# *Technology Online webinar: NCEA level 1 digital technologies achievement standards*

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

# *Technology Online webinar: NCEA level 1 digital technologies achievement standards*

## Introductions

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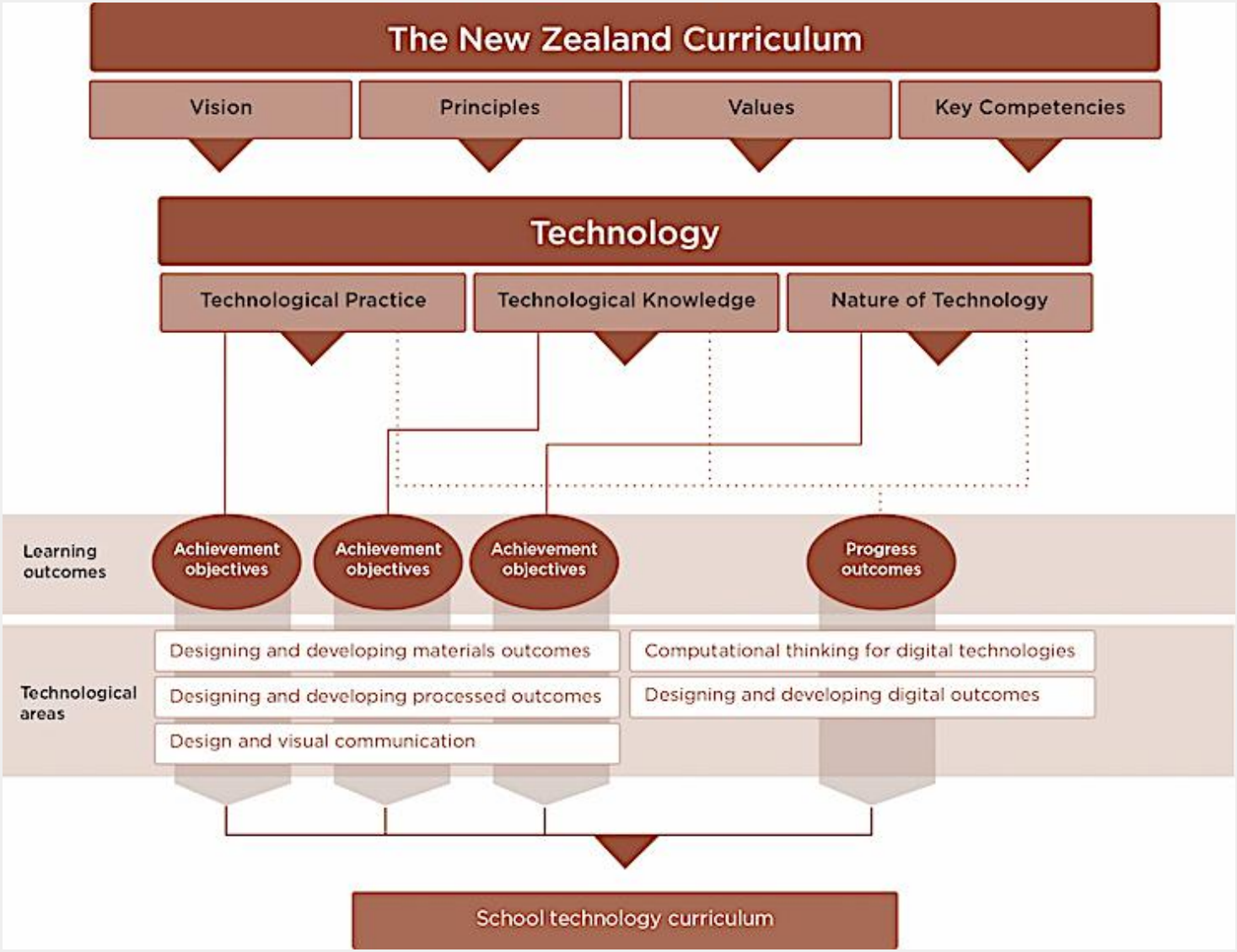
# Webinar content outline

1. **The new structure of the technology learning area**
2. **New terminology common to the digital technologies achievement standards**
3. **Changes to specific achievement standards**

# New structure of the technology learning area



# New structure of the technology learning area

## Achievement standards: Aligned to the Curriculum

- The digital technologies progress outcomes subsume the AO's of Technological practice, Technological knowledge, and Nature of technology.
- In the new digital technologies progress outcomes and achievement standards, there is an integration of contextualised knowledge from the generic technology AO's and specific digital technologies knowledge and skills.
- The new NCEA standards are aligned with the digital technologies progress outcomes for computational thinking and designing and developing digital outcomes.

