

Making the Computer do the Work: Programming with Loops (CT PO 3) EMP08

Facilitation Notes:

Purpose

These notes are intended to support teachers and leaders facilitate the pīkau *Making the Computer do the Work: Programming with Loops* to a group of teachers, for example, in a staff meeting.

Pre-requisites

Essential:

As a minimum participants should have completed the pīkau

- *First steps in programming: CT PO 1 (EMP05)*
- *Programming with Sequence and Output: Computational Thinking Progress Outcome 2 (EMP06)*
- *What is Programming (EMP07)*

before this pīkau.

It is best if participants have also completed the pīkau *What is Computational Thinking and Computational Thinking: the international perspective* before this pīkau.

Preparation

Complete the pīkau yourself.

Ask participants to bring their laptops. If they don't already have a Kia Takatū account they should set one up via <https://kiatakatu.ac.nz/> so they can access the pīkau directly to participate in the activities.

Activity 1: Participants will work through the quiz within the pīkau either individually or in pairs.

Activity 2: Discussion. Think about how you could use programming in your own setting.

Related pīkau:

First steps in programming: CT PO 1 (EMP05) and *Programming with Sequence and Output: CT PO2 (EMP06)* and *What is Programming (EMP07)*.

Facilitation notes

These are arranged in the order that the content appears in the pīkau.

Access to a data projector or shared screen and speakers to present the pīkau is recommended.

Estimated time: 45 minutes (without activities), 60 minutes with activities (recommended).

Section	Facilitation notes
Introduction and What you'll learn	<p>The key points of this section are that you will learn how to:</p> <ul style="list-style-type: none"> ● Identify inputs, outputs, sequence and iteration in simple programs ● Describe the role of a variable ● Predict the behaviour of simple programs ● Explain how multiple algorithms can be used to solve the same problem.
Why this matters...	<p>The key points of this section are:</p> <ul style="list-style-type: none"> ● The idea of a loop in programming is very powerful. ● Inputs are needed to do useful things for the user. ● This is a readiness programme, you will not learn to program here. ● The main focus of this pīkau is Progress Outcome 3. ● Binary digits will be dealt with in a later pīkau rather than here.
Links to existing knowledge	<p>The key point of this section is:</p> <ul style="list-style-type: none"> ● This pīkau builds on from pīkau <i>What is programming? (EMP07)</i>, <i>First steps in Programming: CT PO 1 (EMP05)</i>, and <i>Programming with sequence and output: CT PO2 (EMP06)</i>
A Quick Introduction to Variables	<p>The key points of this section are:</p> <ul style="list-style-type: none"> ● Even though variables aren't mentioned until Progress Outcome 5 it is useful to know about them now. ● Variables are used to store input from users.
Activity 1: Playing with variables	<p>Work through the examples either in pairs or individually. Discuss results.</p>

Inputs in Scratch	<p>The key points of this section are:</p> <ul style="list-style-type: none"> • The commonly used methods of input in Scratch are the ‘when this sprite clicked’ and the ‘ask’ blocks. • Scratch has many other methods of input including video sensing, timer, and when a key is pressed.
Programming in an authentic context	<p>The key points of this section are:</p> <ul style="list-style-type: none"> • Students often respond well when given an authentic context for their projects. • Programming can easily be incorporated to include an authentic contexts.
Activity 2: Discussion	<p>Discuss how you could use programming with participant’s own settings, particularly incorporating ideas from other subject areas.</p>
Inputs in other languages	<p>The key points of this section are:</p> <ul style="list-style-type: none"> • Even different programming languages still have similarities with one another. • Learning one programming language supports the learning of other programming languages. • Scratch is a good scaffold to other programming languages.
Iteration in Scratch	<p>The key points of this section are:</p> <ul style="list-style-type: none"> • Using iteration (such as the ‘repeat’ command in Scratch) makes programs more efficient to write if the same thing is being done multiple times. • Using iteration can prevent bugs being introduced in repetitive code since the programmer only needs to get it right once.
Quiz	<p>Work through the quiz either in pairs or individually. Discuss results.</p>
Link to programme design	<p>The key point of this section is:</p> <ul style="list-style-type: none"> • Programming lends itself to being used across many curriculum areas.
Wrapping up and where to next?	<p>The key point of this section is:</p> <ul style="list-style-type: none"> • With this pīkau, <i>First Steps in Programming: CT PO 1 (EMP05)</i> and <i>Programming with Sequence and Output: CT PO 2 (EMP06)</i> we have covered all but one of the concepts needed to access the full power of computers (the only one missing is <i>selection</i>, which is

	<p>mainly about the “if” statement).</p> <ul style="list-style-type: none">• To get the full power of programming, students need to know about all 6 types of commands (as listed in the curriculum, input, output, storage (variables), sequence, iteration (loops) and selection (selection has not yet been covered).
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