



Technology and Education

Presented by: Catherine Newington

A large decorative graphic on the left side of the slide. It features a semi-circular arrangement of concentric bands. The outermost band is red, followed by a white band, then a dark blue band. Inside these is a complex, colorful pattern of dots and lines in shades of blue, green, yellow, and purple, resembling traditional Indigenous Australian art. The pattern is contained within a white semi-circular border.

Acknowledgement of Country

The ACS would like to acknowledge the traditional custodians of all the lands from which we join. We pay our respects to the Elders past, present and emerging and extend that respect to other Indigenous Australians present.

Agenda



01

Connecting with the real world

Technology is constantly impacted our world. Let's look at some examples of some real impacts

02

Pedagogy and Technology

Let's dive into the pedagogy behind using technology.

03

Robotics

Let's have some fun with Cubit Robotics! No coding needed Just your design thinking.

04

Digital Technologies Curriculum

Explanation of the Digital Technologies Curriculum with some examples of some lessons.

Meeting Catherine



I was a Primary School teacher for 12 years

5 of those years included being a learning and teaching leaders (technologies). My role was to support the development of technology, I got stuck changing ink in printers!

I studied at Monash University to get my postgraduate degree specialising in Education Technologies. This has tightened my knowledge of how technology has the potential to redefine education, and the impact of pedagogical practices when using technologies.

I lead a national program to support the implementation of the Digital Technologies Curriculum across Australia. I have produced around 200 resources to help teachers.

Technology in Our Teaching



The impact of technology on society. How changes to technology have supported growth.



Bringing real life examples and adapting them to the classroom.



Allows students to explore real life scenarios to create authentic learning purposes.



See relevance when learning about topics.

Technology in our real world



Technology in our real world



[Building a place to play in Palestine](#)

Technology in our real world



All Comes together



Educators

Knowing our students.
Knowing our pedagogy.



Curriculum

Honor the Curriculum.
Know what requirements
we need to fulfill.



Technology

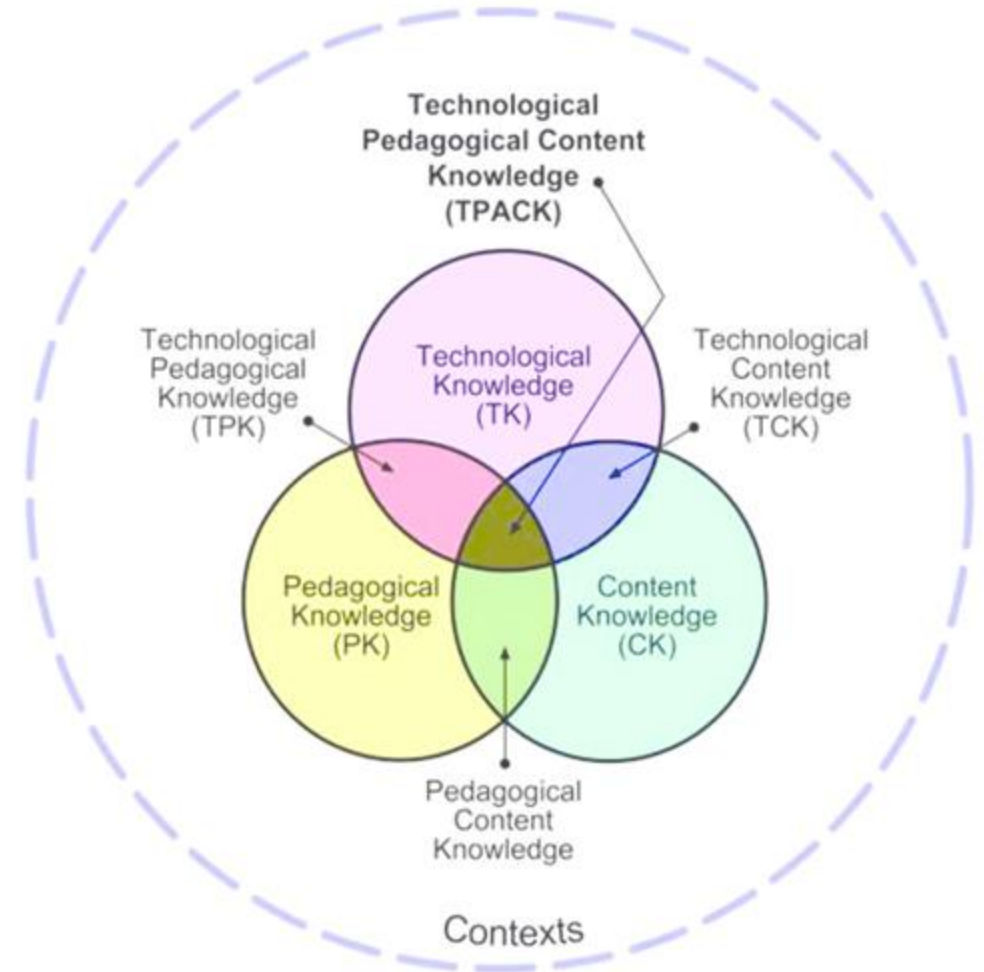
Allows you to evaluate the technology for your
purpose. Choose the right tool for the task.