Read about the revised technology curriculum on The New Zealand Curriculum Online – Technology.

# Progress outcomes (NCEA L1)

- **CT: Progress outcome 6 (Level 1 NCEA)**
  **See NZC Online – Technology – CT Progress outcomes**

- **DDDO: Progress outcome 4 (Level 1 NCEA)**
  **See NZC Online – Technology – DDDO Progress outcomes**

# NCEA: Updated Matrix, Level 1

| Progressions | Level 1 |
|---|---|
| **Computational thinking for digital technologies**<br><br>**Designing and developing digital outcomes** | AS 91877 (1.1)<br>Develop a proposal for a digital outcome<br>3 credits Internal |
| | AS 91878 (1.2)<br>Develop a design for a digital outcome<br>3 credits Internal |
| | AS 91879 (1.3)<br>Develop a digital outcome to manage data<br>4 credits Internal |
| | AS 91880 (1.4)<br>Develop a digital media outcome<br>4 credits Internal |
| | AS 91881 (1.5)<br>Develop an electronics outcome<br>6 credits Internal |
| | AS 91882 (1.6)<br>Develop a computer system<br>4 credits Internal |
| | AS 91883 (1.7)<br>Develop a computer program<br>4 credits Internal |
| | AS91884 (1.8)<br>Use basic iterative processes to develop a digital outcome<br>6 credits Internal |
| | AS91885 (1.9)<br>Demonstrate understanding of searching and sorting algorithms<br>3 credits Internal |
| | AS91886 (1.10)<br>Demonstrate understanding of human computer interaction<br>3 credits External |
| | AS91887 (1.11)<br>Demonstrate understanding of compression coding for a chosen media type<br>3 credits External |

# NCEA: Updated matrix, level 1

The benefit is that there is no clash between DT and other technology subjects for:

- 1.1 (Develop a proposal for a digital outcome)
- 1.2 (Develop a design for a digital outcome)
- 1.8 (Use basic iterative processes to develop a digital outcome)

These standards are more concise and digital technologies specific versions of the equivalent generic technology standards.

The intent would NOT be to do a brief and a proposal in a digital technologies course. Brief could be done as part of a different technology subject (for example, materials).

Externals are also shorter and focus on one topic each (HCI and compression coding).

# New terminology common to the digital technologies achievement standards across the matrix

# *Relevant* implications

Not every one of these examples need to be considered (but at least two). Examples of implications include:

- cultural
- legal
- ethical
- intellectual property
- privacy
- accessibility
- usability
- functionality
- aesthetics
- end user requirements
- health and safety implications

# *Relevant* implications

## Achieved

- students are describing the relevant implications

## Merit

- must show evidence of addressing implications in their work
- these should have been considered in testing and trialling (for example, usability, functionality)
- informed the development of the outcome

## Excellence

- show evidence of refinement while addressing implications to produce a high-quality outcome

# *Relevant* implications

Suggestion:  relevant implications should guide students as a basis for testing and trialling

Examples (in a web development context):

- Have you met ***copyright***?
  (content and images meet copyright requirements)
- Is your site ***accessible***?
  (via multiple devices or screen sizes, alt tags)
- Does your site ***function***?
  (images display, image quality ok and resolution correct, all your navigation links work)
- Is your site ***readable***?
  (proofing of spelling, grammar, appropriate font sizes and colour contrast)
- Is your site ***aesthetically pleasing***?
  (consistency in layout design elements, colours, fonts)
- Does your site meet ***end user requirements?***
  (what were they? Have they been addressed?)

# *Iterative* – An important part of the suite of standards

- Iterative improvement within a student's work will look like ongoing or continuous design, develop, testing/feedback/trialling.
- While it is important that the student shows an ongoing improvement, the student needs to show evidence that the outcome has been refined as a result of testing/feedback/trialling.
- Iterative in this sense (at level 6 of the curriculum)  should just mean more than one.

