

Curriculum Development

NCEA Level 1 2018 vs 2024

Agenda

What's on today?

- What are the new standards?
- What has changed compared to the 2018 standards?
- Adopt Mātauranga Māori
- Mātāpono Māori

Disclaimer!

The views expressed in this presentation are those of Doc (Jaesan Ryfle-Turi).
They do not necessarily represent the views of his kura nor those of the Te Tāhuhu
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The new standards have exited beta!

- The new standards have been published on the [NCEA website](#) and are now marked as **For implementation**
- [Create a computer program](#)
 - Version 2
- [Develop a digital technologies outcome](#)
 - Version 3
- [Demonstrate understanding of usability in human-computer interfaces](#)
 - Version 2
- [Design a digital technologies outcome](#)
 - Version 3

The graphic is titled "Assessment Matrix" and displays "NCEA LEVEL 1 Standards". It contains two columns of information:

Standard Title	Code	Internal	Credits
Digital Technologies 1.1 Create a computer program	92004	Internal	5 Credits
Digital Technologies 1.2 Develop a digital technologies outcome	92005	Internal	5 Credits

Notes about the standards

- For **Develop a digital technologies outcome**, the outcome could include:
 - A digital media outcome such as a webpage or 3D model
 - An electronics outcome such as an environmental monitoring system, wearable tech, or robot
 - A digital information outcome such as a database
- **Design a digital technologies outcome** does not specify examples of valid types of digital technology outcome
- **Create a computer program** and **Develop a digital technologies outcome** are exclusionary — any work handed in for these standards must be two separate pieces of work
 - I infer that a student could do a program as their digital technologies outcome — but that same program could not be assessed for both standards; a student who wanted to do that would need to create two *separate* programs

Create a computer program

5 credits

Internal

Create a computer program: overview

- **Create a computer program** involves:
 - using a suitable programming language to construct a program that performs a specified task
 - testing and debugging the program to ensure it works on expected cases
 - documenting the program with comments
 - ~~setting out program code clearly~~
- **Create a well-structured computer program** involves:
 - using succinct and descriptive variable names
 - documenting the program with comments that clarify the purpose of code sections
 - testing and debugging the program to ensure it works on expected and boundary cases
 - ~~following conventions for the chosen programming language~~
- **Create a flexible and robust computer program** involves:
 - using conditions and control structures effectively
 - using constants, variables, or derived values in place of literals to make the program flexible
 - testing and debugging the program to ensure it works on expected, boundary, and invalid cases
 - ~~ensuring that the program is a well-structured, logical response to the task~~
 - ~~making the program flexible and robust~~
- **The computer program must:**
 - store at least two types of data in variables
 - take input from a user, sensor, or another external source
 - produce output
 - use sequence, selection, and iteration control structures
 - use data stored in a collection.

Create a computer program: what's new?

- **Excellence**

- Using conditions and control structures effectively
 - I find this much clearer to understand than “ensure the program is a flexible and robust response to the task”
 - This means being clear with students what constitutes **effective** use of conditions and control structures
 - Examples
 - Avoiding redundant if/elif
 - Well-explained conditions for if, while, etc.
 - Checking for invalid or null data

Create a computer program: what got simplified?

- **Merit**
 - Using succinct and descriptive variable names
 - More explicit criteria than “documenting the program with variable names [...] that describe code function and behaviour”
 - What counts as ‘succinct’ depends on the programming language
 - Documenting the program with comments that clarify the purpose of code sections
 - I find this criteria much clearer than describing “code function and behaviour” which sounds a bit redundant
 - i.e. that a loop is counting up to 5 isn’t important to me. **Why** is it counting up to 5? That’s what I want to know

Create a computer program: what got simplified?

- **Excellence**

- Using constants, variables, or derived values in place of literals to make the program flexible
 - This lays out very explicitly what is expected for a program to be flexible
 - At OC, we currently consider a program flexible if:
 - You can easily update it by making changes to one variable or constant. For example, adding a product to a shop program does not require reengineering the whole program
 - You have no “magic numbers”, hard-coded numbers in if/elif, while, for i in range, etc.