TPACK



TPACK is a way of describing how technology pedagogy and content fit together to enable powerful learning.

The TPACK model highlights that an idea for using ICT in classrooms must have a sound curriculum and pedagogical fit.



TPACK

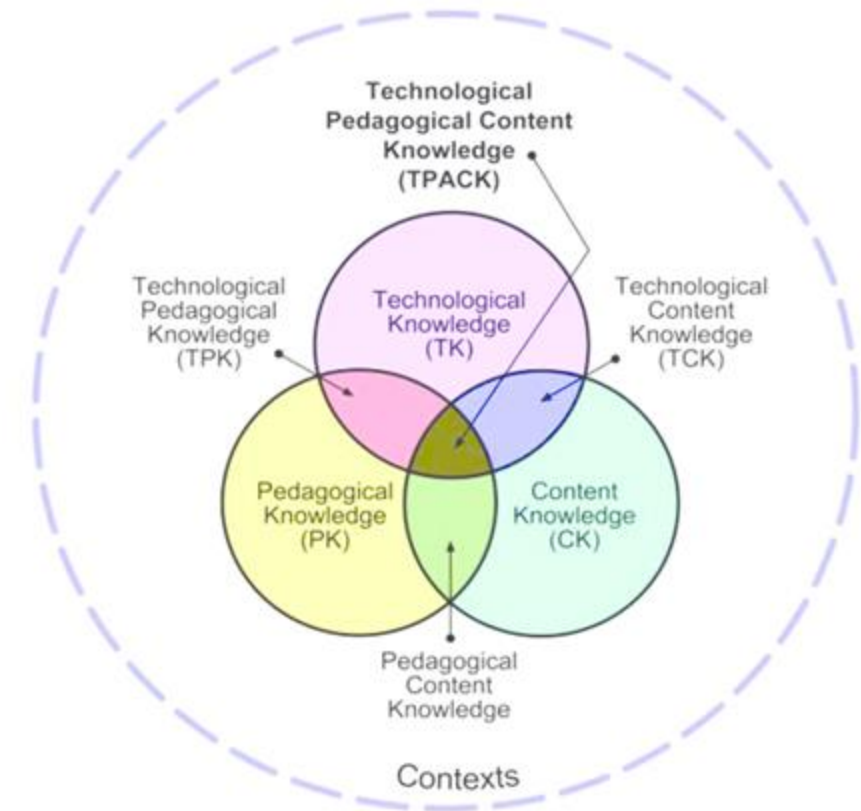


Technology – Evaluating the technology as a tool and making sure you are using the right tool to complete the job.

Focus on how the students will use the technology when they are engaging in their learning. They need to be doing more than just engaging with the technology.

Look at how the technology fits into the curriculum rather than trying to fit the technology into the curriculum.

Example: Drones and 3D Printers



TPACK

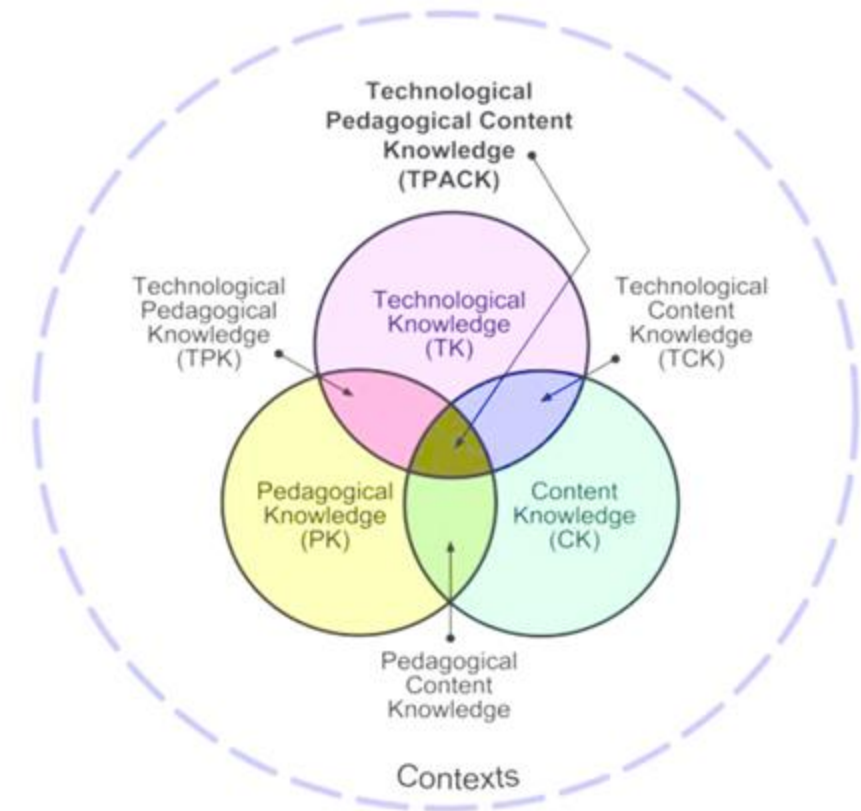


Pedagogy – Knowing who you are as a teacher and knowing what works in your classroom.

