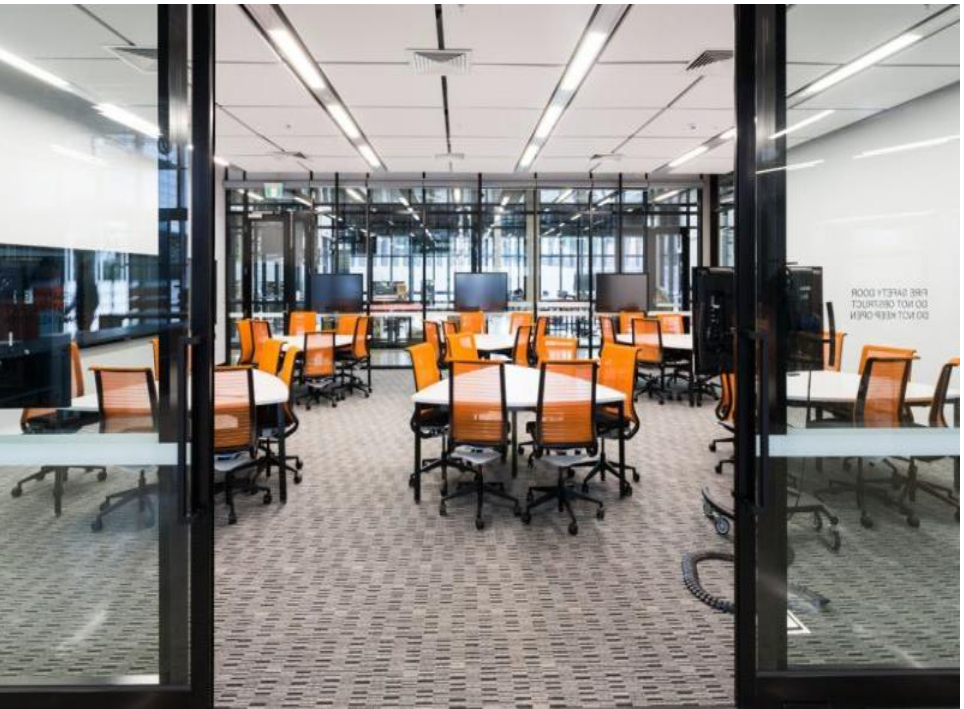
Through enhanced access to design studios, prototyping and manufacturing laboratories:

- students are able to **move** from **idea, to concept, to prototyping** and **fabrication**

- students actively participate in a **“hands on”** high quality environment with access to the latest tools and technologies


PRODUCT REALISATION LABORATORY





With a focus on **connecting learning spaces** to foster creativity, innovation and collaboration, **design spaces** are located throughout

Design studios are accessible, non-timetabled spaces for students:

- **configured by students** as projects require
- supported by a range of **adjacent settings, spaces** and **technologies**


COLLABORATIVE STUDIOS

Through reconsidering traditionally configured laboratory spaces, a more flexible approach was realised:

- Establishment of **large format**, connected **studio-based laboratory environments**
- **Visual** and **physical connections** to adjacent learning studios, maximise **opportunities** for students to move between **theory and practice**

INFORMAL AND FORMAL

Importance of **informal learning** and **social learning** - interstitial settings and spaces:

- informal learning settings are **distributed** throughout, to promote a strong learning community

- **enclosed or open, collaborative spaces** enable use for **informal study** and group project work

LEARNING ENVIRONMENTS AUSTRALASIA

2017 Awards for Excellence in Educational Facilities

Winner – NEW EDUCATIONAL FACILITY

WYNDHAM TECH SCHOOL

Victoria University

Werribee, Australia

One of **ten** new **high tech campuses** by the Victorian state government

Learning characterized by **student centred**, **active investigation** and real world **project based** learning experiences

Focus on industries offering regional **economic** and **employment growth**

Learning programs focus on **STEM** and **21st century skills**

Inspiring and engaging students through **interactive, hands on learning**

A shared environment **driving transformative practice** for local secondary schools

Accessible technologies **enhancing learning experiences**, optimising **innovation** and **discovery**

Transparency and **connectivity** promoting curiosity - encouraging **interdisciplinary engagement**

TECH SCHOOL PRINCIPLES

Engagement with **industry** is **central to curriculum philosophy**

Enabled through **industry based projects**, through to stimulation of **research projects**

Provides **curriculum input** to ensure students acquire **knowledge, competencies** and **skills** sought after by employers

Throughout the brief development, **educators, industry** and the **design team** explored and analysed:

- Student **experiences**
- Student **activities**
- Student **capabilities**

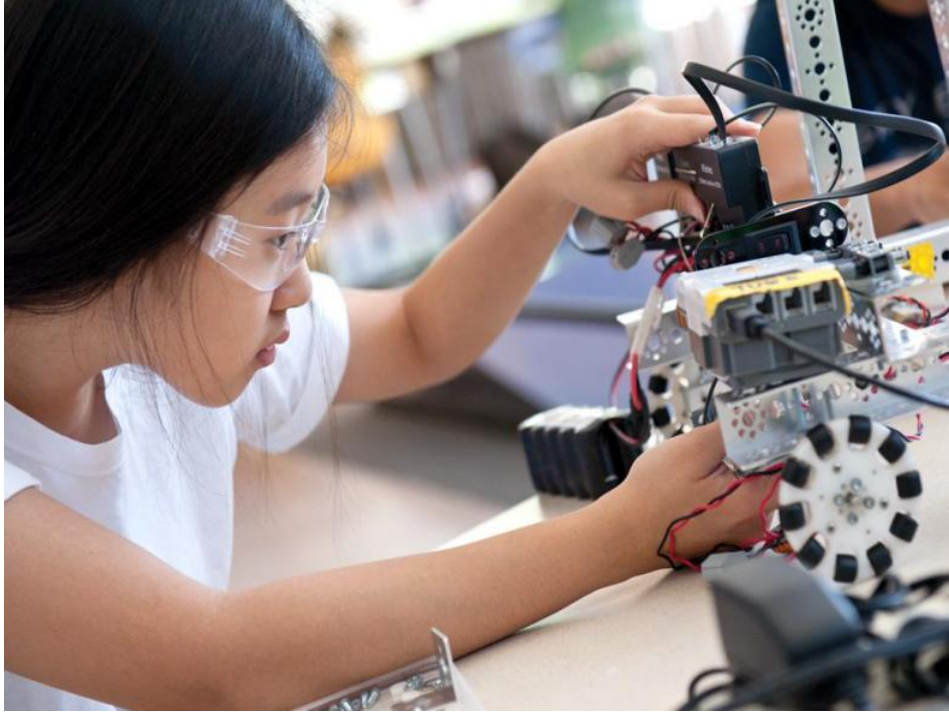
These were developed and responsive to the guiding **Tech School principles**

Analysis of numerous **pedagogical models** identified attributes that would **support students** through **active engagement** in their learning process:

