Interdisciplinary product design, materials technology, and applied chemistry

MINISTRY OF EDUCATION
Te Tāhuhu o te Mātauranga

Technology Online

Kaua e rangiruatia te hāpai o te hoe;
e kore to tātou waka e ū ki uta

Karakia Timatanga

Kia hora te marino
Kia whakapapa pounamu te moana
Hei huarahi mā tātou
i te rāngi nei
Aroha atu aroha mai
Tātou i a tātou katoa
Hui ē! Tāiki ē!

Opening Karakia
May peace be widespread
May the sea be like greenstone
A pathway for us all this day
Let us show respect for each other
For one another

Bind us all together

Interdisciplinary product design: Introductions

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Webinar content outline

1. The beginning
2. Interdisciplinary
3. Key insights
4. Student perspectives
5. The course
6. Collab
7. Chemistry
8. Major project
9. Contexts
10. Students' reflections
11. What next?

The beginning

1. **Wellington Girls' College curriculum review**

   Staff expressions of interest in:

   - Thematic courses
   - Modular courses
   - Cross curricular

2. **Future focused curriculum**

3. **STEM, STEAM, or HASS?**

   Interrogating models of curriculum integration

The beginning

Design thinking

- Empathise
- Design
- Ideate
- Prototype
- Test

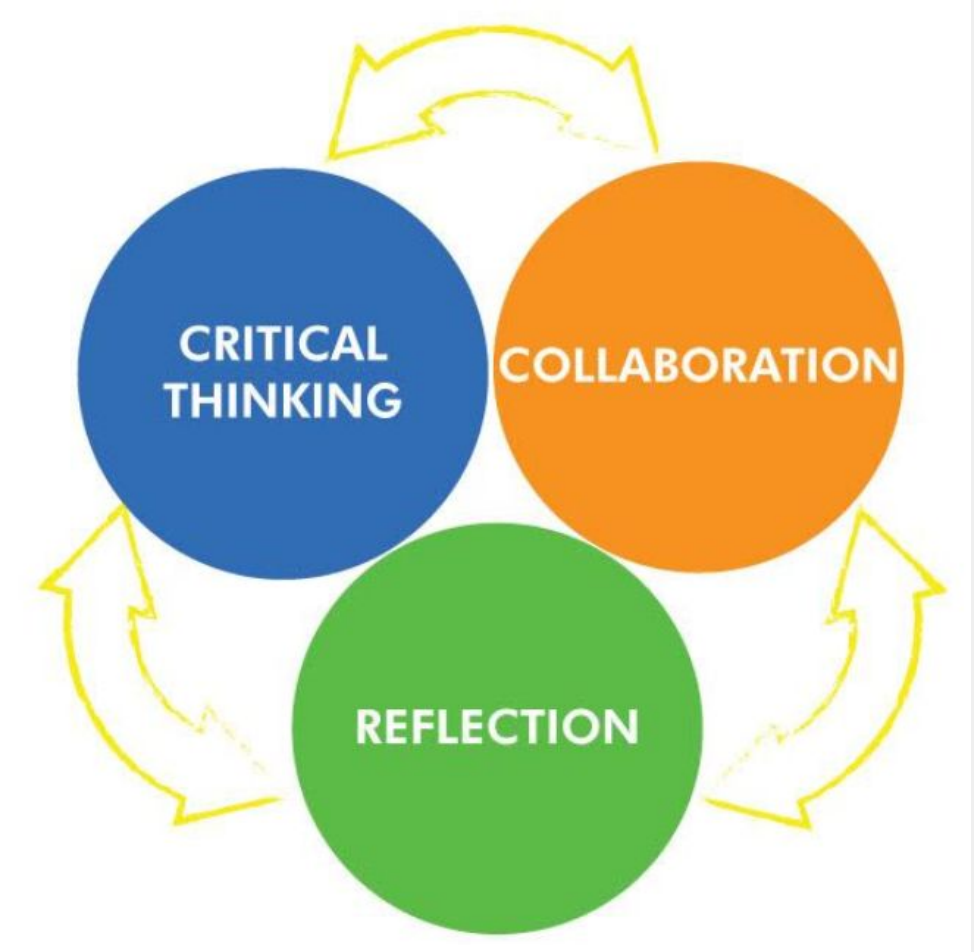
Transforming schools

- Creativity
- Critical reflection
- Communication
- Collaboration

Key insights

Interdisciplinary perspectives

- Commitment to intellectual openness and curiosity, and awareness of the limits of current knowledge and the links amongst disciplines



Student perspectives

What do students say about learning ?

