ACS ICT EDUCATORS PROGRAM

CREATING A DIGITAL TECHNOLOGIES SCOPE AND SEQUENCE

acs.org.au /ict-educators.html

INTRODUCTION

Catherine is a registered teacher with over 12 years' experience in the classroom including 5 years as learning and teaching leader.

She holds a postgraduate degree specialising in Education Technologies. This has tightened her knowledge of how technology has the potential to redefine education, including the holistic approach – not to be governed by a product or device but rather how pedagogical practices influence the potential of technology in education.

SUPPORTING TEACHERS

COMMUNITY OF PRACTICE

CONTENT KNOWLEDGE

Understanding the Curriculum from a level perspective rather a topic

'The curriculum wording itself is quite ambiguous and needs to be broken down for teachers to make sense of'

-Primary School Teacher, Mill Park, Victoria

IMPLEMENTATION

Integrating digital technology across the curriculum

'Be provided with a range of resources that can be used by students and teachers within the classroom'

-Primary School Teacher, Mill Park, Victoria

CONTENT KNOWLEDGE

PERIPHERAL DEVICES

Levels 3-4

Information

For a digital system to function and performs certain tasks, it needs devices that will input and output data. Devices that will input the data into the computer (to store and manipulate the data) and devices that will output the data (to view the data). Peripheral devices are digital devices that are the extra 'add ons' to a computer. These can take the form of:

- Mouse
- Printer
- Scanner
- Webcam
- Monitor or interactive white board
- Speakers
- Microphone

These devices can be connected to a computer via a cord that will be directly plugged or wirelessly through WIFI or Bluetooth. Devices can also be added into a hard drive such as extra memory or a graphics card. Peripheral devices are categorised as:

Input devices	Output devices	Storage devices
Puts data into the computer such as a mouse to click, a keyboard to write information.	Takes data from the hard drive such as a monitor allows you to view information, speakers allow you to hear sound, printer printers out information.	Holds the data such as hard drives that allows you to save information from the hard drive.

Curriculum Expectation

Students will investigate and explore how peripheral devices are used to help perform a task (printer to print out a hard copy, a monitor to watch a video) for a purpose and the type of data that is transmitted between the devices.

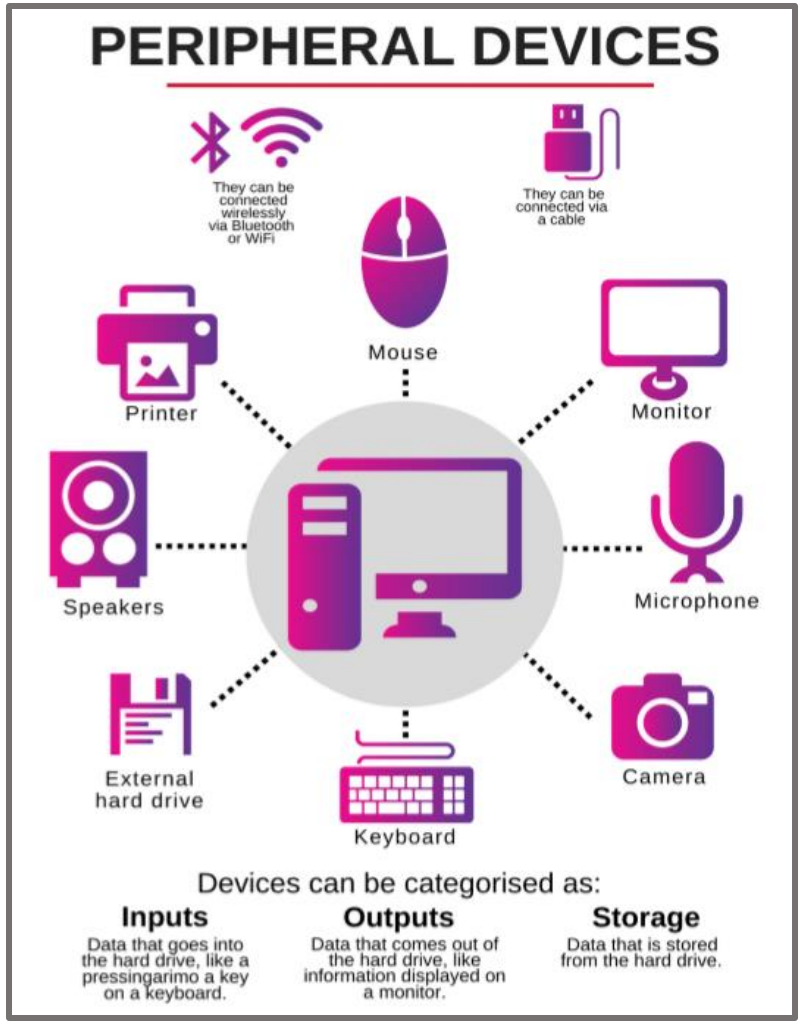
Video Resource

Click the image to open the video

This video identifies and further explains the role of common peripheral devices.

Video Source: study.com

acs.org.au



CONTENT KNOWLEDGE

RGB – RED GREEN BLUE

Levels 7-8

How we see colours represented in real life compared to a digital system is different. RGB stands for the three main colours that are used digitally - Red Green Blue. RGB is nothing more than the acronym to help describe how we see digital colours and images. To go further, we need to go back a little and look at binary code to better explain RGB.

Binary Code

Binary code is what we call the language that is spoken by computers. And it's not made up of letters like we use in the English language, it's made up of just two digits - 0 and 1's. Together those 0 and 1's can make up different combinations. Just like the English language, the same letters can make up different words. How many words can you make from the letters: N L F I T Y T?

It's called binary code only uses two numbers. On any device you use, when you press a character (a letter or symbol), the digital system doesn't recognise it as the letter or symbol, it recognizes it as a sequence of 0 and 1's. The sequence of 0 and 1's will be made up of 8 bits. The word 'bit' is a combination of the word binary and digit and refers to one of the digits either the 0 or 1.

The connection between RGB, pixels and binary

Have you ever zoomed in on a picture and noticed that the image starts to look blurry? There's a reason for that! You're no longer looking at the whole image but tiny individual squares. A digital image is made up of pixels (squares). Within each pixel there are rectangles that are made up of three colours – red green and blue. All digital imagery is made from those three colours. The change in colour will depend on the value of the red green and blue. If you wanted to create black, all the values (the red, green and blue) will be set at 0. If you wanted to create white the red, green and blue's value will be set at 255. The lower the numbers are darker colours, high numbers are brighter colours. The three colour combinations can make millions of colours! The value of the RGB is stored in a digital system as a bit. The black we spoke about before will be stored as 00000000. To store white – all the values (found in red green and blue) are stored as 11111111. As the colours change so do the 0 and 1s represented in red, green and blue. Click on the images to watch these videos that further explain Binary and RGB.

Video Source: Crash Course Computing

Video Source

CONTENT KNOWLEDGE

F-2

- Data
- Algorithms
- Hardware and Software
- Information Systems to Meet Needs
- Online Collaboration

3-4

- Data
- Algorithms
- Visual Programming
- Peripheral Devices
- Systems to Meet Needs
- Online Collaboration

Student Focused

- Online Collaboration

5-6

- Data
- Algorithms
- Visual Programming
- Networks
- Whole Number Representation
- User Interface
- Defining Problems
- Systems to Meet Needs
- Online Collaboration

Student Focused

- Algorithms
- Binary Code
- Common Components
- Data Transmission
- Visual Programming
- Networks
- Online Collaboration
- Internet
- Flowcharts

CONTENT KNOWLEDGE

7-8

- Data
- Algorithms
- Data Transmission
- Binary Code
- User Experience
- Real World Problems
- Information Systems to Meet Needs
- Evaluating Digital Solutions

Student Focused

- RGB
- HTML and Websites
- Online Protocols

9-10

- Data
- Algorithms
- Data Compression
- Hardware and Software
- User Experience
- Interactive Solutions
- Real World Problems
- Iterative Approach

IMPLEMENTATION

CONTENT

- Overview
- Key Questions, Key Vocabulary and Key Understandings
- Success Criteria and Learning Intentions
- High level ideas for you to see the development of skills and modify the lessons based on the needs of your school and students

Unit Overview

The purpose of this unit is to equip students with identifying common emotions they feel on a regular basis and using digital technology to help them cope with negative emotions. Students will design an app that will help them identify and manage personal stressful situations. This app with be personalised to meet the needs of emotions they most identify with.

The unit will commence by students identifying a range of common negative emotions and the impact these emotions have on their wellbeing. They will develop knowledge around the different strategies used to help and cope with these emotions and begin to understand which strategy best align with their wellbeing. Students will investigate and look at current apps and look at how they support promote healthy wellbeing for their users. They will use current digital solutions and their own ideas to develop their personalised app.

Curriculum Targeted Areas

The digital technology is central to this unit of work. Areas of interest may include:

- Design and Technology
- Personal and Social Capability
- Critical and Creative Thinking

Further investigation into these areas is required to ensure they align with the following activities. Tasks may need to be modified to ensure Content Descriptions and Achievement Standards are met.

Australian Curriculum Alignment

The following sessions have been created using the Australian Curriculum: Digital Technologies Curriculum. Activities may need to be modified to ensure state Digital Technologies Curriculum Standards/Syllabus are met. ACS has support and documents to help align this unit to other Digital Technology Curricular.

Session

'Session' has been used to define the order of tasks to complete the unit. It does not define a set time required to complete the task. Time allocated to complete a session is the teacher's discretion. This allows for flexibility for to drive the duration of the task and make modifications if necessary. Sessions can be merged into one allocated class period or may run over multiple periods.

IMPLEMENTATION

CONTENT

- Overview
- Key Questions, Key Vocabulary and Key Understandings
- Success Criteria and Learning Intentions
- High level ideas for you to see the development of skills and modify the lessons based on the needs of your school and students

Key Preparation

Students will need to access to a software program that will help them analyse and interpret data. A common software program to collate and interpret data is spreadsheets. Programs such as Microsoft Excel, Google Sheets and Apple Number all contain the capacity to manipulate and present data. GCFLearnrfree.Org has a plethora of videos to support knowledge development to use spreadsheet software. It should be noted that other spreadsheet software (such as Google Sheets, Apple's Sheets and) use a similar layout to Microsoft Excel and these videos can be adapted to suit your needs.

The design of their new social media platform is completed unplugged. Students will not be creating a digital prototype of their digital solution.

ACS Resources

Resources have been created to help teachers and students unpack and understand topics found within the Digital Technologies Curriculum. These give brief explanations of the topic and the expectations to teach the topic at the curriculum year level. It is intended the information is presented in a way that will set the foundation for further research.

Key Understandings

Students will:

- Define social media and social data and explain how social media is a tool to acquire data.
- Evaluate Social media apps and platforms for their use to collect social data.
- Develop skills in using spreadsheet software programs to analyse and visual data.
- Design and evaluate a new social media digital platform with the intention to support scientists to collect

Key Questions

- What social apps and platforms do you know and use and what is their prime function?
- How can social media support the wider community?
- How are scientists using social media to gather more data about marine life?
- How is data collected and analyzed?
- How can you use spreadsheets to collect and analyse social media data?
- If you could create a social media platform to help marine life what would it look like?
- What type of data would need to be included to help scientists?

Key Vocabulary

Collaboration, protocols (ethical, social and technical protocols), social media, data collection, social data, analysing data, digital solutions, user experience functional requirements, student solutions, digital systems meeting needs, innovative ideas

IMPLEMENTATION

CONTENT

- Overview
- Key Questions, Key Vocabulary and Key Understandings
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- High level ideas for you to see the development of skills and modify the lessons based on the needs of your school and students

Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
9.	Binary Code	**Learning Intention** Students investigate and explain how images, text and sounds are represented in social media platforms. **Success Criteria** I can explain how images, texts and sounds are represented on a social media platform.	Pose the question to the whole class – how are images, sounds and text represented in a digital solution like a social media platform? Students discuss how images and sounds are represented in digital solutions and allow the conversation to come from students.	Students complete research in to RGB and binary code and create short explanations of binary code and the representation of data within the social media platforms.
Session Resources	**Student Resources** • ACS Student Resource: RGB and Binary Code		**Teacher Resources** • ACS Teacher Resource: Binary Code • ACS Teacher Resource: Binary Code Presentation	
10.	Evaluation	**Learning intention** Students will evaluate their new design based on a set criterion of questions and prompts. **Success Criteria** I can evaluate my social media design by answering a set of questions and prompts.	Students will share their designs and ideas with their peers.	Students will independently complete an evaluation of their design for a new social media app. They will answer a set of questions and prompts to help them articulate the purpose of their digital solution.
Session Resources	**Student Resources** • Student Design Evaluation		**Teacher Resources**	

IMPLEMENTATION

ASSESSMENT

- Aligned to Curricular
- Match the Content Description to the sessio
- Assessment Statement

Assessment – Australian Digital Technologies Curriculum			
Content Description	**Session**	**Assessment Piece**	**Assessment Statement**
Examine the main components of common digital systems and how they may connect together to form networks to transmit data (ACTDIK014)	5	Identifying the parts of the digital system	Students explained how a system works to help identify a chosen natural disaster. They identified how it connects to a network and transmits data to provide information on the natural disaster.
Examine how whole numbers are used to represent all data in digital systems (ACTDIK015)	4	Binary code activity	Students identified how the digital systems represents data as 0 and 1's and explained how Binary Code is used for representing data.
Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information (ACTDIP016)	12	Collecting and analysing data via Cubit Kits	Students collected data about earthquakes through coding an earth simulator and used this data to influence earthquake proof structure.
Define problems in terms of data and functional requirements drawing on previously solved problems (ACTDIP017)	7	Evaluation of a current digital	Students evaluated a digital system by identifying strengths and weaknesses including how the system functions and how well it completes a task.
Design a user interface for a digital system (ACTDIP018)	8	Design of a new natural disaster digital system	Students designed a new user interface for an updated digital system.
Design, modify and follow simple algorithms involving sequences of steps, branching, and iteration (repetition) (ACTDIP019)	9	Flowchart and written English statements	Students represented algorithms using a flowchart and include sequence of steps, branching (multiple options) and iteration (repeats) to show how their digital system would operate.
Implement digital solutions as simple visual programs involving branching, iteration (repetition), and user input (ACTDIP020)	11	Cubits – programming the earthquake simulator	Students used Cubit Kits to build and code an earthquake simulator.
Explain how student solutions and existing information systems are sustainable and meet current and future local community needs (ACTDIP021)	10	Evaluation of their digital system	Students explained how their natural disaster system meets needs of people and is an improvement to the current system. They explained how their developed solution meets current and future needs.
Plan, create and communicate ideas and information, including collaboratively online, applying agreed ethical, social and technical protocols. (ACTDIP022)	1	Evidence of working in an online environment to work collaboratively	Students used a digital platform to generate and communicate their ideas to develop their app design.

IMPLEMENTATION

F-2

- Fairytales
- Growth and Change
- Pirate Treasure Race
- Simple Machines
- Sustainable Users of Energy
- Sequence of Steps
- Healthy Bots
- Digital Games Through the Years

3-4

- Reinventing Willy Wonka's Chocolate Factory
- Perfect Plants
- Helping Animals
- Flowcharts to Solve School Yard Problems
- Australian History
- Technology used by Scientists
- Healthy Bots
- Stop Motion Animation
- Animal Lifecycles with Merge Cubes

5-6

- Natural Disasters
- Sphero Sports
- Healthy Lifestyles
- Solar Systems
- Circuits and Switches
- Helping Those Less Fortunate
- My Past and My Family
- Australian History
- Minecraft Community

- Scope and Sequence
- Lunch Time Code Club Activities

DIGITAL TECHNOLOGIES CURRICULUM

7-8

- Stress Less!
- Quantum Computing
- Getting Connected
- Social Data Helping Marine Scientists
- Experiencing VR

9-10

- Creating Entrepreneurs
- Creating a Podcast
- Digital Animations
- Technology Supporting Marine Sustainability
- Building a Chatbot

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COMMUNITY OF PRACTICE

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

DEDICATED FORUM

Creating a Digital Technologies Scope and Sequence

CONNECT WITH CATHERINE

catherine.newington@acs.org.au

RESOURCE CENTRE

For F-10 Digital Technologies Curriculum related resources

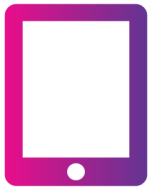
EVALUATING TECHNOLOGY

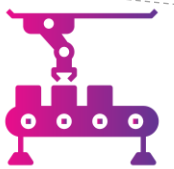
EDUCATORS

Knowing our students.
Knowing our pedagogy.

CURRICULUM

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

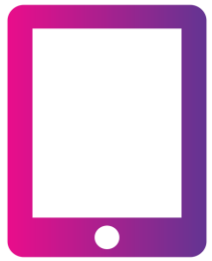




TECHNOLOGY

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

EVALUATING TECHNOLOGY



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.

DIGITAL TECHNOLOGIES CURRICULUM

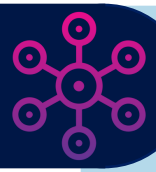
When planning ask the question - how has technology influenced that topic or concept?

How the Digital Technologies Curriculum can be embedded in other learning areas. And provide meaningful examples to teach the curriculum.

'Not Impossible: Project Daniel'

Video Source:
https://www.youtube.com/watch?v=SDYFMgrjeLg

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?

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