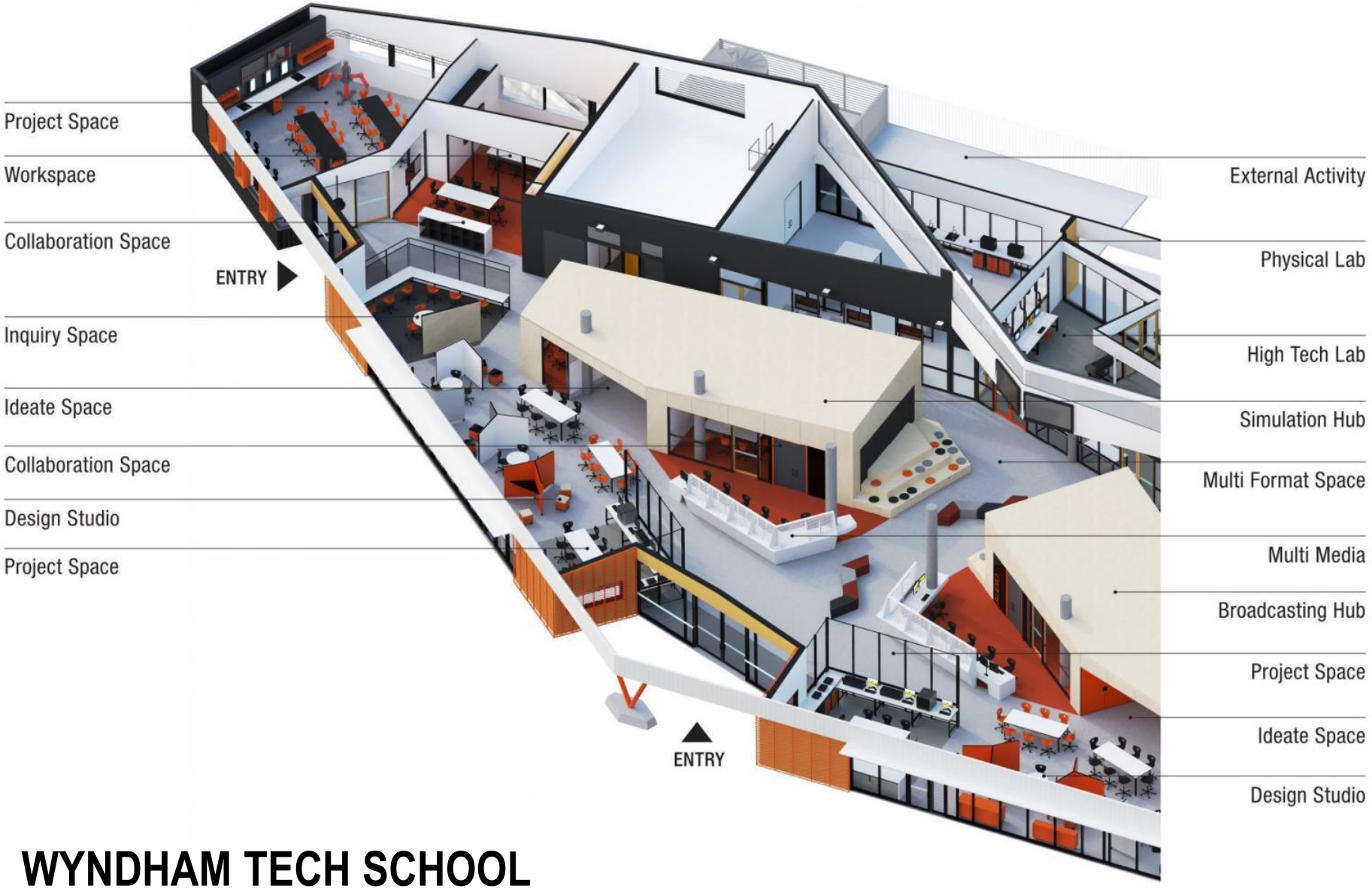
- **Challenge based learning**
- **Design thinking**
- **Project based learning**

Educators and designers collaborated to establish strategic **design principles**:

- An **immersive** learning environment
- **Authentic** and **engaging**
- "Hands on" **practical settings**
- **Agile** and **adaptable** spaces
- **"Learner led" spaces** - able to be **"constructable"**
- **"Plug & play"**
- Support potential for **multi-use** of settings and spaces