# *Iterative* – An important part of the suite of standards

Examples of iterative improvement could be:

- in the design phase, the student has made checks against technical or ***end-user specifications*** and ***aesthetics*** then made an improvement
- in the development phases, the student has tested ***functionality and usability aspects, aesthetics*** of their outcome then made refinements
- when trialling the final outcome, the student has checked end-user specifications and made refinements

# Step ups -> Informed (M)-> Refined (E)

**Informed (M)**

- Using feedback and research to improve quality
- Using information from testing and trialling to improve the quality and functionality
- Addressing relevant implications

# Step ups -> Informed (M)-> Refined (E)

**Refined (E)**

- emphasis is on ***high-quality***
- applying information from the planning, testing, and trialling of components to develop a high-quality outcome
- iterative improvement throughout the design, development, and testing process
- applying design elements, presenting data effectively
- well-structured, comprehensively tested
- fit for purpose (including meeting specs and end-user requirements)

# Iterative, informed, refined

Teaching and learning programme should provide students with opportunities to:

- Test, trial, improve
- Discuss/brainstorm implications relevant to the context and how students can test that they have addressed those implications
- Discuss/link iterative development to improvement of the quality of an outcome

# Changes to the digital technologies achievement standards

# 1.1 Develop a proposal for a digital outcome (3 credits)

Similar to generic brief – but more concise and appropriate for a digital outcome

A proposal for a digital outcome is a concise document that provides an overview of the project:

- the proposed outcome statement (problem/issue, scope, purpose, context)
- the requirements (including the specifications)
- the end users
- the resources required (people, equipment, time).

# 1.2 Develop a design for a digital outcome

Similar to generic conceptual design - but more concise

Develop a design for a digital outcome involves:

- defining the purpose and end users
- researching and generating a range of design ideas
- describing relevant implications
- describing the appropriateness of the chosen design.

# 1.3 Develop an outcome to manage data

- The data may be stored in a flat file or relational database.
- The intent is to be open about how the data is stored and presented to allow for different technologies.
- Does not have to be Access or FileMaker - but can be. Airtable (online database) can also be used.
- Can be used ***in combination with Digital Media***.
- Could present the data on a web page or in an infographic.

# 1.4 Develop a digital media outcome

Only ONE media type required!!!  Still 4 credits

Develop a digital media outcome involves:

- using appropriate tools, techniques, and design elements for the purpose and end users of the outcome
- applying appropriate data integrity and testing procedures in the development
- describing relevant implications.

# 1.5 Develop an electronics outcome – 6 credits

**(Combination of the knowledge and implement from the old standards)**

Develop an electronics outcome involves:

- using appropriate resources and techniques when developing a functional combination of hardware and software that performs to specifications
- modifying and debugging embedded software
- undertaking testing procedures to debug and diagnose the electronic system
- describing the interfaces and functions of components and systems used
- describing relevant implications

# 1.6 Develop an computer system – 4 credits

Develop an computer system involves:

- using appropriate tools, procedures and protocols when installing and configuring hardware, software and peripherals for a purpose and end-user
- undertaking a range of appropriate testing procedures, diagnosing and troubleshooting to identify and resolve given installation and configuration faults
- investigating the parts and components (hardware and software) to be used in the computer system
- describing relevant implications.

# 1.7 Develop a computer program - 4 credits

- Planning is not required – however it should be part of teaching and learning programme.
- Focus should be on decomposition of the problem – tackling the programming in smaller chunks, testing iteratively and systematically.
- For larger projects and to assess the iterative development – use 1.8 standard which does have the planning and implementation together.

# 1.7 Develop a computer program – 4 credits

Develop a computer program involves:

- writing a basic program that performs the specified task, using a suitable programming language
- setting out the program code clearly
- documenting the program with comments
- testing and debugging the program to ensure that it works on a sample of ***expected cases***.

# 1.7 Develop a computer program – 4 credits

New Requirements:
A basic computer program is a program written in a programming language, that uses:

- variables storing at least two types of data (e.g. numeric, text, Boolean)
- sequence, selection and iteration control structures
- input from a user, sensors, or other external source, ***and one or more from***:
  - data stored in collections (e.g. lists, arrays, dictionaries)
  - user-defined methods, functions, or procedures.