Create a computer program: what got simplified?

- **Excellence**

- Testing and debugging the program to ensure it works on expected, boundary, and invalid cases
 - Previously, testing had to be comprehensive — I understood that to mean the entire program had to be tested
 - My understanding is that there will just need to be some testing of invalid cases, where-ever they are in the program
- Though technically more succinct, I actually find this much more vague due to removal of other Excellence criteria...

Create a computer program: what got removed?

- **Achieved**

- ~~Setting out program code clearly~~ is no longer required
 - To me, it was always unclear what setting code out clearly meant
 - Highly dependent on the language you are using
 - Much more work for students using Scratch than Python, etc.

- **Merit**

- ~~Following conventions for the chosen programming language~~ is no longer required
 - No more students getting marked down for not following PEP-8!
 - No more nice looking code :(
 - Obviously, using conventions this should still be taught — just no longer assessed

Create a computer program: what got removed?

- **Excellence**

- ~~Ensuring that the program is a well-structured, logical response to the task~~
 - This one is supplanted by Using conditions and control structures effectively
- ~~Making the program flexible and robust~~
 - This one is supplanted by Using conditions and control structures effectively **and** Using constants, variables, or derived values in place of literals to make the program flexible

Create a computer program: other notes

- The current and new standard mention that debugging is required
 - However, only the **new** standards explain what that is (in the unpacking)
 - taking action as a consequence of testing
 - The current standard's clarifications don't ... well ... clarify that!
- Check out the [exemplars](#) for this standard

Develop a digital technologies outcome

5 credits

Internal

Develop a digital technologies outcome: overview

- This standard amalgamates of a few existing standards:
 - Develop a proposal for a digital outcome
 - Develop a digital outcome to manage data
 - Develop a digital media outcome
 - Develop an electronics outcome
- However, it is mostly an evolution of **Use basic iterative processes to develop a digital outcome** which is the basis of the comparison on the next slide

Develop a digital technologies outcome: overview

- **Develop a digital technologies outcome** involves:
 - describing the purpose, potential users, requirements, and specifications of the outcome
 - using appropriate tools or techniques of a digital technologies domain to produce an outcome that addresses the requirements and specifications
 - testing the outcome to ensure basic functionality
 - ~~trialling components of the outcome in an iterative manner~~
 - ~~managing the development by decomposing the digital outcome into smaller components~~
 - ~~describing relevant implications~~
- **Refine a digital technologies outcome** involves:
 - following conventions relevant to the tools or techniques of a digital technologies domain
 - using information from testing ~~and trialling~~ to make improvements to the outcome's fitness for purpose
 - ~~addressing relevant implications~~
- **Enhance a digital technologies outcome** involves:
 - applying tools or techniques optimally in the production of a fit-for-purpose outcome
 - using information from trialling the outcome with others to improve its fitness for purpose

Develop a digital technologies outcome: what's changed?

- Overall, the standard is simpler than the ones it replaces
 - Relevant implications are completely gone
 - However, the activity that the students are given should still reflect the big ideas which encompass them/mātāpono Māori
 - [Examples on the NCEA website](#)
 - Iterative development is completely gone
 - No **need** for students to follow an iterative development process
 - However, no reason not to teach it — it encourages regular testing and collection of feedback
- Using information from trialling the outcome with others to improve its fitness for purpose is a bit more explicit — trialling must be with other people — and is an Excellence criteria rather than Merit

Develop a digital technologies outcome: exemplar

- Check out the [exemplars](#) for this standard

Demonstrate understanding of usability in human-computer interfaces

5 credits

External

Demonstrate understanding of usability in HCI: overview

- **Demonstrate understanding of usability in human-computer interfaces** involves:
 - describing the purpose of human-computer interfaces
 - describing usability principles and their use in human-computer interfaces
- **Examine the usability of human-computer interfaces** involves:
 - explaining how usability principles have been applied in human-computer interfaces
 - explaining the usability of human-computer interfaces in terms of usability principles
- **Evaluate the usability of human-computer interfaces** involves:
 - comparing the usability of human-computer interfaces
 - applying usability principles to suggest improvements to human-computer interface usability

Demonstrate understanding of usability in HCI: overview

- Realistically, this standard has not changed much in terms of the criteria
- However, what counts as a *usability principle* has changed:
 - Nielsen's usability heuristics are still there
 - Mātāpono Māori
 - Accurate use of te reo Māori
 - Support for te reo Māori in tools such as spell checking
 - Support for expressions of tikanga and mātauranga Māori
- In the [2022 pilot](#), students selected one interface of their own, opening the possibility of discussing whichever aspects were relevant
- Specifications for the current version will be released in December 2023

Design a digital technologies outcome

5 credits

Internal → **External**

Design a digital technologies outcome: overview

- **Design a digital technologies outcome** involves:
 - describing a need or opportunity, potential user(s), and requirements
 - ~~researching and~~ generating design ideas for the proposed digital technologies outcome
 - describing how the selected design addresses the need or opportunity and meets the identified requirements
 - ~~describing relevant implications~~
- **Refine a design for a digital technologies outcome** involves:
 - using feedback to make improvements to the design throughout the design process
 - explaining how design decisions made during the design process improve the quality of the proposed digital technologies outcome
 - ~~explaining how the design meets relevant implications~~
- **Evaluate a design for a digital technologies outcome** involves:
 - justifying how decisions made during the design process contribute to the selected design's fitness for purpose

Design a digital technologies outcome: what's new?

- **Achieved**
 - Describing how the selected design addresses the need or opportunity and meets the identified requirements
 - In current standard, students describe “appropriateness” in terms of the purpose and end users
 - From 2024, students will describe how the design addresses
 - The need/opportunity, broadly similar to the purpose
 - Identified requirements
 - The requirements will derive from both the teacher-provided specifications and data collected from end users, so realistically end users will still form a part of this criteria

Design a digital technologies outcome: what's new?

- **Excellence**

- Justifying how decisions made during the design process contribute to the selected design's fitness for purpose
 - In the current standards, justification is about the design itself
 - From 2024, justification is of the choices made in the design process
 - These are deliberate choices made in relation to an aspect of the design, such as:
 - Feedback
 - Research
 - Consideration of manaakitanga or kaitiakitanga
 - Consideration of design principles or usability principles

Design a digital technologies outcome: what got removed?

- **Achieved**

- ~~Researching and~~ generating design ideas for the proposed digital technologies outcome
 - Research is no longer an Achieved criteria
 - However, as stated, research is one of the design decisions that a student can be used for Merit and Excellence
 - In the 2023 common assessment activity, it appeared to be expected regardless
- ~~Describing relevant implications~~
 - Relevant implications are gone
 - However, as stated, consideration of mātauranga Māori, design principles, and usability principles can be used as design decisions for Merit and Excellence
 - That said, implications/mātauranga can be used as a framework for generating meaningful requirements (which is an Achieved criteria)

Design a digital technologies outcome: what got removed?

- **Achieved/Merit**

- ~~Researching and~~ generating design ideas for the proposed digital technologies outcome
 - Research is no longer an Achieved criteria
 - However, as stated, research is one of the design decisions that a student can be used for Merit and Excellence
- ~~Describing relevant implications and Explaining how the design meets relevant implications~~
 - Relevant implications are gone
 - However, students **must** consider manaakitanga **or** kaitiakitanga in relation to the design outcome or design process
 - Consideration of mātaōpono Māori, design principles, and usability principles can be used as design decisions for Merit and Excellence
 - That said, implications/mātaōpono can be used as a framework for generating meaningful requirements (which is an Achieved criteria)

Design a digital technologies outcome: other notes

- NZQA will provide a topic at the start of the year
 - The outcome must be designed with that topic in mind
 - NZQA provides example outcomes that students can design
 - **Or** the student can come up with their own outcome, so long as it meets the topic
- Students will complete a portfolio — which is not assessed
 - Instead, students complete a report based on their portfolio
 - The report must be done **in-class** during a particular time frame, up to 4 hours given