Students want:

- programmes that are intellectually stimulating and challenging
- freedom to learn
- to undertake new challenges
- to feel a sense of belonging

The course

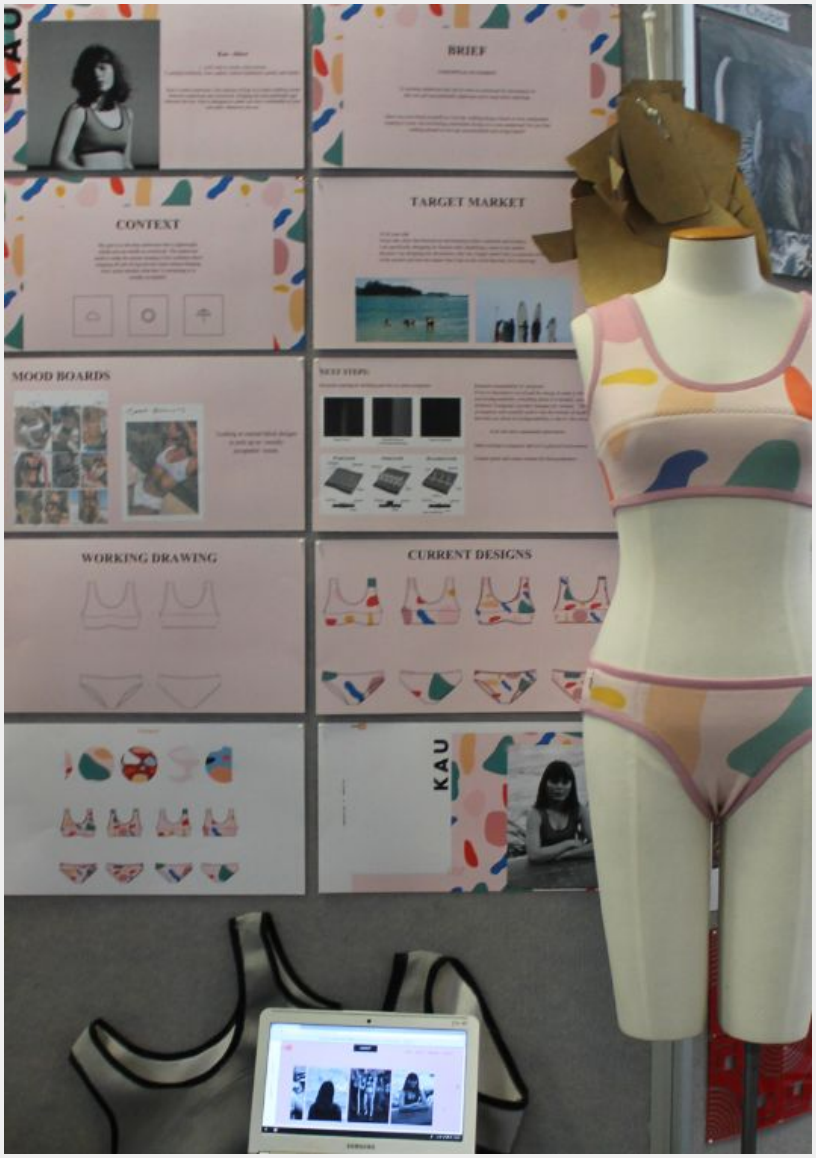
The interdisciplinary applied science technology programme provides learning opportunities that build on skills and experience in science, design technologies, technology innovation, and technology practice.

The learning programme provides a pathway to promote interdisciplinary alliances, for example between scientists, designers, and technologists.

The course

Course structure

- An introductory collaborative project called Collab
  - Formative assessment
- Major project with textile performance
  - Achievement Standards with an opportunity for Scholarship



Collab

Collab is an introductory collaborative design project that aims to give the students an experience of applied design science and technology practice.

- Formative assessment
- Chemistry
- Technology practice
- Technology expert

Chemistry

Introduction to dyes and dyeing techniques from a Chemistry perspective. Why do certain dye types only dye certain fibres, how to explain this from a Chemistry point of view.

Practical work to investigate dyeing different fabrics with a variety of natural and synthetic dyes and comparing results to theory of dyeing.

Dye Synthesis - how synthetic dyes are made from starter molecules subjected to several chemical reactions. Implications of the dye manufacturing process on people and the environment.

Major project

Product design with material performance focus

13AMS project briefs

Textile design covers a broad range of design disciplines under the heading of “textiles”.

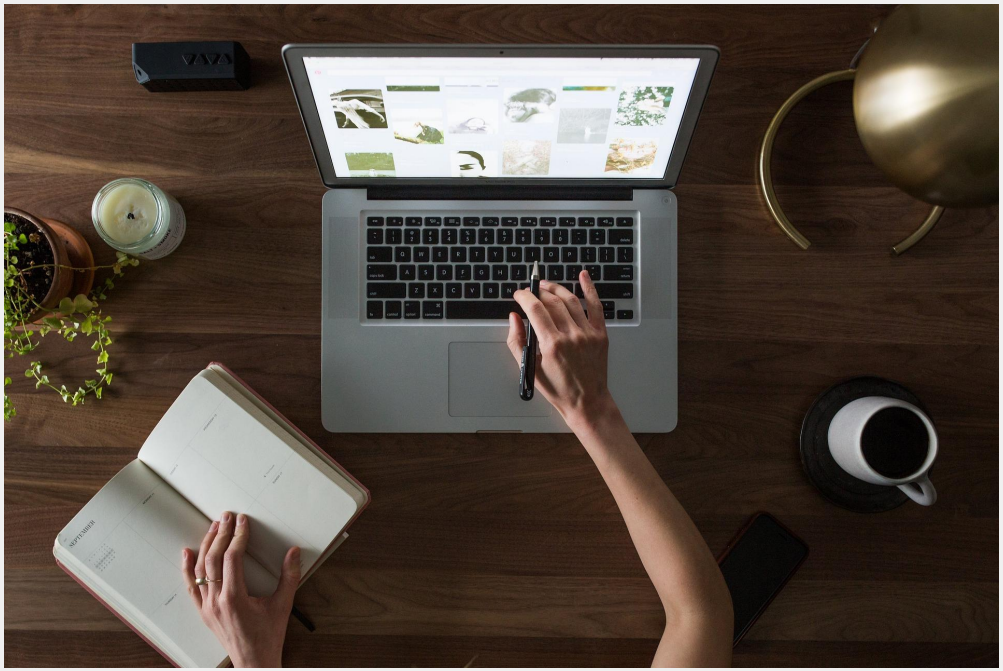
We are principally focused upon the creative application of design to a wide range of natural and synthetic soft fibres and materials, such as neoprene, leather, or canvas.

The surface designs can form a part of many different aspects of people’s lives, be they fashion or interior or exterior application.

We encourage exploration and experimentation, combining techniques and materials to create innovative design developed from drawing.

Major project: Brief development

- Qualitative and quantitative research
- Technology experts
- Innovation
- Sustainability
- Brief refinement



Major project: Prototype

- Material development
- Modelling
- Synthesise evidence testing
- Material performance
- Fitness for purpose in its broadest sense
- Manufacturing

Major project: Scholarship

- Design practice
- Synthesis
- Elegance and originality
- Analysis and critical thinking
- Reflective report
- Material performance

Contexts

Frances

“My goal is to develop underwear that is lightweight, stylish, and can double as swimwear.

The underwear needs to make the person wearing it feel confident about stripping off and diving into the water, without thinking twice about whether what they are swimming in is socially acceptable.”

Hannah

“My WGC Senior A Waterpolo girls and I really struggle with our competitive WGC togs. The fit is not inclusive for different heights, weights, and body types, making us uncomfortable wearing them for numerous reasons.

Because of this, my aim is to design a range of sizing adaptations – through using adjustments to universal women’s sizing – specifically tailored to certain body needs, and that would allow the WGC waterpolo togs to be more inclusive for all students.

It is important to me that these togs would still be appropriate for the WGC school culture, but more so be tailored to waterpolo, rather than just swimming.”

Ashley

“In different weather and seasons we need to wear different clothes to adapt to the physical environment. The temperature difference between morning and evening, raining or windy often means people in Wellington need to prepare by wearing a coat or jacket.”

Winter

“With the rapid development of science and technology in today’s society, a large number of pollutants from industrial production and carbon emissions have caused serious environmental pollution. In a country which has extreme environmental problems, the air that people breath into their bodies contains all the pollutant particles.

Some of them can be filtered through nose hairs, but the rest are too tiny to be filtered, so the air people breathe in is very harmful for their health.”

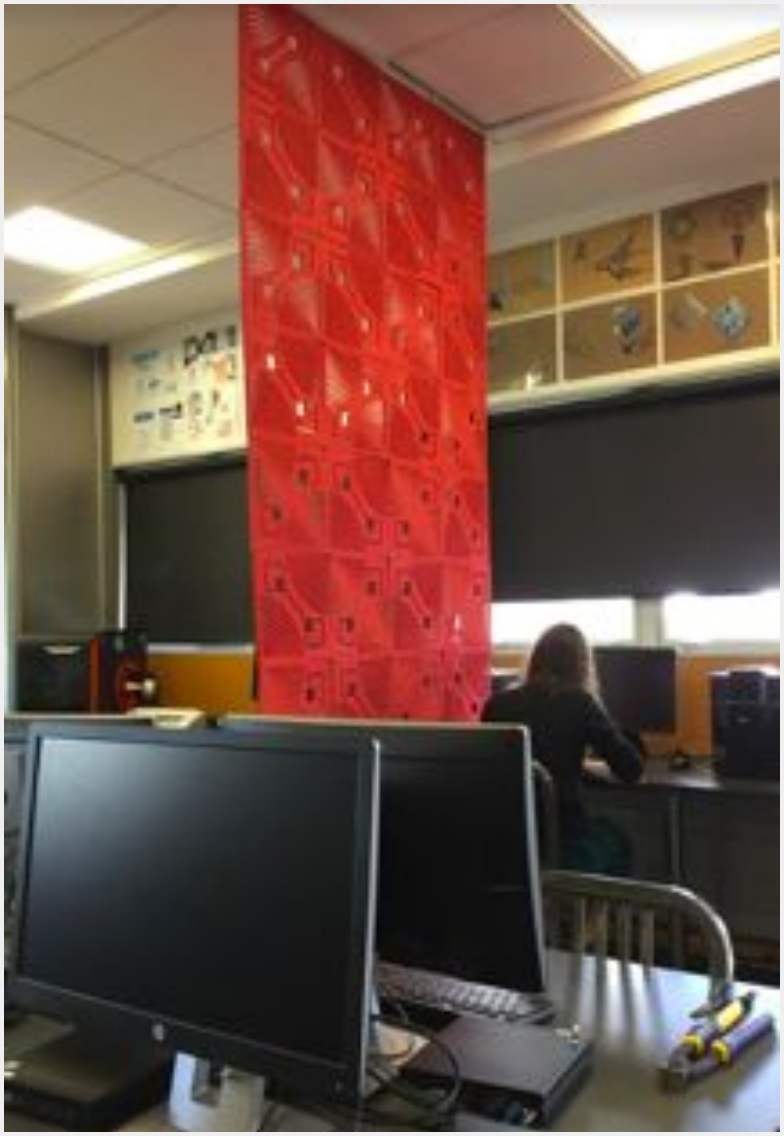
Ella

“Sustainability is something that does not cross people minds enough when it comes to shopping, and with designs developing our world is becoming more and more polluted. There are ways to use waste to create new products.

Living in Wellington, a raincoat is something we all need but it's not necessarily something we all want. If there was a raincoat available that was sustainable and also aesthetically pleasing and that can also be recycled or reused, wouldn't you want to buy it?”

Abby

“I want to explore how I can reinvent the traditional bi-folding room dividers by creating a unique, modern, innovative, and interesting hanging room panel. I will explore modern techniques such as laser cutting to explore how light and dark elements work together to create something aesthetically beautiful as well as hitting the main brief of functionality.”



Students' reflections

Winter

“I am captivated by design. I was also lucky to have access to digital technologies like laser cutting, digital printing, and the 3D printer, which gave me broader choices for developing my scholarship project. Technology allowed me to find a pathway which I actually love and can keep doing for life, so next year I plan to study design in architecture at the University of Sydney.”