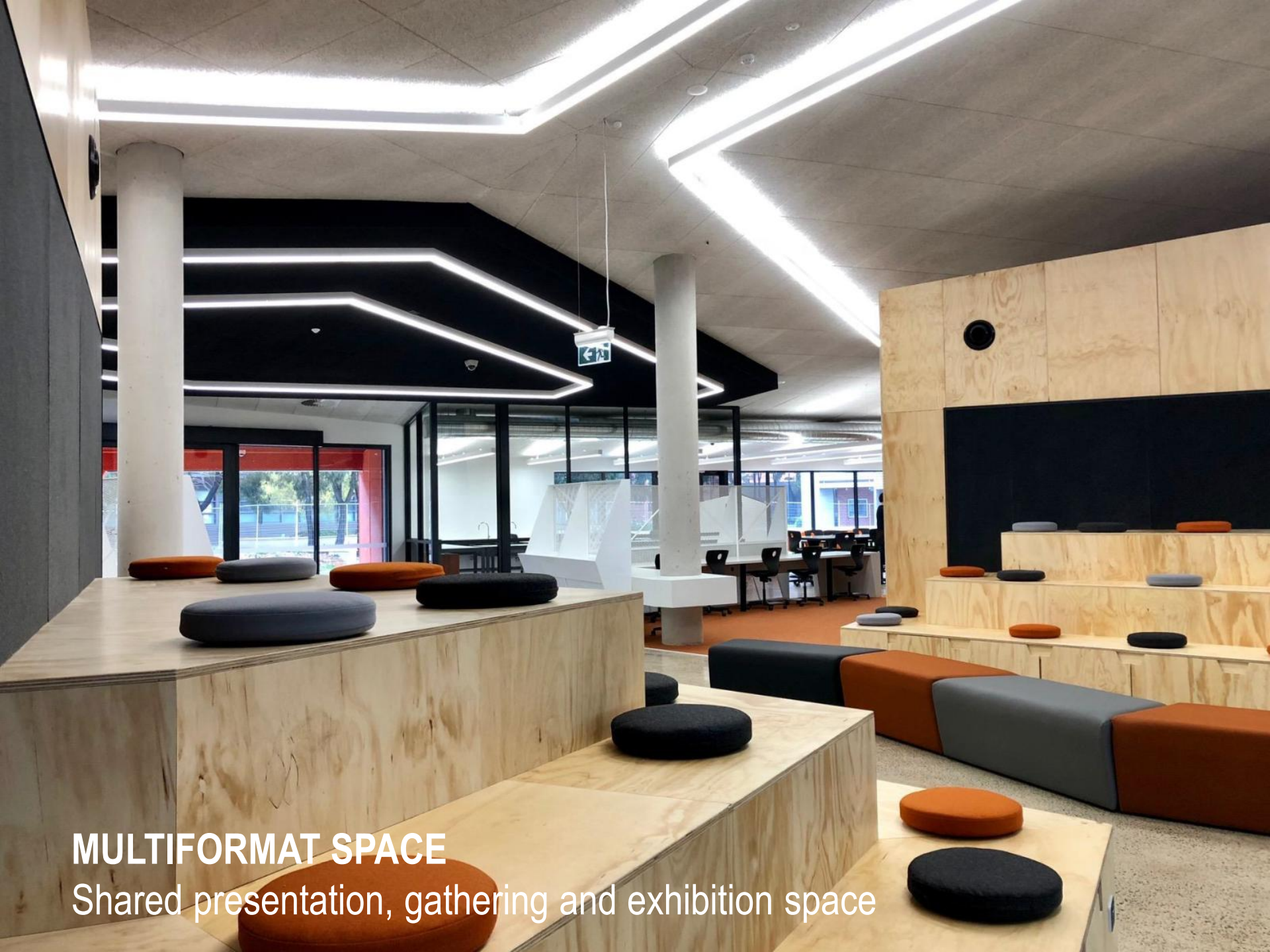


DESIGN PRINCIPLES



WYNDHAM TECH SCHOOL

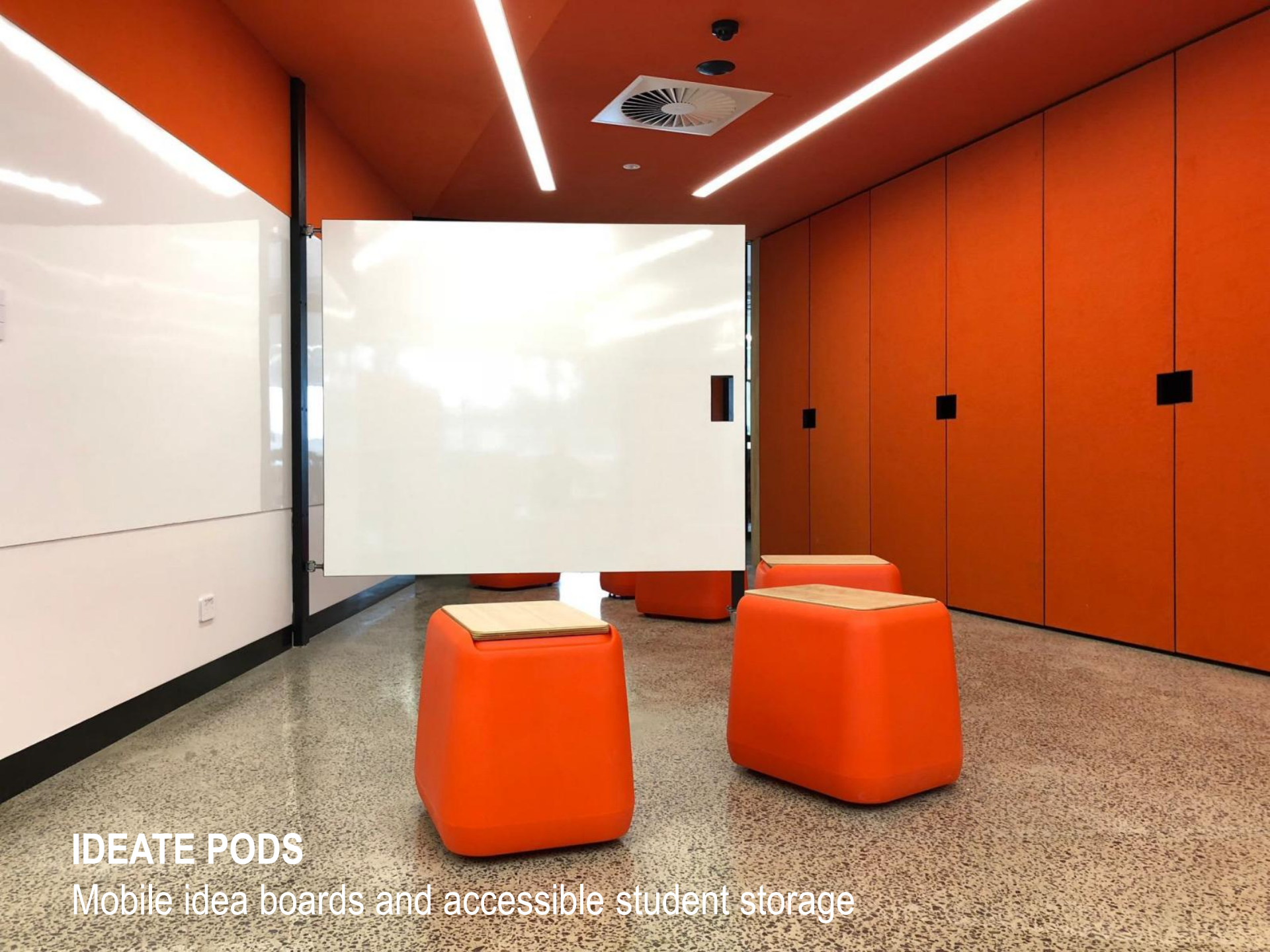
Spaces, settings and activities


MULTIFORMAT SPACE
Shared presentation, gathering and exhibition space

DESIGN STUDIOS