Finding and evaluating the technology that fits into your pedagogy.

If you choose technology that doesn't marry your pedagogy, it can hinder.

I love project based learning, inquiry based learning where students are exploring and constructing their own knowledge. Drill and skill based technology doesn't work for me.



TPACK

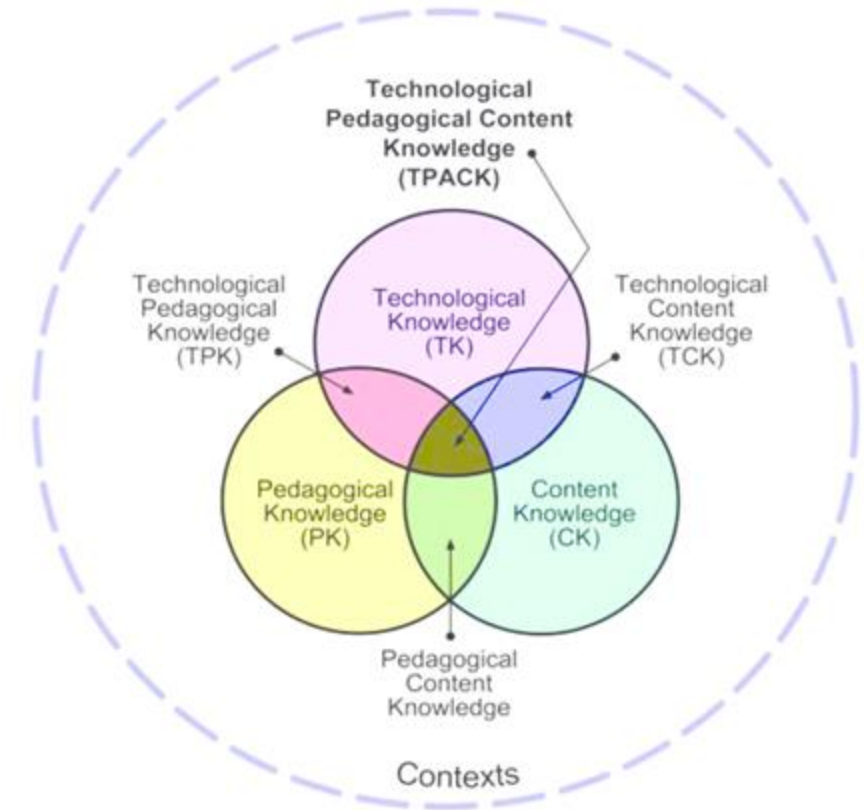


Content – Knowing what you need to teach the students. Knowing the curriculum standards and knowing how you will assess.

Honour the curriculum

Knowing the standards that your students need to meet too. This may be different for some.

Explore the curriculum.



TPACK in 2 minutes



TPACK Reflection Activity



[Complete this reflection within the Google Doc](#)

Technology: What technologies have you seen used for learning purposes? What programs are you confident with?

Pedagogy: What are your pedagogical beliefs? How would you use teaching to support your students? What is one thing you would look for when choosing technology?