# 1.8 Use basic iterative processes to develop a digital outcome (6 credits)

- Great for open-ended and team projects or competitions
- Can use with Propose and Design standards or with an implement
- Is NOT restricted to a computer program - it can be for any digital technologies outcome
- Students must demonstrate that they have planned their development process, decomposed the problem and developed their outcome iteratively

# 1.9 Demonstrate understanding of searching and sorting algorithms

- Internal (used to be part of the 1.44 external)
- For A – students carry out a searching **and** sorting algorithm, so can demonstrate this in a variety of ways (doesn't have to be written description)
- For M and E – just need to focus on searching OR sorting, not both, by comparing two different algorithms:
  - determining best, average, worst cases (M)
  - investigating costs with different data sets (E)

# Digital technologies teaching resources on TKI

- Teaching and learning guides
- Teaching and learning programmes (being updated during 2018)
- Assessment Tasks
- CT: Progress outcomes, exemplars, and snapshots
- DDDO: Progress outcomes, exemplars, and snapshots

**Digital Technologies and Hangarau Matihiko Online for NCEA**

Self-contained online learning modules are being developed by Auckland University in partnership with the Ministry. They will be freely available to all NZ students and teachers.

- Ready for use Term 3: Modules supporting both DT externals, including one external adapted into te reo.
- Ready for use Term 1, 2019: One internal DT module, modules for both Hangarau Matihiko standards, and the other external adapted into te reo.

# Newsletter

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Technology Online

Kia ora and welcome to the twenty-fifth 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?

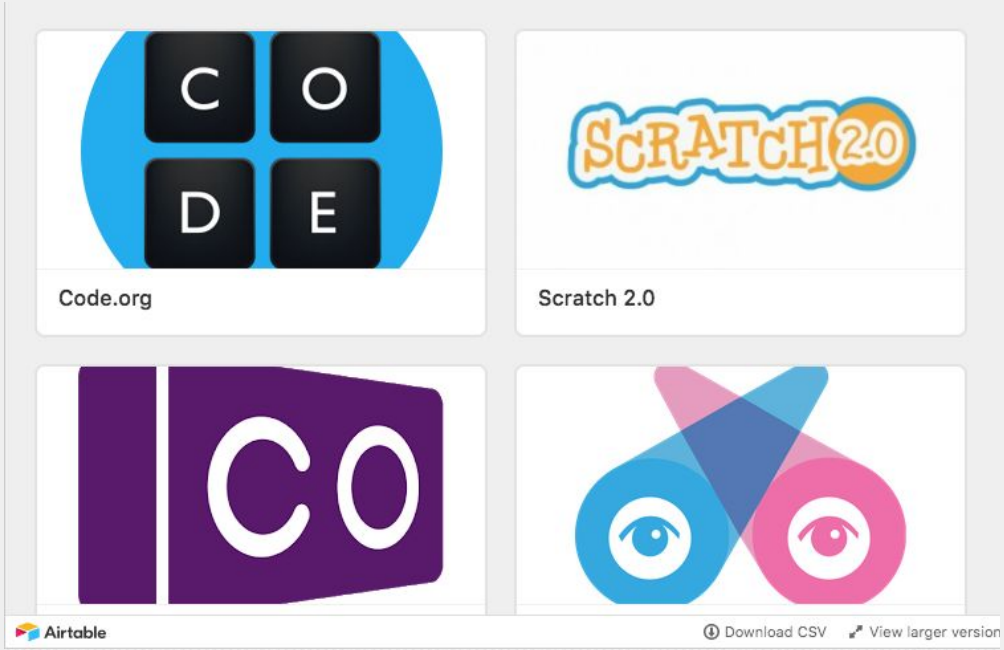
New and revised resources are being loaded every week. Here are some of our recent favourites.

### Digital technologies resources

**Learning with the internet of things**
Four videos share how students in Dunedin participated in a programme where they applied computational thinking skills to their own projects – solving real world problems.

# Technology Online resources

- Technology in the NZC
- Links for digital technologies



# 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*