Agile student environments for design activities


MULTIMEDIA AND COLLABORATIVE SPACES
Accessible and adjacent to design studios



IDEATE PODS

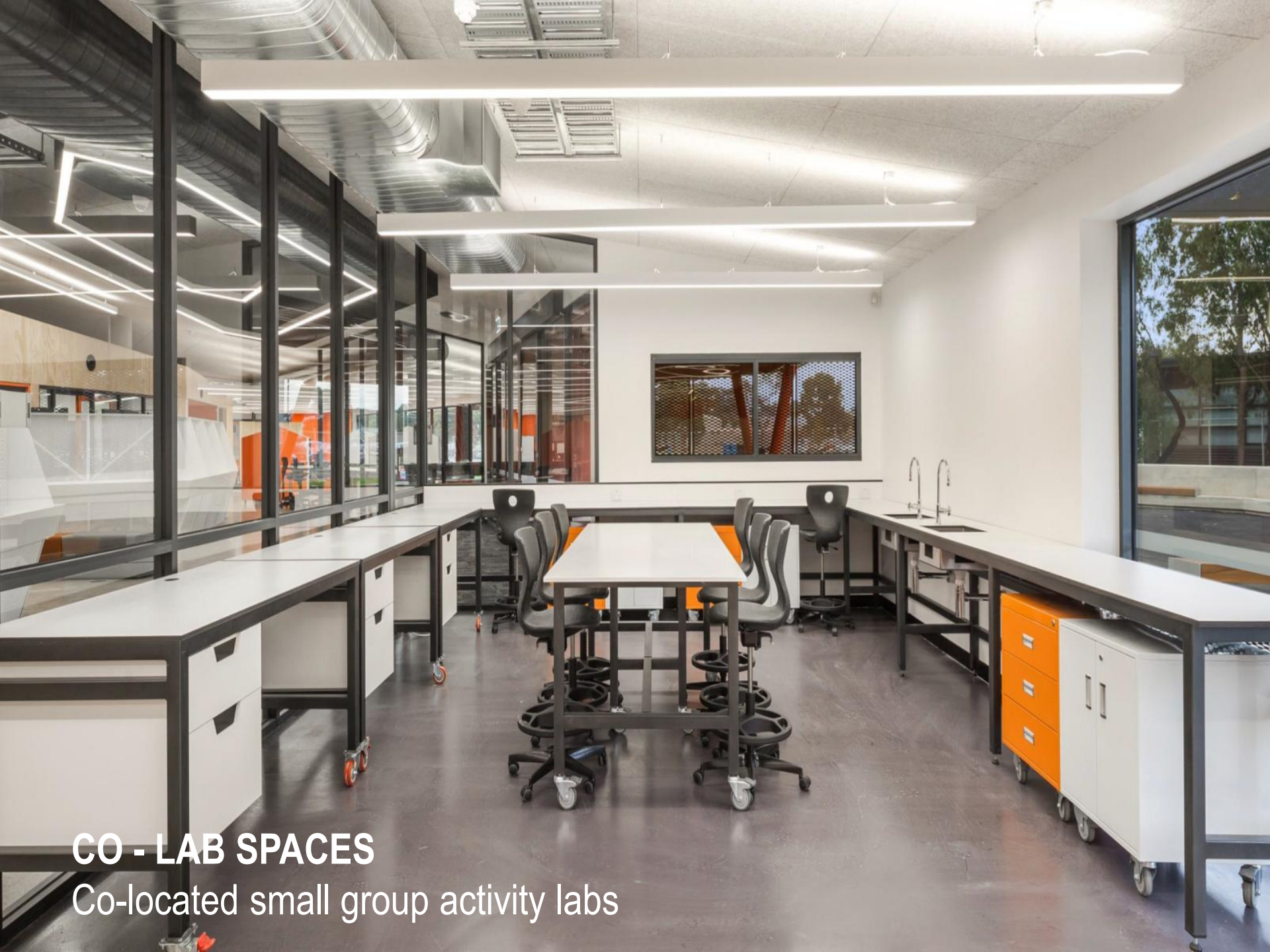
Mobile idea boards and accessible student storage