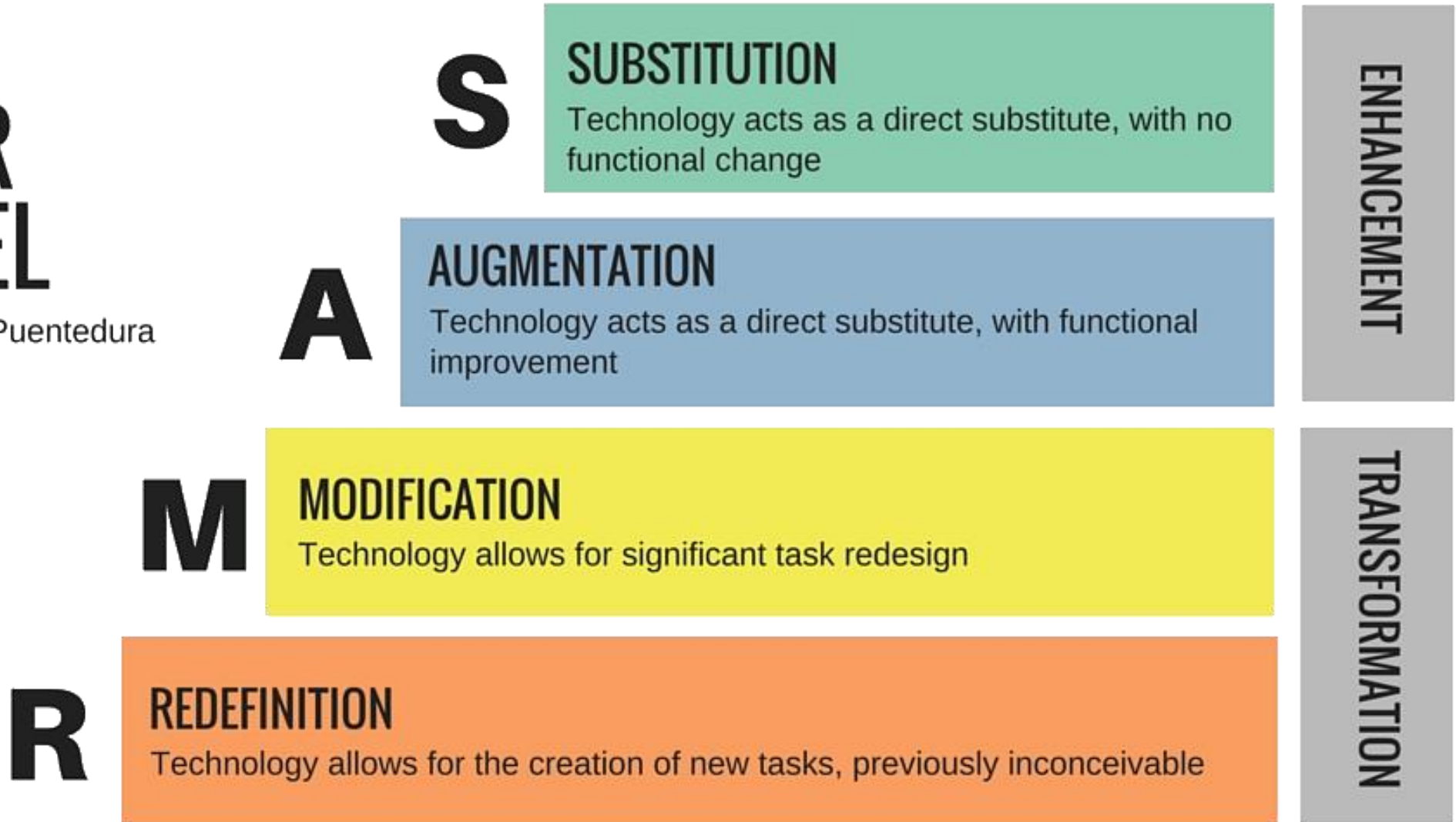
Content: How are technologies supporting curriculum learning? What have you seen on teaching rounds? Or experienced yourself as a learner?

SAMR Model



THE SAMR MODEL

Dr. Ruben R. Puentedura



SAMR Model



S

SUBSTITUTION

Technology acts as a direct substitute, with no functional change

Substitution - Technology acts as a direct tool substitute for traditional practices, with no functional change could be time saving and resource friendly

- Digital textbook - online quizzes - digital whiteboard - word/docs

SAMR Model



A

AUGMENTATION

Technology acts as a direct substitute, with functional improvement

Augmentation - Some functional improvement

- Multimedia elements images, videos layout skills in presentations, online instruction, online independent research eg Gapminder

SAMR Model



Modification - Co-authorship and collaboration intended - less teacher direction

- Podcasts, blogs, website authorship ie google sites

M

MODIFICATION

Technology allows for significant task redesign

SAMR Model



Redefinition - student centered, self directed learning, real-world authentic problem solving. Students display high levels of technology skills

- Extensive multimodal elements in presentations
- Potential world wide audiences