Hope

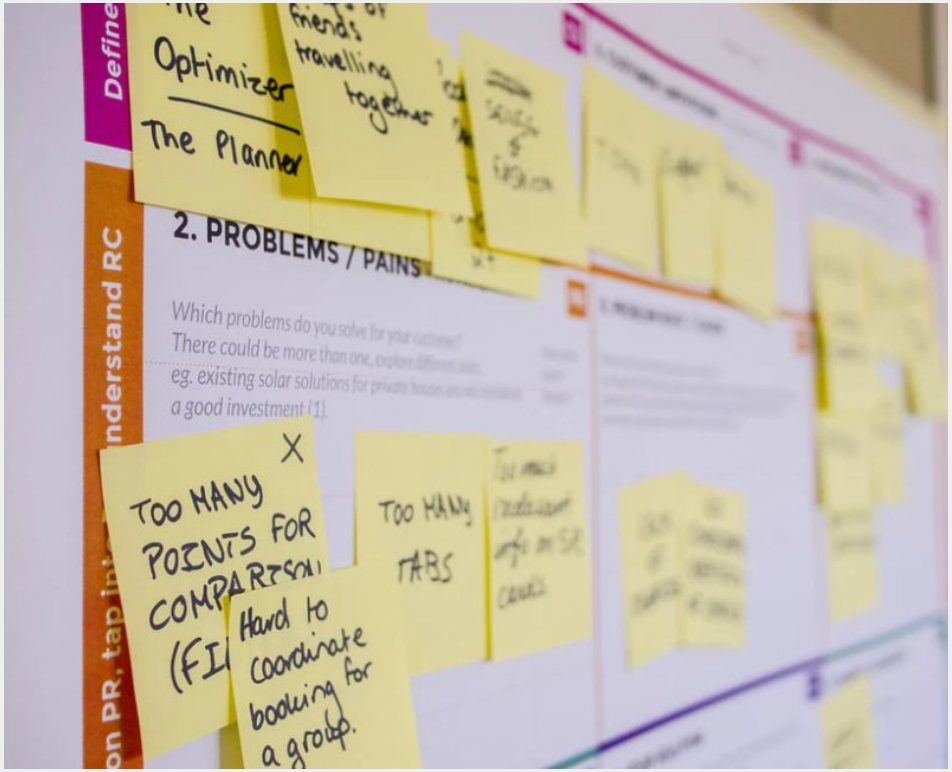
“I have been challenged in my growth of techniques/skills within the physical technology environment and pushed to explore and deepen my knowledge of design in theory. The technology department has given me the privilege of learning advanced skills that the teachers have patiently assisted me with.”

What next?

- Strengthen material performance
- Integrate chemistry
- Student agency

Questions?

- Some nuts and bolts stuff – timetabling and staffing, team teaching?
- Did you need to sell the idea to students?
- Assessment strategies
- Cross curricular



Technology Online resources

- A technology department with a digital and design focus
- Resourcing for a digital and design focus
- Exploring sustainability in the fashion industry
- Webinar recordings

Technology Online newsletter

- **See the Technology Online newsletter here**

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Technology Online

Kia ora and welcome to the twenty-eighth edition of the Technology Online newsletter. In these newsletters we keep you up-to-date with Technology Online and pass on other information that you may find useful as a member of the technology education community.

What's new on Technology Online?

New and revised resources are being loaded every week. Here are some of our recent favourites.

Webinar recordings

Introducing the learning progressions for digital technologies
Catherine Johnson describes the new learning progressions for computational thinking and designing and developing digital technologies, and shares where to find out more information and support.

NCEA level 1 digital technologies achievement standards
In this webinar recording, hear Julie McMahon and John Creighton talk about the new structure of the technology learning area, new terminology in the achievement standards, and changes to specific digital technologies standards.

Useful websites – Links for digital technologies

Links for digital technologies
Explore tables full of useful digital technologies resources to help you in your planning. You can find links to resources, and you can also download the tables to use as the start of your own resource collection.

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Kaua e rangiruatia te hāpai o te hoe;
e kore to tātou waka e ū ki uta

Karakia Whakamutunga

Ka whakairia te tapu
Kia watea ai te ara
Kia tūruki whakataha ai

Kia tūruki whakataha ai
Hui e Tāiki e

Restrictions are moved aside
So the pathway is clear
To return to everyday activities

Enriched and unified