SMALL GROUP COLLABORATION

Visual and physical adjacencies

INQUIRY AND RETREAT SPACES

Distributed, legible and accessible

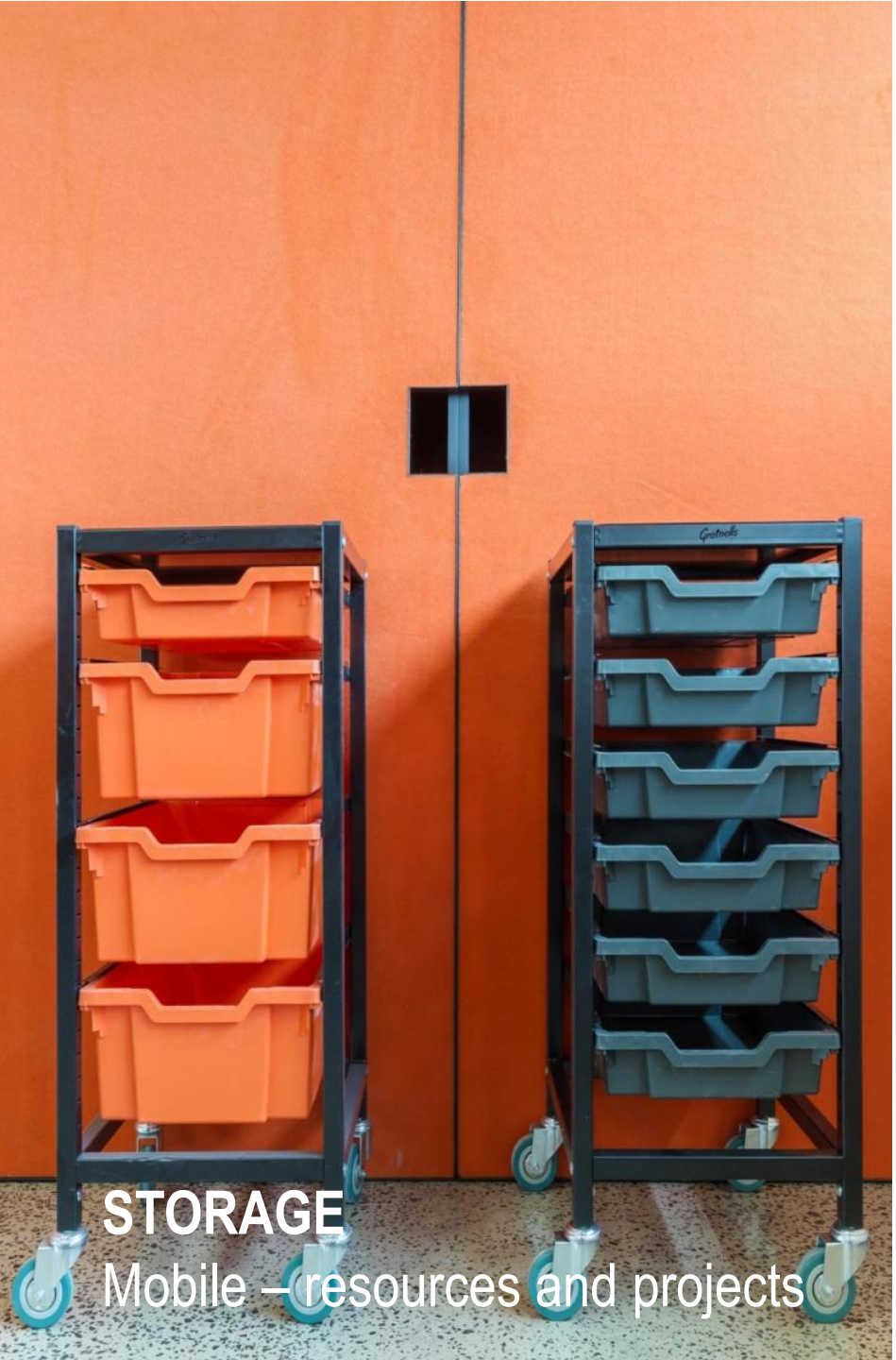


CO - LAB SPACES

Co-located small group activity labs

PROTOTYPING LABORATORIES

Larger format specialist intensive activity spaces



STORAGE

Mobile – resources and projects

2018 VICTORIAN SCHOOL DESIGN AWARDS

Winner – Best New Secondary School

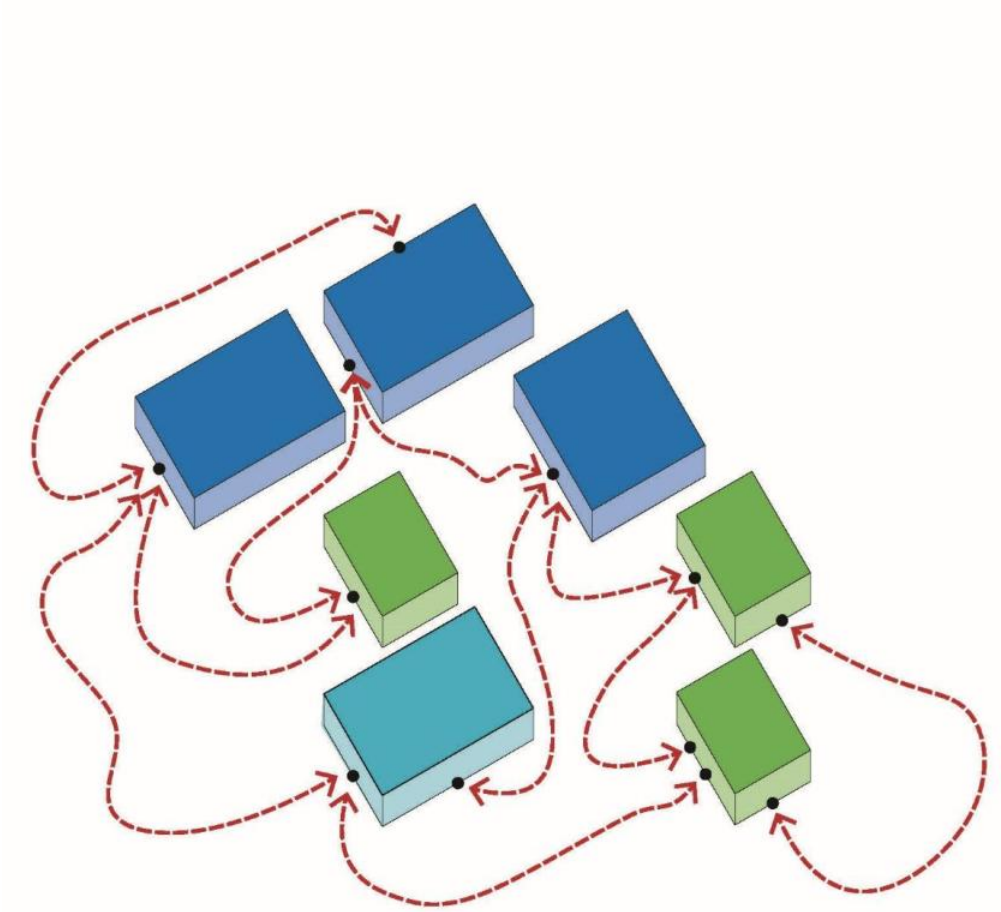
PRAHRAN HIGH SCHOOL

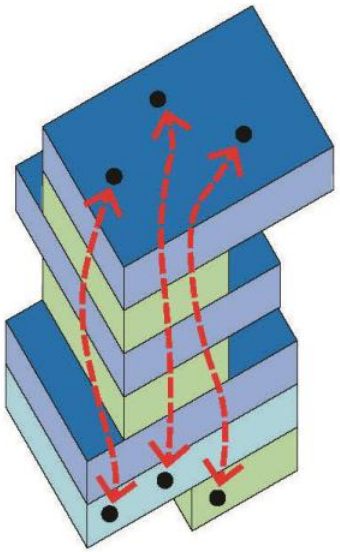
Melbourne, Australia

Prahran High School - new campus for **650 secondary students** in inner Melbourne

Leading example of **next generation** of **multi-level learning environments**

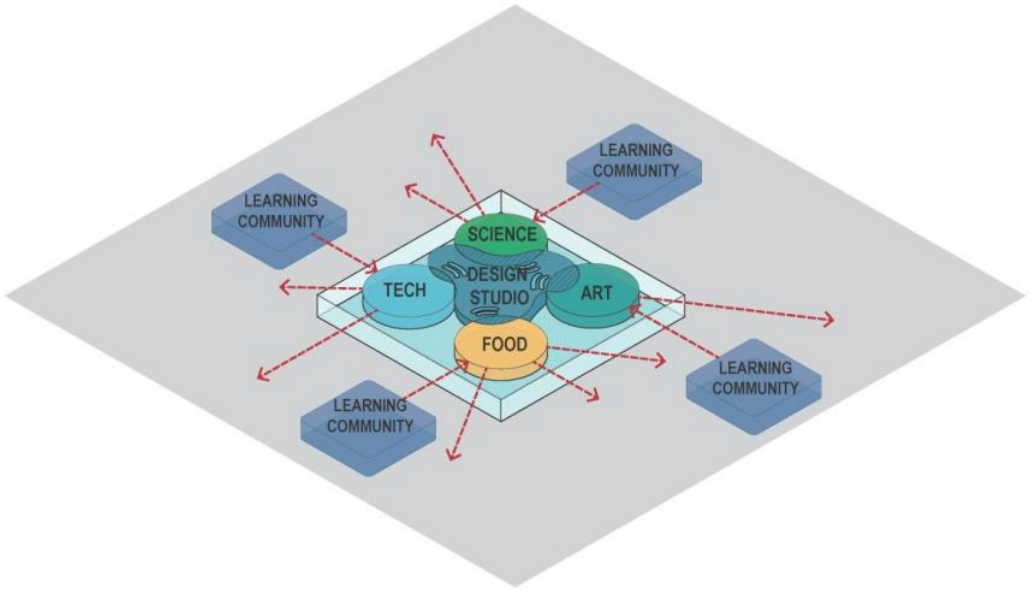
Challenge for **educators** and **designers** to **shift thinking** away from **traditional horizontal movement** and **connectivity** to a **vertical learning experience**