R

REDEFINITION

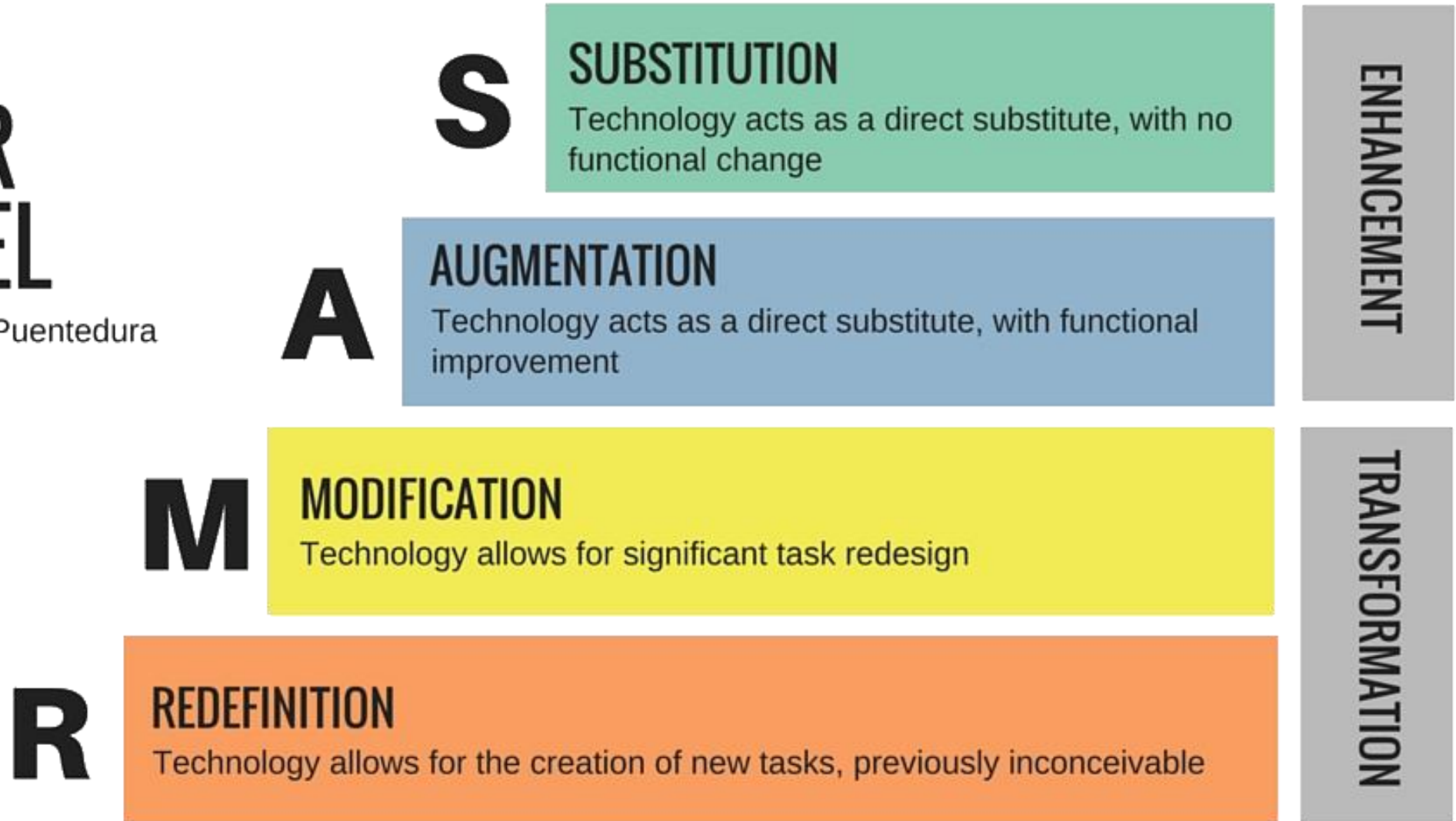
Technology allows for the creation of new tasks, previously inconceivable

SAMR Model



THE SAMR MODEL

Dr. Ruben R. Puentedura



SAMR Reflection



[Complete this reflection within the Google Doc](#)

What technologies are you using and how are you using them in your classes?

Where are they in the regards to the positions within the SAMR model?

What do you need to move onto the next level?

Evaluating Technology



PEDAGOGY



Does the content accommodate for individual differences?

CURRICULUM



Can the technology be used within another subject area of the curriculum?

ASSESSMENT & FEEDBACK



When the learner is incorrect, does the technology give instant feedback?

INTERFACE & DESIGN



Can content such as music and animations be controlled by the user (turned off and on)?

USABILITY



Can students use the program independently after the first use?

[Find more questions here](#)

A Shift in Pedagogy



Setting the scene

Literacy Professional Development

Implemented the concept of 'Author Study' into fortnightly literacy rotations

First author was Pat Hutchins

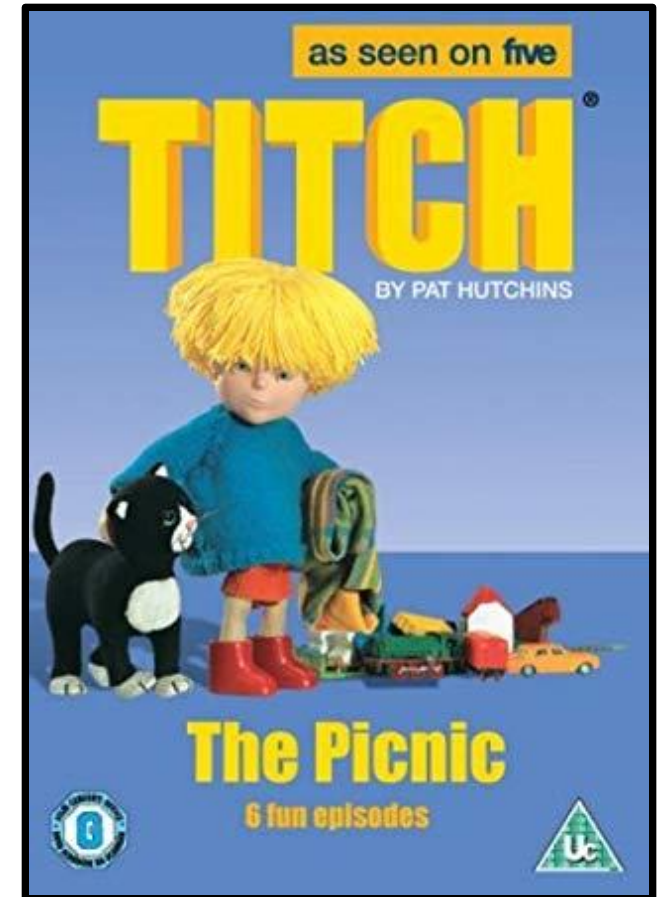
Initial idea

First book we read was 'Titch'

This book was turned into a Claymation series

Explored stop motion activity.

