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
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
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
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
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
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
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 mult-use of settings and spaces
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 - 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
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