Identifying opportunities to build data literacy in Years 7–10 Digital Technologies

P–10 Australian Curriculum

Key messages

Through Digital Technologies, students in Years 7–10 develop a deep understanding of the nature of data and its representation, and computational skills for interpreting data. The data concepts in the curriculum provide rich opportunities for authentic data exploration while developing data processing and visualisation skills.

This factsheet focuses on:

- key concepts in Digital Technologies that relate to data
- data literacy opportunities within the Digital Technologies curriculum
- framing teaching, learning and assessment to ensure that students are engaging with data meaningfully.

Key concepts of Digital Technologies

Three of the key concepts in Digital Technologies focus on data: data collection, data representation and data interpretation. These concepts provide rich opportunities for authentic data exploration in other learning areas while developing data processing and visualisation skills.

Data collection (properties, sources and collection of data)

Data collection describes the numerical, categorical and textual facts measured, collected or calculated as the basis for creating information and its binary representation in digital systems (ACARA, 2020).

In this context, students:

- obtain existing data from reliable sources or create new data for a set purpose
- ensure data is recorded in ways that make it easy to access and manipulate
- ensure data is correct, meaningful and handled according to Australian privacy principles.

Data representation (symbolism and separation)

Data representation describes how data is represented and structured symbolically for storage and communication by people and in digital systems (ACARA, 2020).

In this context, students focus on:

- the use of binary in digital systems
- representing data with visual conventions, e.g. graphs, charts, infographics
- separating content and presentation using appropriate structures, e.g. HTML, CSS.

Data interpretation (patterns and contexts)

Data interpretation describes the processes of extracting meaning from data (ACARA, 2020).

In this context, students:

- summarise data, its attributes and its relationships to identify trends and outliers and draw conclusions
- model objects and events as structured data, e.g. querying databases and presenting results
- present data in ways that effectively demonstrate meaning, e.g. diagrams, maps, charts, graphs.

Data literacy opportunities — Australian Curriculum: Digital Technologies

An achievement standard states what students should know and be able to do at the end of a specific year. The standards provide explicit opportunities for students to employ their data literacy understanding and skills.

The table below offers teachers a quick overview of the alignment between the achievement standard references to data and the content to be taught.

Alignment of data literacy in achievement standards and content descriptions		
Achievement standard	**Sub-strands**	**Content description**
Years 7–8		
• Distinguish between different types of networks and defined purposes. • Explain how text, image and audio data can be represented, secured and presented in digital systems.	Digital systems	Investigate how data is transmitted and secured in wired, wireless and mobile networks, and how the specifications affect performance (ACTDIK023)
	Representation of data	Investigate how digital systems represent text, image and audio data in binary (ACTDIK024)
• Analyse and evaluate data from a range of sources to model and create solutions.	Collecting, managing and analysing data	Acquire data from a range of sources and evaluate authenticity, accuracy and timeliness (ACTDIP025)
Years 9–10		
• Explain the control and management of networked digital systems and the security implications of the interaction between hardware, software and users. • Explain simple data compression, and why content data are separated from presentation.	Digital systems	Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034)
	Representation of data	Analyse simple compression of data and how content data are separated from presentation (ACTDIK035)

• Design and implement modular programs, including an object-oriented program, using algorithms and data structures involving modular functions that reflect the relationships of real-world data and data entities. • Take account of privacy and security requirements when selecting and validating data. • Share and collaborate online, establishing protocols for the use, transmission and maintenance of data and projects.	Collecting, managing and analysing data	Develop techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources, considering privacy and security requirements (ACTDIP036)
		Analyse and visualise data to create information and address complex problems, and model processes, entities and their relationships using structured data (ACTDIP037)
	Producing and implementing	Implement modular programs, applying selected algorithms and data structures including using an object-oriented programming language (ACTDIP041)

Using data to inform a digital solution

Creating digital solutions is at the core of Digital Technologies. Across each band, students will create digital solutions that:

- use data
- require interactions with users and within systems
- impact on people, the economy and environments.

The problem, need or opportunity that is posed is an important part of the process, as it can help to foster student engagement with data when creating their digital solutions.

Considering larger world issues can lead to engaging teaching and learning as students try to grapple with big issues that are typical of these contexts. Issues such as health, poverty, sustainability and environmental conservation lead students to consider what our preferred future might look like and can provide opportunities for students not only to think more globally but also provide excellent opportunities to collect, represent and analyse the abundance of data that exists around these topics.

Typically, teachers would choose a manageable chunk of these big issues to allow accessibility for students. For example, students might investigate how water management systems in the school could be improved, and then design and create a digital solution that can solve or improve this issue.

References

Australian Curriculum, Assessment and Reporting Authority (ACARA), Australian Curriculum Version 8, www.australiancurriculum.edu.au/f-10-curriculum/technologies/digital-technologies.