Skilled students on process and technology



A Shift in Pedagogy



The Main Project

Literacy Professional Development

Used 'Rosie's Walk' for big term project

Main focus was using a text that contained minimum words but told a story through pictures.
Writing focus became writing quality narratives

Curriculum Links

English (Reading and Writing)

Digital Technologies (hardware and software)

Critical and Creative Thinking

Personal and Social Capabilities

Science



A Shift in Pedagogy



Become a
risk taker



Make time for
some skill
development



Adapt

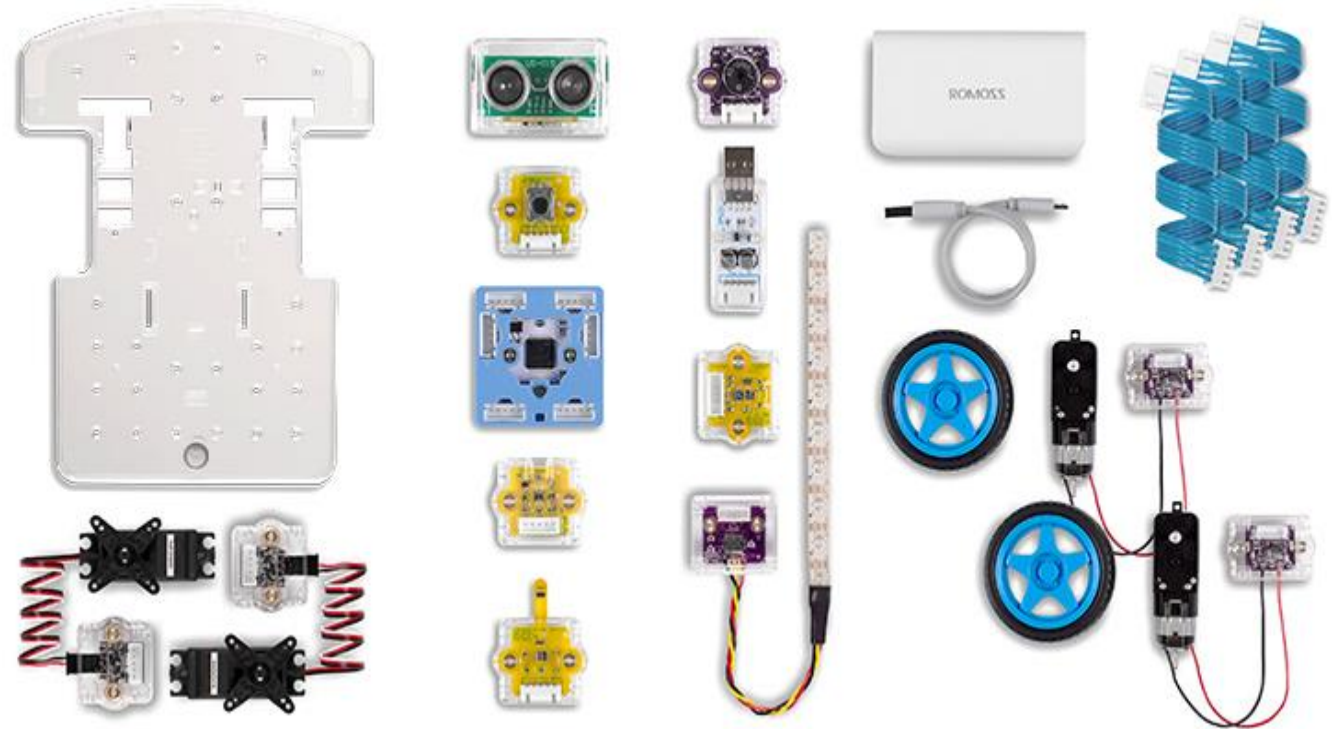


Curriculum
awareness &
links

Implementation

ACS ICT Educators supports schools with
robotics

Integrating digital technology across the
curriculum through robotics and
authentic learning experiences



Implementation

Cubit's approach to STEAM Education emphasizes the integration of the various fields and an unconstrained problem-solving approach through design challenges in our curriculum themed around solving real-world problems.

<https://cubit.cc/>



Hands on Robotic Activities



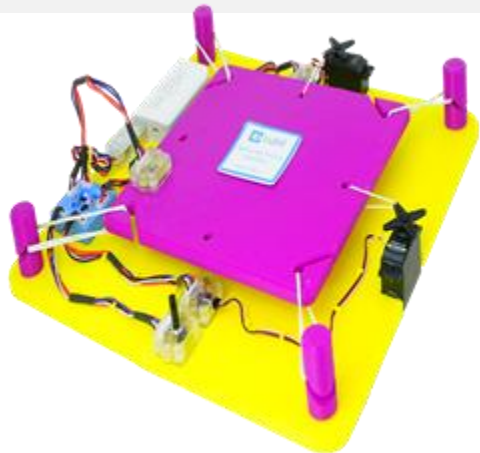
1

2

4

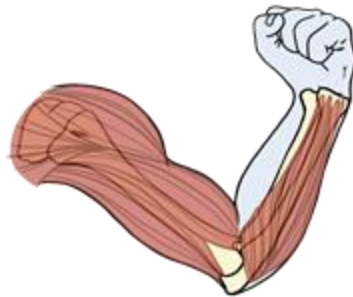
Simulating Earthquakes

Build a prototype structure that will be tested on an earthquake simulating table.