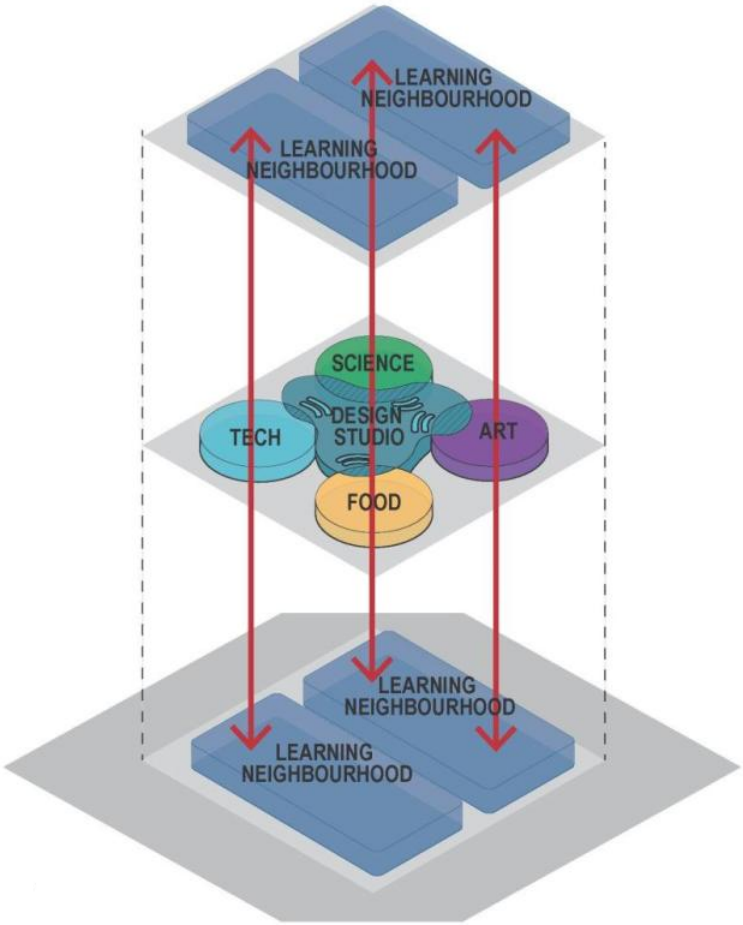




DISTINCT SPECIALIST ACTIVITY AREAS

Individual, discipline specific “silos”





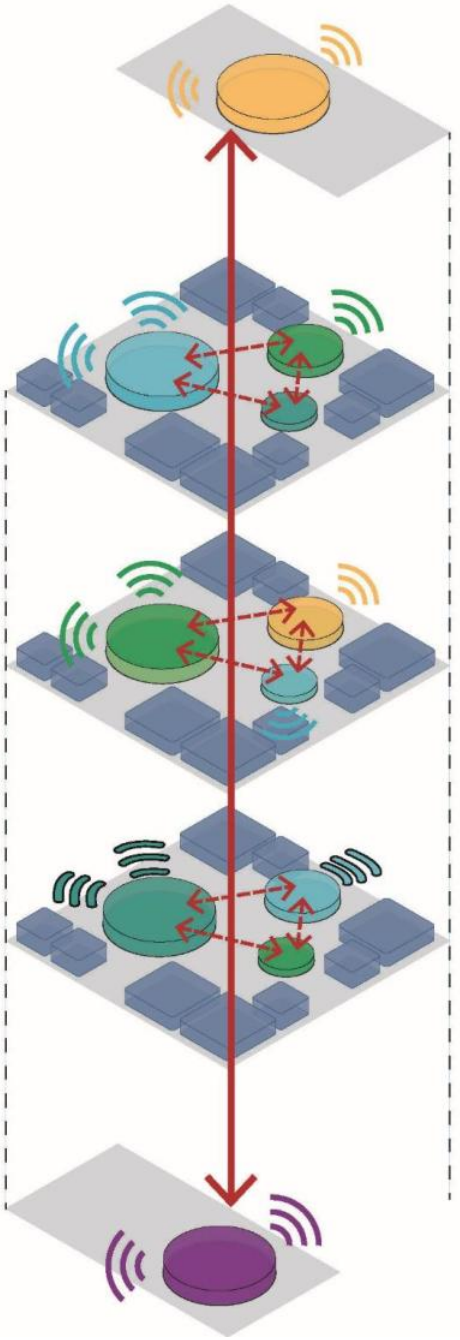
INTEGRATED SPECIALIST PRECINCTS

Enable interdisciplinary “collisions” and potential

“Self-contained model”:

- **Independent**, **comprehensive** but small scale design, art, technology & science **precincts** embedded **within each learning community**

- Each floor “self contained” with **little encouragement for vertical student movement** between learning communities

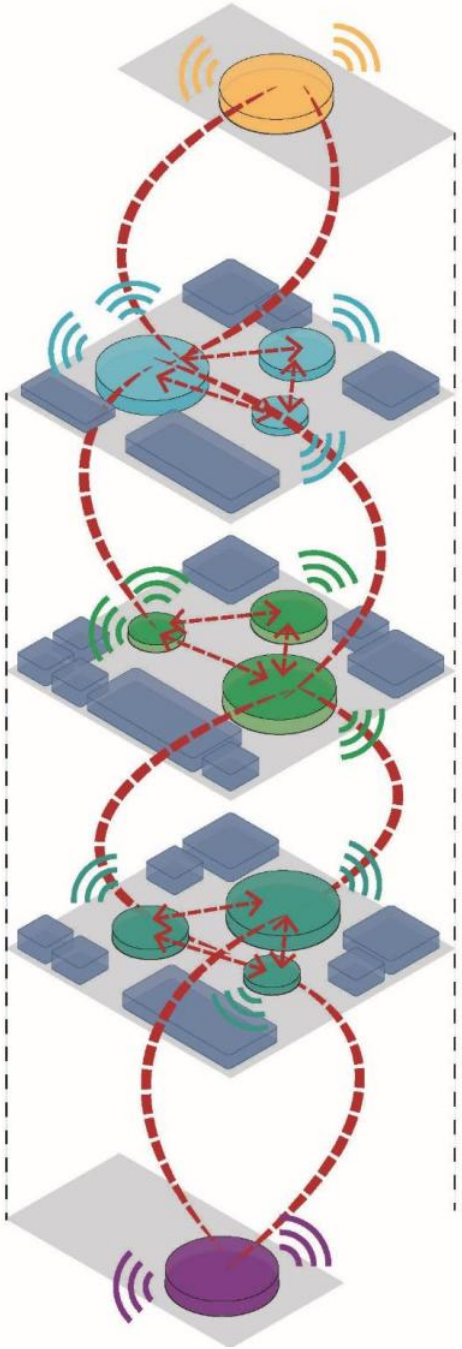


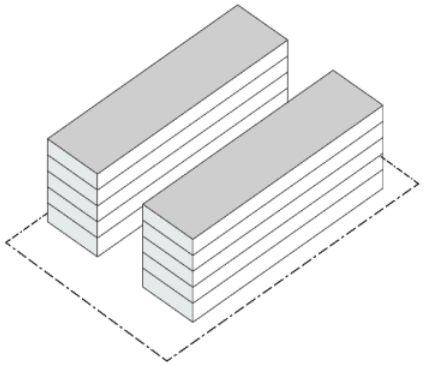
“Distributed model”:

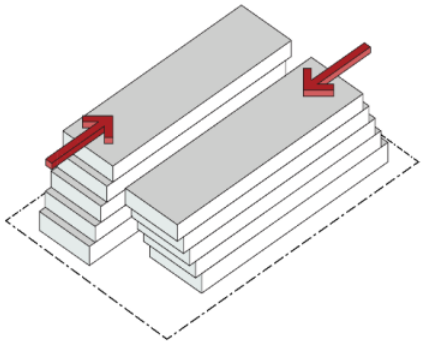
- **Specialist activity settings** and **spaces “threaded”** through **all levels** - integrated across the learning communities

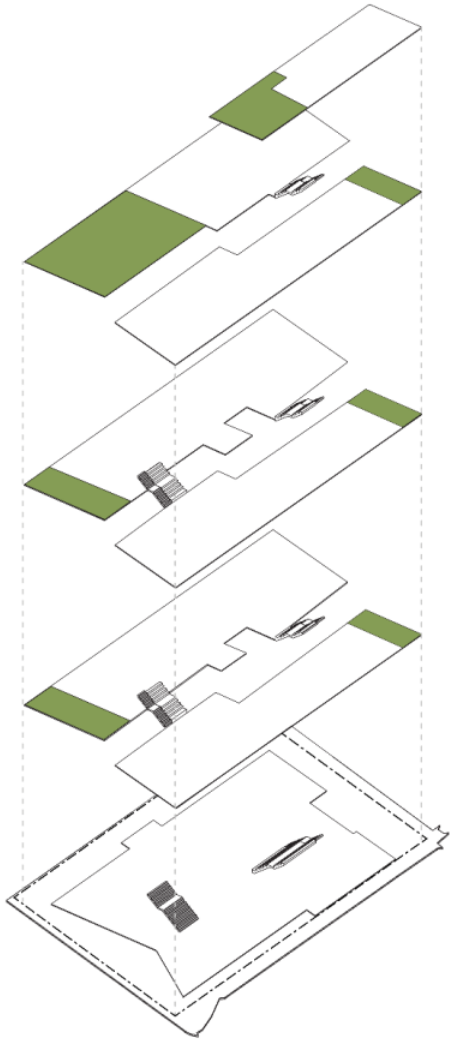
- Distributed **design studios** along the journey become the **conduit for ideas, connectivity and movement**

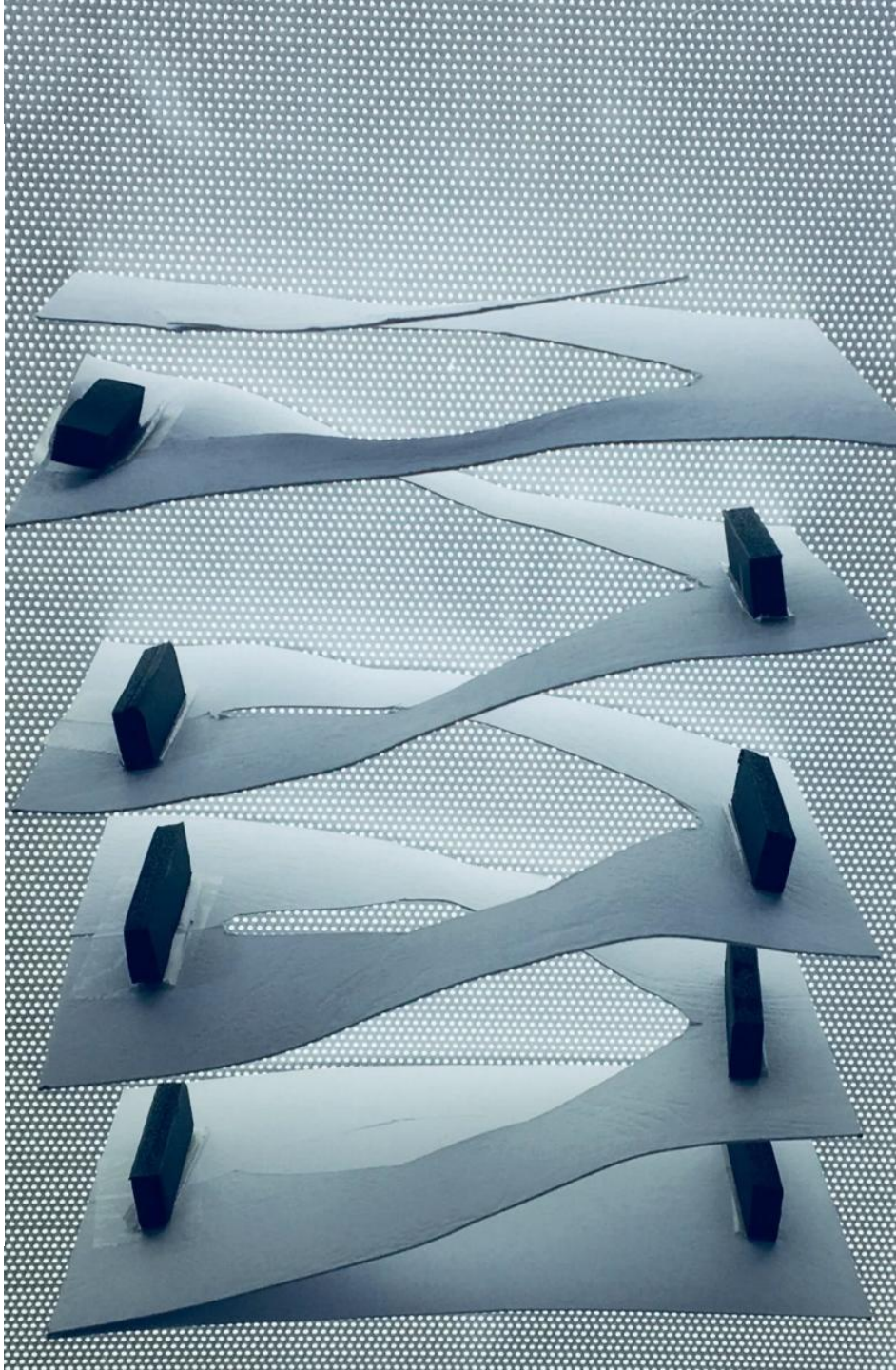
- Promotes **collaboration, awareness** and social interest





