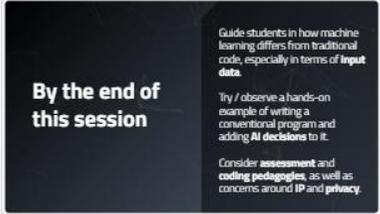
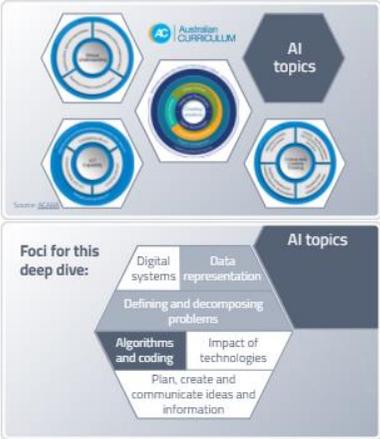


AI Professional Learning: AI and conventional programming (Yrs 7-10)

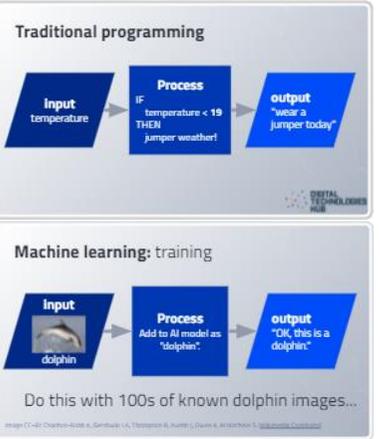
Session overview

DT Curriculum focus	Relevant slides	Covered in the session	Resources
		<p>During this session you will:</p> <ul style="list-style-type: none"> • Explore guiding students in how machine learning differs from traditional code, especially in terms of input data. • Try / observe a hands-on example of writing a conventional program and adding AI decisions to it. • Consider assessment and coding pedagogies, as well as concerns around IP and privacy. 	
<p>Defining and decomposing problems / Algorithms / Implementation</p>		<p>Curriculum connections</p> <ul style="list-style-type: none"> • Digital Technologies: Focus on defining and decomposing problems creating a digital solution that incorporates algorithms and implementation the related key concepts include: <p>Defining and decomposing problems: the focus on the precise definition and communication of problems and their solutions.</p>	

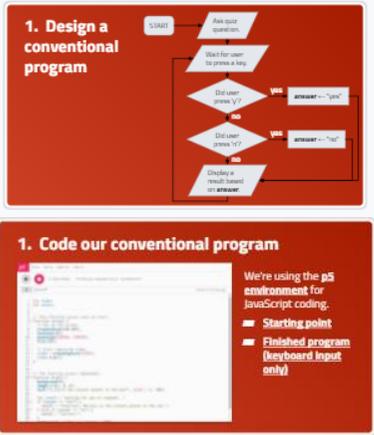
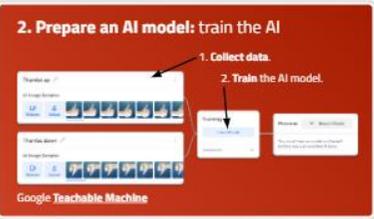
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		<p>Implementation: the automation of an algorithm, typically by using appropriate software or writing a computer program.</p> <p>Algorithms: precise description of the steps and decisions needed to solve a problem.</p> <p>While focussing on implementation we can incorporate relevant general capabilities.</p> <ul style="list-style-type: none"> • General capability: ICT capability • General capability: Critical and creative thinking <p>We also include ways of thinking, particularly:</p> <ul style="list-style-type: none"> • Design Thinking • Computational Thinking 	
Implementation		<p>How is AI different from conventional programming?</p> <p>We describe the way a conventional program uses branching to make decisions based on specific binary conditions.</p>	<p>Downloadable resources/links</p> <p>Artificial Intelligence Explainers: Video 1: Introduction to AI & machine learning</p>

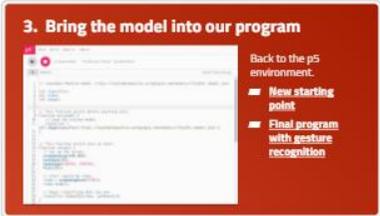
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		<p>We contrast this to the way a machine learns using images or other complex training data to predict with accuracy what the test data is.</p> <p>The video listed provides a useful easy to understand explanation.</p>	
<p>Data representation</p>		<p>Using a simulation, we demonstrate how machine learning systems are able to fill in knowledge gaps.</p>	<p>Downloadable resources/links</p> <ul style="list-style-type: none"> • Simulation at My Computer Brain • Lesson idea: Home automation with AI (Years 5-8)
		<p>We consider where Conventional Programming and AI are best applied for addressing Digital Technologies curriculum in the Secondary classroom.</p> <p>Conventional Programming Includes:</p> <ul style="list-style-type: none"> • Algorithms • Implementation 	