Bionic Joint

Design a bionic joint using the Cubit robotic DC motor and dial to create movement. Make it look good!



Smart House

Design a smart house. How can technologies be used to support a person to live independently?



Using the Cubits



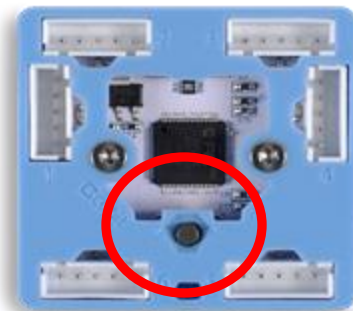
1

Plug the USB
into the
battery



2

Wait for blue lights to
turn on. Press the grey
circular button to
launch the code



3

Wait for blue lights to
turn on. Press the grey
circular button to
launch the code



Play and Reflect



Can this activity be integrated into another subject area? How could you adapt it?

What challenges could you face with a task like this at school?

How can the activity be aligned to another year level?

Could you use the same activity with robotics you already have available at your school?



ICT/DL v DigiTech: The Difference



*“..... is like the difference between **using a game and being able to create a game**. It is the difference between **using an Instagram filter and being able to create your own photo filters**.”*

Dr Rebecca Vivian

Her summary can be found [here](#)

Doing an Audit



Digital Technologies Curriculum

- Investigating how a digital system works
- Looking at the parts that make up a digital system and knowing how they all work together
- The type of data it collects
- How you would create with it
- Cyber Safety and Cyber Security

ICT Capabilities/Digital Literacy

- Investigating what you can do with a computer
- Learning about the functions of a program
- Knowing how to create a document
- Know your way around a program

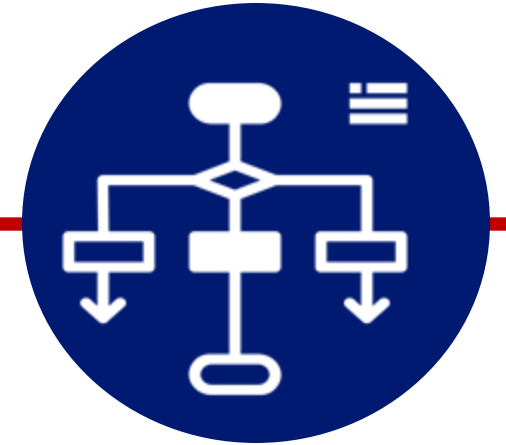
3 Ways of Thinking



**Systems
Thinking**

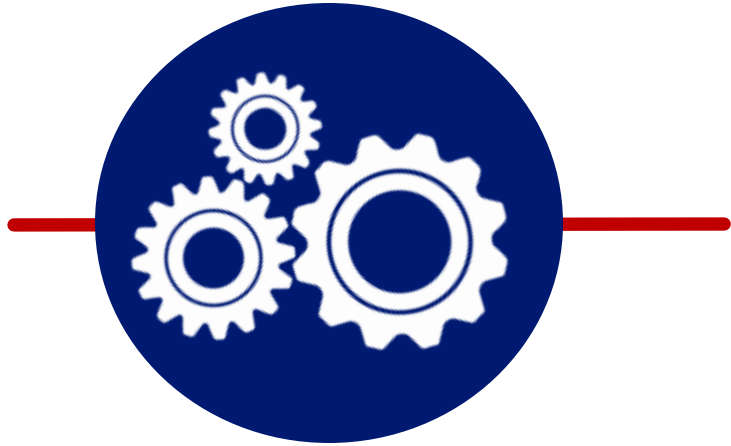


**Design
Thinking**



**Computational
Thinking**

3 Ways of Thinking



Systems Thinking

- Analysing how systems work together to solve a problem and perform a task.
- Identify components of a systems.
- Understand the relationships and interaction between the components.
- Solve problems based on knowing the systems mechanics and components.

<http://rr2p.org/article/234>

3 Ways of Thinking



Design Thinking

- A creative process used to solve a problem using innovative ideas
- Generate new ideas and evaluate them based on a criteria.
- Justify the purpose to create something.

- Consider the problem, the people and the equipment.
- Promotes creative thinking, teamwork, and have students take responsibility of their own learning.

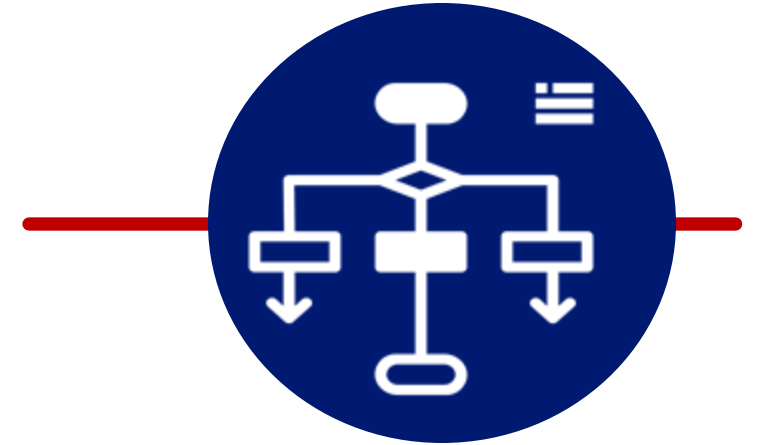
3 Ways of Thinking



A problem-solving method that involves various techniques and strategies that **can** be implemented by *digital systems*.

Techniques strategies include:

- organise *data* logically
- breaking down problems into parts
- defining abstract concepts and designing
- use algorithms, patterns and models.



**Computational
Thinking**

Digital Systems



The main components of common digital systems (hardware, software, networks), and how such digital systems may connect together to form networks to transmit data.



Using
technology
(hardware and
software)

Plugging in
other parts
peripheral
devices

Connecting
multiple devices
together to make
a network

How you connect
(through wires or
wireless
connection)

How quick and
safely you can
connect and
share
information

Data Representation



Understand how data are represented and structured symbolically. Recognise different types of data.



Knowing what data is

Data can be represented in different way (money)

Data that is stored in a digital system is represented as 0 and 1s

Images, sound and text is stored as different data

The files to store data different on the quality

Data Interpretation



Collecting, collating and interpreting data. Commonly use spreadsheets. Cross over to data in Mathematics. In version 9, area no longer in the Digital Technologies Curriculum



Using software to interpret data

Data can be represented in different way

Make sure that the data you have found is quality. Visual it

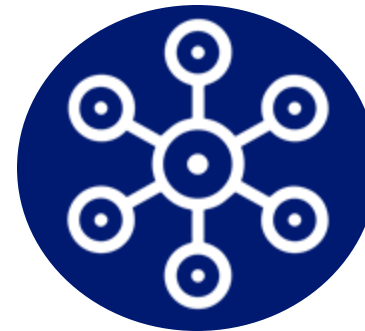
Gather data from multiple sources. Visual it

Collect and collate qualitative and quantitative data

Creating Digital Solutions



Create a **MEANINGFUL** digital solution. This is coding to create an app, creating a game. Create for a purpose and look at the potentials of technologies and bring that into the classroom



Using tech to solve problems
Solve problems based on how to use tech

Using tech to solve problems, add some coding commands
Solve problems to help your school

Using tech to solve problems, add a couple more
Solve problems to help your wider community.

Using programming languages (python to code)
Listen to your stakeholders

Integrating the Digital Technologies Curriculum



**HARDWARE AND
SOFTWARE**



Is there room to look at the hardware and software of technology?

DATA



What data can be collected?

COLLABORATION



Can they use technology to work on project together?

DESIGN



Is there room for students to design something new?

Integrating the Digital Technologies Curriculum



ROBOTICS



Can robotics and programming be used as a method to solve a problem?

PROBLEM SOLVING



Is there a problem based on specific themes students can solve?

COMMUNITY NEEDS



How can solutions help the school community and wider community?

Integrating the Digital Technologies Curriculum



FAIRY TALES & THE 3 WAYS OF THINKING



Watch the story of Rapunzel. Instead of the Prince climbing up the hair, draw a digital system that will get the prince up the tower.

HEALTHY BOTS



Imagine a robot does your food shopping for you. Program your bot to only pick up healthy foods.

Integrating the Digital Technologies Curriculum



HELPING ANIMALS



Evaluate screen shots of apps and websites that support animal sustainability. Create your own based on an animal of your choice.

PERFECT PLANTS



Using the robotics. Go for a walk and collect data about the best place to plant a been plant.

Integrating the Digital Technologies Curriculum



NATURAL DISASTERS



Evaluate different systems that are used to help with natural disasters. Create a new one using new technologies

ENHANCING COMMUNITIES WITH MINECRAFT



Look at how Block by Block uses Minecraft to give people a voice when designing parts of a community. Design a space that is accessible for everyone.

Integrating the Digital Technologies Curriculum



GETTING CONNECTED



How can you provide internet access to remote communities? Research about internet speeds. Then use Minecraft to design your network.

SOCIAL DATA



Read about how Marine Scientists have called on social media to collect data. Learn to upload and use spreadsheet program to analyse data.

Integrating the Digital Technologies Curriculum



CREATING A PODCAST



Create a survey you will give to your stakeholders to help you understand the best topics to include in that podcast.

CREATING ENTREPRENEURS



Create an app that you'd like to create to solve a problem and make you money. What would that app do and what would it look like?

ACS ICT Educators Program provides support to teachers to implement the Digital Technologies Curriculum with confidence.

<https://www.acs.org.au/ict-educators.html>