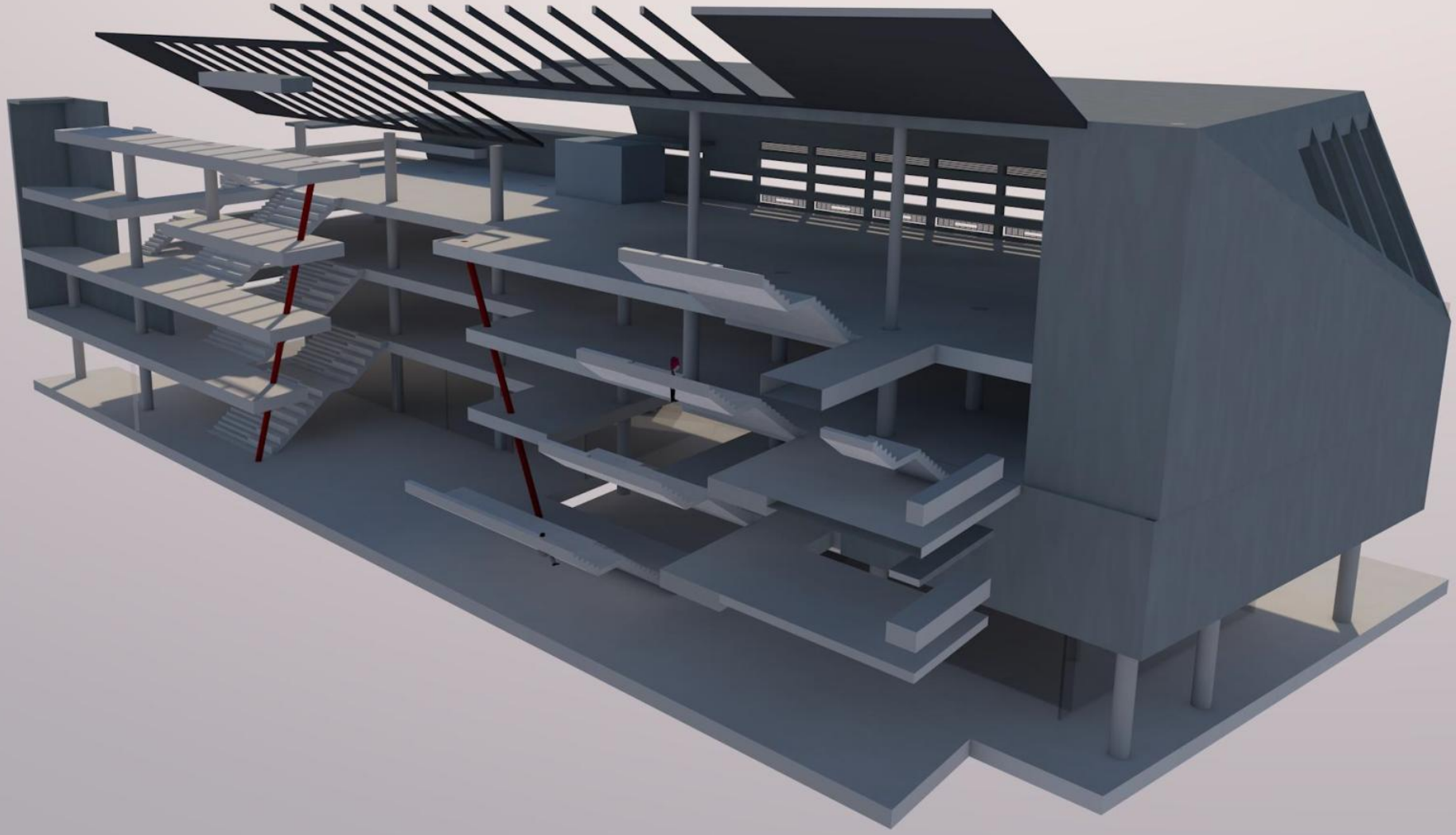






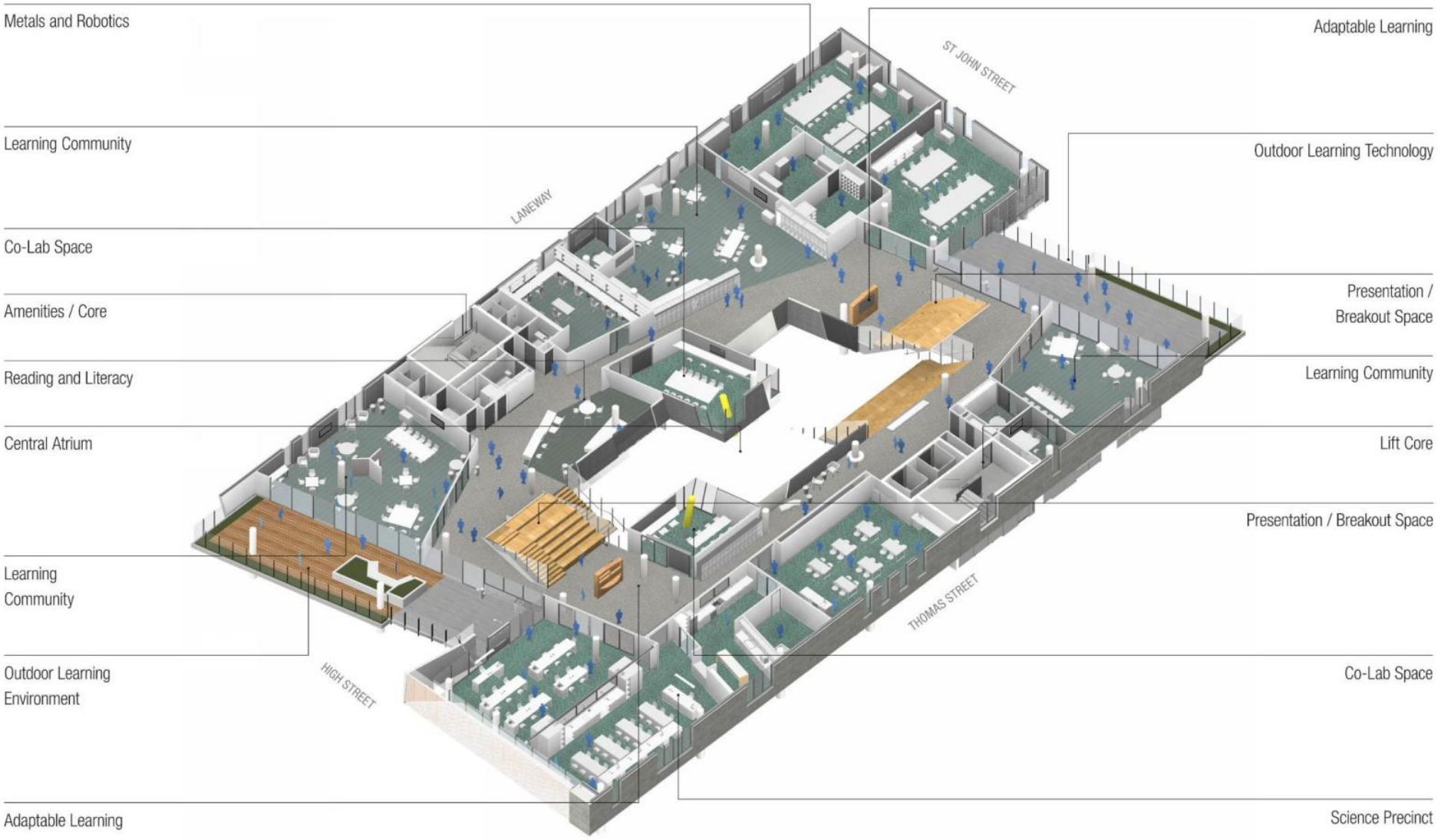
VERTICAL CONNECTIVITY

Conceptual studies



HORIZONTAL AND VERTICAL CONNECTIVITY

Around atrium and connected through broad bleachers



LEARNING COMMUNITIES

Integration of activity spaces and settings at each level

ACCESS AND MOVEMENT

A series of interconnected bleachers and stairways

CENTRAL GALLERY ATRIUM

Visual and physical evidence of learning throughout


PRAHRAN HIGH SCHOOL
Multi level interdisciplinary learning

THANKYOU

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