Year 11 (Stage 1): Digital Technologies

Scope and Sequence

Identify curriculum	**Curriculum Overview**	**Year 11 (Stage 1) overview** Students create practical, innovative solutions to problems of interest. By extracting, interpreting, and modelling real-world data sets, students identify trends to examine sustainable solutions to problems in, for example, business, industry, the environment and the community. They investigate how potential solutions are influenced by current and projected social, economic, environmental, scientific, and ethical considerations, including relevance, originality, appropriateness, and sustainability.
	Assessment and Achievement standard	Assessment of the curriculum will be conducted via the following methods: • summative internal assessments – the summative assessment will be conducted through projects and presentations. This will be assessed internally by the classroom teacher. The assessments will be conducted in conjunction with the South Australian Certificate of Education. Three assessments will be conducted through Assessment Type 1: Project Skills and one assessment in Assessment Type 2: Digital Solutions. See assessment overview and specific assessment documents for further detail. Note. This will also allow the teacher to gauge the learning by students and determined whether the teaching level is appropriate to the classroom.

Unit 1 Overview

Unit 1 “Data Makes Me Move” is designed to encourage students to interrogate data associated with fitness recording devices and their applications. Students will collect data through one of these applications, analyse and compare against other applications/programs. They will consider ethical considerations, implicit with data collection and sharing. Finally, they will develop a concept design, to manage or display the information collected.

Throughout this Unit, students will require and have access to a computer or laptop, internet connection and school cloud service, through the school network system.

General Capabilities.

Literacy. Students will be required to comprehend information through text, listening and viewing, through a variety of media, such as graphical, video and audio information. They will also be using a variety of media to compose information for others to understand. The medium used will be chosen by the students, individually and as groups, to allow for a more differentiated assessment mode. Students may also be introduced to a variety of terms that are specific to the content, which is intended to expand their vocabulary.

Numeracy. Student will be collecting, sorting and analysing data from colleagues or other sources. This will predominately be in the form of numbers, which they will need to understand, in order to be successful in this Unit of Work and Assessment Tasks.
Key areas in Numeracy addressed through this Unit of Work are: Using Measurement, Recognising and using patterns and relationships, Interpreting statistical information.

Information and Communication Technology Capability. As this is a Digital Technologies Unit, students will inherently be using ICT to investigate, create and communicate. They will also specifically address social and ethical protocols and practices when using ICT.

Critical and Creative Thinking. Students will consider the existing frameworks that exist, with regard to ethical issues of data collection, use and storage. Students will also be required to create their own solutions to Assessment Tasks 2 in this Unit of Work (UoW) and in subsequent Assessment Tasks in this subject. Assessment guides are designed to allow students to explore through their own methods and create unique solutions to the task.

Personal and Social Capability. Students will work individually and collaboratively throughout this UoW. The collaborative investigation and Assessment Task production will require students to demonstrate and further develop self- and social management and awareness skills, by directing their own and other's learning, and planning and conducting investigations.

Ethical Understanding. Students will be introduced to and investigate the Ethical issues surrounding the use of data, its storage and collection. They will specifically investigate their responsibilities regarding the data they have collected or been given from the beginning of the unit.

Background Context

The Class is 19 students, with 1 indigenous, 2 recent immigrants and split 14 males and 5 females. Attendance is 85%. 5 students speak English as a second language or not their main language at home. Due to the area catchment of the school zone and through student selection of this unit, most students are from middle-high socio-economic backgrounds. Many of the students that undertake this subject are highly motivated and work well individually to achieve specific goals and tasks. Therefore, prefer to be given tasks that allow their own investigation, learning and assessment production. Key difficulties, for this group, can be the

integration of collaborative project skills that, at times, needs to be closely monitored to ensure contribution from all students and task sharing.

Students have explored the suite of Microsoft Office 365 programs and be familiar with all common functions and many specific functions. Specifically relevant to this UoW, students will know and understand the functions within Microsoft Excel. Students understand how units of measure are used and be familiar with common units of measure. During this unit they will be introduce to new, specialised units of measure, that are specific to the context of this UoW.

Unit Map

Unit 1		Data Makes Me Move	
	Week		
Data Collection	1	Introduction to Data Collection	
	2	Recording Data	Submission of draft/working documents for AT1
	3	Ethics and Presentation	Presentation of Assessment Task 1
Data Analysis	4	Data Analysis	
	5	Evaluating Data	Submission of draft/working documents for AT2
	6	Producing User Friendly Data	Submission of Assessment Task 2
Unit 2			
Product Design Plan	7	Designing Digital Solutions	
	8	Testing, Evaluating, Iterating	Submission of draft/working documents for AT3
	9	Refining and Presentations	Presentation of Assessment Task 3

Note: Unit 2 continues the theme from Unit 1 and required the completion of Unit 1 before commencement. Unit 2 is included to show where this UoW is designed to be completed.

Unit of Work: Data Collection		
Unit 1		**9 Weeks (1-9)**
Focus Area 3: Data analytics	Students use computational thinking skills and strategies to analyse relationships in data sets, apply programming and program-design skills, and use a digital system to transform data into information. They develop skills in identifying patterns of similarities or repetition in data sets, and making predictions and drawing conclusions from these patterns. They use simple techniques to analyse and display the data. Students apply their computational thinking skills to identify and define problems using data, and develop solutions. They apply their programming and program-design skills to create and refine digital solutions. A solution may take the form of a product, prototype, and/or proof of concept. Students have opportunities to work collaboratively and reflect on ways in which their solution could be used or improved. Students extend their ethical understanding by researching and discussing the possible ethical implications of data collection, storage, and/or use. Self-assessment tools or skills frameworks may be used to support the development and application of students' skills in working collaboratively. The following framework provides a set of possible techniques and strategies that can be used for learning. Key learning elaborations to be addressed include: • Students apply computational thinking to identify and analyse relationships in data sets. • Students use computational thinking skills to identify and define problems. • Students create digital solutions based on data • Students research and evaluate the ethical implications surrounding the collection, storage, use, and/or security of data	

Week 1 – Lesson Overview – Introduction to Data Collection

Lesson Outcome: Introduction to Data Collection

During this week, students will be introduced how data can be collected and stored. They will also be given the details of the first assessment. They will also be using and investigating various applications and devices that are used to record, analyse and display data from fitness activities. Students will be given the Assessment Task 1 Outline.

Success Criteria: Students understand how data is collected and stored. Students begin investigating fitness applications and devices. Students understand the requirements of the assessment and have chosen an application/program for Assessment Task 1.

Teacher Notes: Prepare resources to show and explain data storage and collection.

Resources: Each student will need an electronic device to record fitness activity data. This can be achieved through most smart phones, otherwise specialised devices, such as watches can be used.

Week 2 – Lesson Overview – Recording Data

Lesson Outcome: Recording Data

Week 2 Overview, students will be introduced how data can be collected and stored. They will also be given the details of the first assessment. They will also be using and investigating various applications and devices that are used to record, analyse and display data from fitness activities.

Success Criteria: Students understand how data is collected and stored. Students begin investigating fitness applications and devices. Students understand the requirements of the assessment and have chosen an application/program for Assessment Task 1.

Teacher Notes: If students are unable to source sufficient data on their own, a publicly available data set will be made available for student use. (Thambawita, et al., 2020) This will be the same data set will be used in later lessons within this subject, specifically for Data Analysis.

Students will be required to submit or present a draft or working document of their presentation to the teacher.

Resources: Each student will need an electronic device to record fitness activity data. This can be achieved through most smart phones, otherwise specialised devices, such as watches can be used.

Students may also be able to coordinate with organisations with NTIS to source data and/or statistics.

Week 3 – Lesson Overview – Ethics and Presentation

Lesson Outcome: Ethics and Presentation

Week 3 Overview, students will discuss ethical issues about data can be collected, stored and used. Students will have started a presentation to display the data they have collected (or been provided) an incorporate the content investigated during this week.

Success Criteria: Students will be able to explain their thoughts on the ethical issues arising from data collection, whether it is knowingly or unknowingly given. Students will also apply these thoughts and opinions to the data they have collected.

Teacher Notes: Priority during the teaching period is to guide student investigation on ethics surrounding data storage, collection and use, followed by presentation preparation. Students will spend at least one lesson period during this week to prepare and refine their presentation.

Resources: PPT or guided discussion or investigation will be used initiate learning. This will be followed by individual or collaborative investigation on student laptops/computers. Appropriate resources are required for presentation of Assessment Task 1. During observations, the teacher must understand how the students intend to present that information and provide of facilitate the appropriate resources.

Week 4 – Lesson Overview – Data Analysis

Lesson Outcome: Data Analysis

Week 4 Overview, students begin understanding, manipulating and understanding the data they have collected or been provided. They will be required to assess and analyse the efficacy and information that can be gained from data. Students will also be given the Assessment Task 2 outline.

Success Criteria: Students will have the tools and knowledge to analyse data. Further, will identify new ways to assess the data provided and create their own solutions to presenting the data.

Teacher Notes: Teacher will initially show students a variety of methods to analysing data and presenting it in a user-friendly manner. Then, will guide students to discover their own methods to manipulate data presentation and analysis.

Resources: Teacher will demonstrate methods through their own laptop/computer and use a projector or screen sharing to allow students to see the demonstrations.

Week 5 – Lesson Overview – Evaluating Data

Lesson Outcome: Evaluating Data

Week 5 Overview, students will develop methods to analyse the data provided and interpret information gained from their observations.

Success Criteria: Students will continue to analyse the information that is obtained from the data set and investigate various ways they can manipulate the data so it can be used and displayed for their own needs. Students will be required to submit a draft or working document to demonstrate their progress toward Assessment Task 2.

Teacher Notes: This teaching period will require students to work independently and collaboratively, assisted with teacher guidance toward Assessment Task 2. Teacher will be required to demonstrate or give examples of how data sets can be interpreted and the information that can be gained from raw data.

Resources: Students will need access to the classroom with computers, internet and intranet access.

Week 6 – Lesson Overview – Producing User Friendly Data

Lesson Outcome: Producing User Friendly Data

Week 6 Overview, this week students will be shown some methods to display data in a user-friendly manner.

Success Criteria: Students will be able to creatively identify ways to display the information that is drawn from the data set that is easily understood by a target audience.

Teacher Notes: Priority during this teaching period is to provide students the tools and methods to display data analysis, so that they can create their own solution to Assessment Task 2.

Resources: Students will need access to the classroom with computers, internet and intranet access. Students will also need to be able to present their presentations.

Lesson Plan Weeks 3

Lesson 3.1 Ethics of Data Collection, Storage and Use

Demographic of Lesson

Year Level:	**11**	**Length of lesson in minutes:**	**45**
Topic/Theme:	**Ethics of Collection, Storage and Use of Personal Data**		
Curriculum Learning Area:	**Digital Technologies**		
Focus Area:	**Data analytics**		
General Capabilities:	**Literacy** Students will be required to demonstrate their understanding of written, spoken, multimodal information regarding the content. They will be required to demonstrate their comprehension of this information through Assessment Task 1. Information and Communication Technology Capability Students will investigate the content theme through ICT devices and create a multimodal presentation. They will also be required to apply social and ethical protocols they have been learning, with the use of the data they have collected. Critical and Creative Thinking Students will evaluate the concepts initially introduced by the teacher, then critically analyse these concepts, whilst conducting their own investigation. Ethical Understanding Students will focus on recognising and exploring ethical concepts through this lesson and the teaching period. Students will evaluate the rights and responsibilities of individuals and organisations when collecting, storing and using data, in particular, personal data. They will discuss the risks associated with broad capture of data. Personal and Social Capability Students will be able to reflect on their interactions with other, when they collected data and how that interaction may have affected others. Further, through Assessment Task 1, students will be required to work collaboratively, therefore requiring management of individual and group needs.		
Learning Intention (objective)	**Students are learning:** Ethics of Collection, Storage and Use of Personal Data		
Success Criteria (assessment):	**Students will be able to:** • **Understand basic ethical concepts of data use** • **Conduct their own investigation of ethical issues from data usage** • **Review their own digital footprint and how it may be used**		

Lesson Sequence:

Timings:	Teacher Activity:	Student Activity:	Resources/Notes
	Preliminaries:		
5 min	Confirm attendance, all students have access to a computer and can view the projector. (This should be unchanged from previous lessons.)	Students will either start up their laptop or login to their workstation.	Confirm and review PPT prior to lesson. Check links and references etc.
	Introduction (Beginning):		
10 min	Ask the students what they think Ethics mean, in broader society. Then direct it toward how it relates to personal data/information. Examples: Strava Privacy Controls do not provide privacy zones like Garmin Connect. Use of Strava by Military personnel on operations. Link	Students will be directed toward the projector for the introduction of this lesson.	PPT used to provide information to prompt student learning and investigation.
	Lesson Body (Middle)		
20 min	Students are directed here to conduct their own investigation on how Ethics applies to data collection/use/storage, but specifically toward Assessment Task 1.	Students can conduct the investigation individually or in their project groups, to collaborate and discuss issues they may have found. Investigation will be primarily online.	Key questions may be provided to prompt students toward guided discovery. Key words to aid investigations: data, breach, protection, personal, privacy, responsibility
	Key Ideas to Investigate: Personal data Unknowing collection Responsibilities Organisational Data	Students are not required to view every website, or any of the provided links.	Links to prompt or guide investigation. Harvard Business School - Data Ethics Introduction to Data Ethics Cyber.gov.au Australian Cyber Security Centre Australian Information

			Commissioner - Data Breaches Biggest Data Breaches for the 21st Century
5 min	Begin to discuss openly with all students on what they found during their investigation. How it applies to them, others and their Assessment Task.	Students should be actively participating in discussion and presenting their findings. If they don't have sufficient information, this discussion may provide other answers and opinions and guide further investigation.	Be prepared to collate discussion points and provide them on the projector.
	Conclusion/Summary (End)		
5 min	Summarise some ethical issues associated with data capture. Relate what was investigated to the Assessment Task.	Consider how their own digital footprint can be used/abused.	This investigation will continue in the next period, in support of completing Assessment Task 1.

Reflection/Notes:

How do you know if the lesson went well?	Did students engage with the concepts? Did students actively investigate? Did students choose to work individually or collaboratively? What answers were not expected from students?

Resources

Links to prompt or guide investigation.
Harvard Business School - Data Ethics Introduction to Data Ethics
Cyber.gov.au Australian Cyber Security Centre
Australian Information Commissioner - Data Breaches
Biggest Data Breaches for the 21st Century

Appendix List

1. Stage 1 Digital Technologies LAP - Data collection and analytics
2. Assessment Task 01 - Data Collection and Analytics

References

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