Unpacking the Digital Solutions subject report 2021

Internal assessment

Presenters

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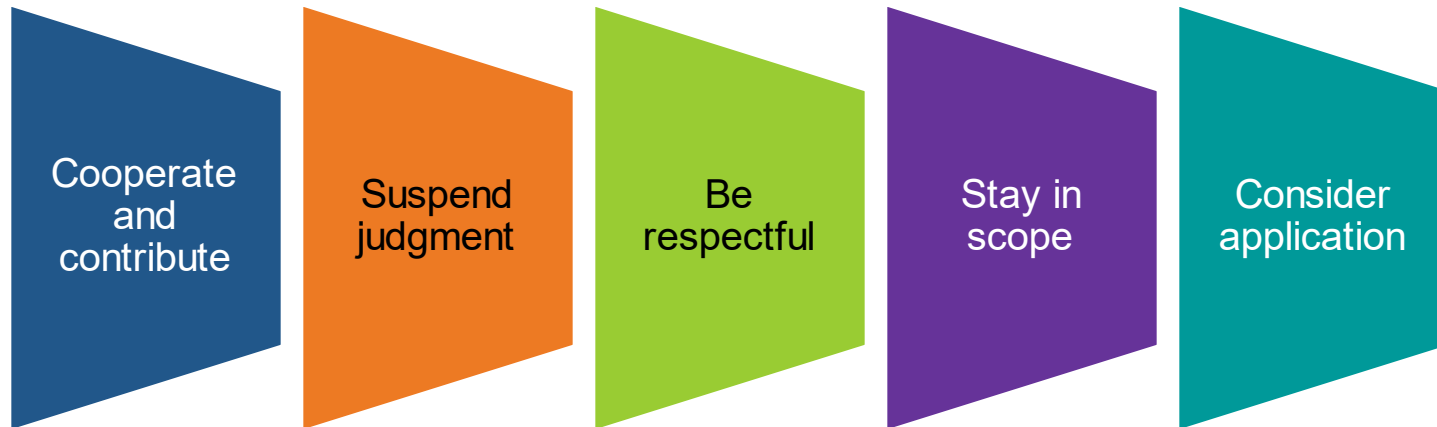Principal Education Officer, Technologies Learning Area Unit

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Norms

Cooperate and contribute

Suspend judgment

Be respectful

Stay in scope

Consider application

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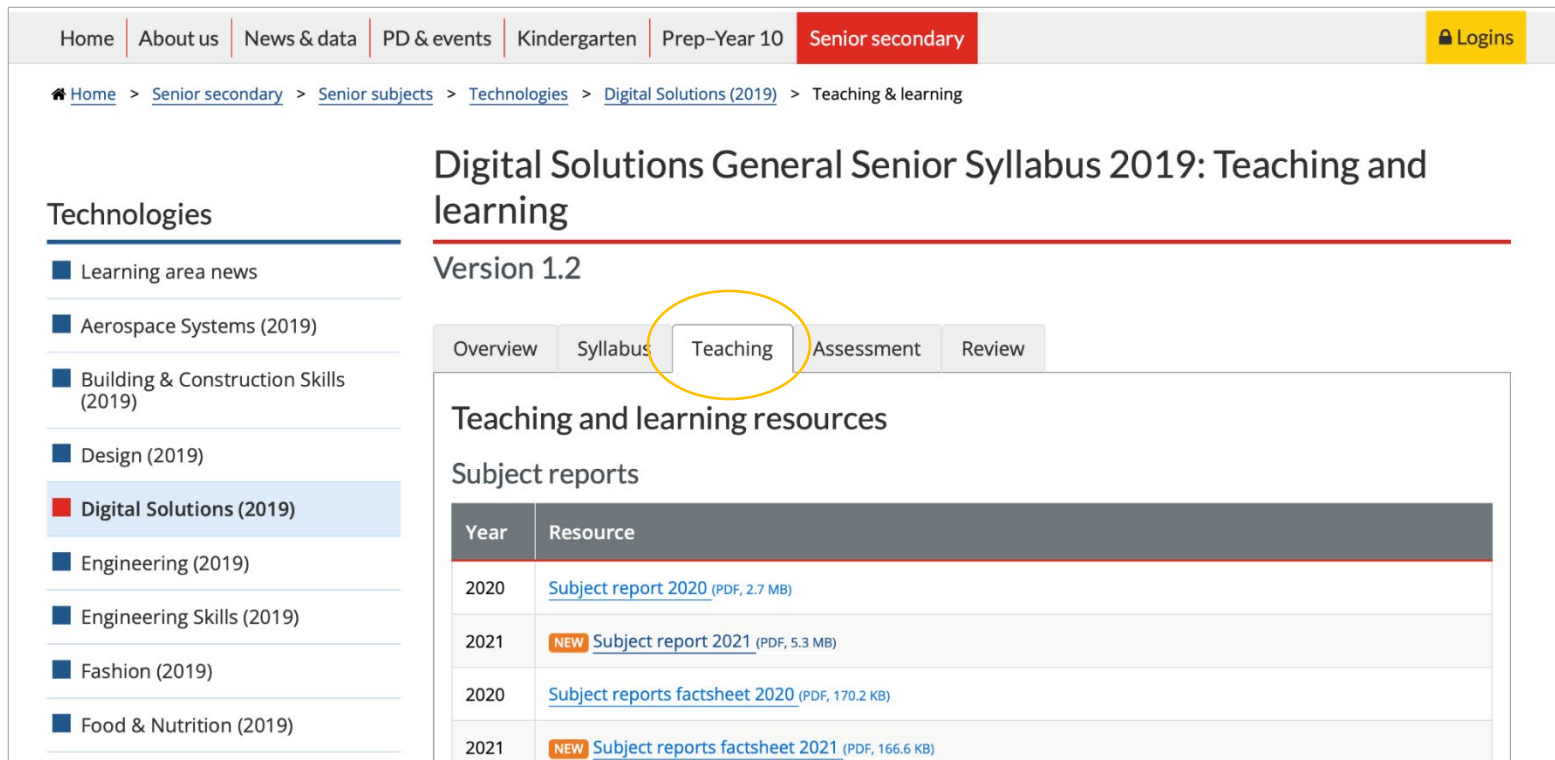
Learning goals

Learn how to use the QCAA Digital Solutions subject report to inform teaching and assessment practice.

Success criteria

You will know you are successful if you can reflect purposefully on the information provided in the subject report to determine how you can improve your school's internal assessment in Digital Solutions.

Locating the subject report

The purpose of the subject report

2021 summative assessment cycle key outcomes:

- Quality assurance: Endorsement and Confirmation
- External assessment results

- