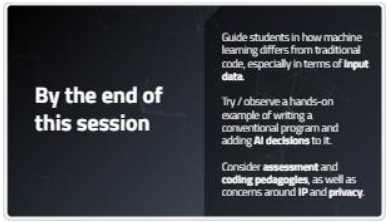
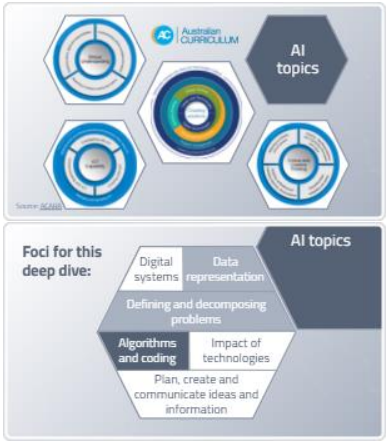
AI Professional Learning: AI and conventional programming (Yrs 7-10)

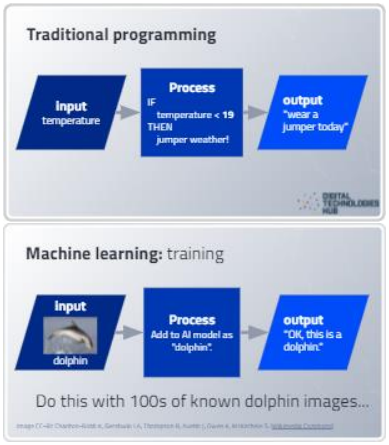
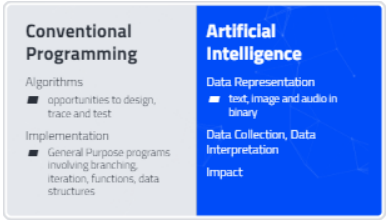
Session overview

DT Curriculum focus	Relevant slides	Covered in the session	Resources
		During this session you will: • 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**.	
Defining and decomposing problems / Algorithms / Implementation		Curriculum connections • Digital Technologies: Focus on defining and decomposing problems creating a digital solution that incorporates algorithms and implementation the related key concepts include: **Defining and decomposing problems:** the focus on the precise definition and communication of problems and their solutions.	

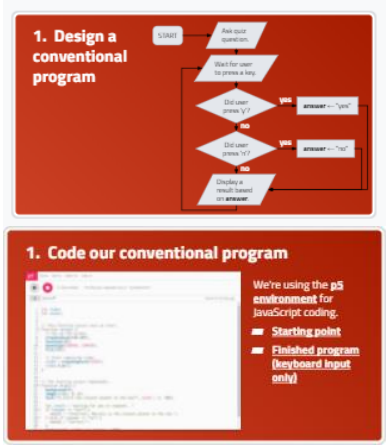
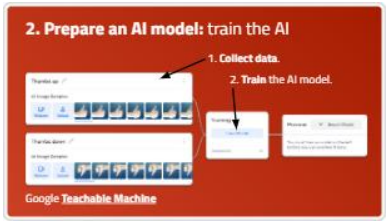
AI Professional Learning: AI and conventional programming (Yrs 7-10)

		Implementation: the automation of an algorithm, typically by using appropriate software or writing a computer program. **Algorithms:** precise description of the steps and decisions needed to solve a problem. While focussing on implementation we can incorporate relevant general capabilities. • General capability: ICT capability • General capability: Critical and creative thinking We also include ways of thinking, particularly: • Design Thinking • Computational Thinking	
Implementation		How is AI different from conventional programming? We describe the way a conventional program uses branching to make decisions based on specific binary conditions.	Downloadable resources/links Artificial Intelligence Explainers: Video 1: Introduction to AI & machine learning

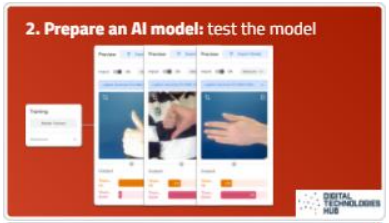
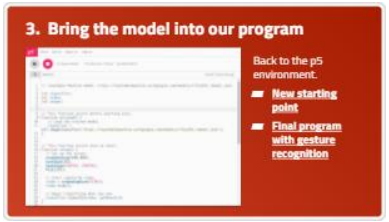
AI Professional Learning: AI and conventional programming (Yrs 7-10)

		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. The video listed provides a useful easy to understand explanation.	
Data representation		Using a simulation, we demonstrate how machine learning systems are able to fill in knowledge gaps.	Downloadable resources/links • Simulation at My Computer Brain • Lesson idea: Home automation with AI (Years 5-8)
		We consider where Conventional Programming and AI are best applied for addressing Digital Technologies curriculum in the Secondary classroom. Conventional Programming Includes: • Algorithms • Implementation	

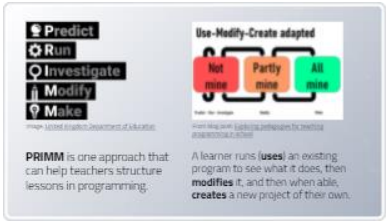
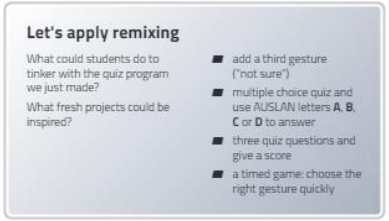
AI Professional Learning: AI and conventional programming (Yrs 7-10)

		○ Programs involving branching, iterations, functions and data structures Artificial Intelligence Includes: • Data Representation, Collection, Interpretation • Impact ○ Recognising voice, images, and filling in the data gaps.	
Defining and decomposing problems / Algorithms / Implementation/ Computational Thinking		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. We then code the program using the online P5 JavaScript environment.	Downloadable resources/links • The P5 online JavaScript environment • Starting point for our conventional program • The finished conventional program
Defining and decomposing problems / Data representation		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. Then, we export the model for use in our conventional program.	Downloadable resources/links • Google Teachable Machine

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

			
Algorithms / Implementation		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.	Downloadable resources/links • New starting point for our code (includes the unique URL for the AI model) • Final program with gesture recognition
		We highlight some similar and related lessons available on the Digital Technologies Hub. We also discuss challenges with using the popular Python programming language for these kinds of applications.	Downloadable resources/links • Lesson idea: Rock, Paper, Scissors, AI! (Years 7-8)

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

			• Lesson idea:: Home automation: General Purpose programming (Years 7-8)
Implementation / Computational Thinking / ICT Capabilities	  	We discuss evidence-based approaches to teaching coding and the opportunities for learning that can come with **remixing** someone else's program • 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. We explore remixes or improvements that could be made to our demonstration solution. We explore how remixing opens up discussion for ICT Capabilities: recognising **intellectual property**	Downloadable resources/links • Article: Exploring pedagogies for teaching programming in school

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		We highlight potential privacy concerns with AI tools that take photos and sounds, and consider options for safer use.	
Data representation / Defining and decomposing problems / Algorithms / Implementation		We discuss various assessment options for: • understanding of AI and its connection to data representation, • algorithm design and code implementation	*In assessing code in languages like Python or JavaScript, consider a rubric that includes important skills for general-purpose programming.* • *Download a sample rubric here in Word or PDF format.*