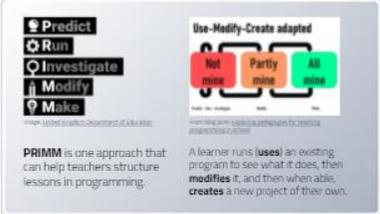
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		<ul style="list-style-type: none"> ○ Programs involving branching, iterations, functions and data structures <p>Artificial Intelligence Includes:</p> <ul style="list-style-type: none"> • Data Representation, Collection, Interpretation • Impact <ul style="list-style-type: none"> ○ Recognising voice, images, and filling in the data gaps. 	
<p>Defining and decomposing problems / Algorithms / Implementation/ Computational Thinking</p>		<p>We begin our hands-on example by designing a conventional program that asks a single quiz question, then waits for the user to press Y or N on the keyboard.</p> <p>We then code the program using the online P5 JavaScript environment.</p>	<p>Downloadable resources/links</p> <ul style="list-style-type: none"> • The P5 online JavaScript environment • Starting point for our conventional program • The finished conventional program
<p>Defining and decomposing problems / Data representation</p>		<p>After considering the kind of data we need for our AI component, we train the model from "thumbs up" and "thumbs down" photos before testing it.</p> <p>Then, we export the model for use in our conventional program.</p>	<p>Downloadable resources/links</p> <ul style="list-style-type: none"> • Google Teachable Machine

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<p>Algorithms / Implementation</p>		<p>With the unique AI model URL, we return to our conventional program and add code so that the user can answer with their thumbs as well as with the keyboard.</p>	<p>Downloadable resources/links</p> <ul style="list-style-type: none"> • New starting point for our code (includes the unique URL for the AI model) • Final program with gesture recognition
	<p>Relevant lesson ideas</p> <p>Rock, Paper, Scissors, AI! Similar to the hands-on example we just did. Train an AI model and demonstrate adding it to a program. Expand on this lesson to have the computer play Rock, Paper, Scissors with you!</p> <p>Home automation: General Purpose programming Use JavaScript in the Pencil Code environment to incorporate speech recognition in a program. Also can be done in Python (with limitations).</p> <p><small>LESSON: Rock, Paper, Scissors, AI! (Years 7-10) LESSON: Home automation: General Purpose programming (Years 7-10)</small></p>	<p>We highlight some similar and related lessons available on the Digital Technologies Hub.</p> <p>We also discuss challenges with using the popular Python programming language for these kinds of applications.</p>	<p>Downloadable resources/links</p> <ul style="list-style-type: none"> • Lesson idea: Rock, Paper, Scissors, AI! (Years 7-8)

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			<ul style="list-style-type: none"> Lesson idea: Home automation: General Purpose programming (Years 7-8)
<p>Implementation / Computational Thinking / ICT Capabilities</p>	 <p>Let's apply remixing</p> <p>What could students do to tinker with the quiz program we just made?</p> <ul style="list-style-type: none"> ■ add a third gesture ("not sure") ■ multiple choice quiz and use AUSLAN letters A, B, C or D to answer ■ three quiz questions and give a score ■ a timed game: choose the right gesture quickly <p>What fresh projects could be inspired?</p> <p>Privacy</p> <p>Students photographing their own face or recording their own voice is a privacy concern.</p> <p>What alternatives could you do for your coding activities?</p> <ul style="list-style-type: none"> ■ emojis ■ toys ■ fruit / vegetables ■ semaphore and poses ■ sign language** 	<p>We discuss evidence-based approaches to teaching coding and the opportunities for learning that can come with remixing someone else's program</p> <ul style="list-style-type: none"> PRIMM is one approach that can help teachers structure lessons in programming. PRIMM stands for Predict, Run, Investigate, Modify, Make. Use-Modify-Create. This is when a learner runs (uses) an existing program to see what it does, then modifies it, and then when able, creates a new project of their own. <p>We explore remixes or improvements that could be made to our demonstration solution.</p> <p>We explore how remixing opens up discussion for ICT Capabilities: recognising intellectual property</p>	<p>Downloadable resources/links</p> <ul style="list-style-type: none"> Article: Exploring pedagogies for teaching programming in school

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		<p>We highlight potential privacy concerns with AI tools that take photos and sounds, and consider options for safer use.</p>	
<p>Data representation / Defining and decomposing problems / Algorithms / Implementation</p>	<div data-bbox="497 316 875 523"> <p>Data representation, Impact</p> <p>Train and test an AI model</p> <ul style="list-style-type: none"> • Rate how well the AI recognised objects. • Discuss the training data used. • List ways it may be improved. <p>Research Algorithmic Bias</p> <ul style="list-style-type: none"> • Discuss real-world examples of algorithmic bias. • Consider social impact. </div> <div data-bbox="497 539 875 746"> <p>Data representation, Algorithms, Implementation</p> <p>Utilise a trained AI model in a coded program</p> <ul style="list-style-type: none"> • Design and develop a program in a suitable environment such as p5.js or JavaScript. • Import the AI model and use it to drive the program's decisions. • Assess General Purpose Programming with a suitable rubric. </div> <div data-bbox="497 762 875 970"> <p>Students' use of apps & tools</p> <p>Think Aloud! Student interview</p> <ul style="list-style-type: none"> • Screen captures or saved program <p>Self-reflection</p> <ul style="list-style-type: none"> • What they learned, challenges, checklist/rating their skills before/after <p>Analysis</p> <ul style="list-style-type: none"> • Artefacts such as worksheets or analysis of AI tools, applications and real world users. • Criteria used </div>	<p>We discuss various assessment options for:</p> <ul style="list-style-type: none"> • understanding of AI and its connection to data representation, • algorithm design and code implementation 	<p><i>In assessing code in languages like Python or JavaScript, consider a rubric that includes important skills for general-purpose programming.</i></p> <ul style="list-style-type: none"> • <i>Download a sample rubric here in <u>Word</u> or <u>PDF</u> format.</i>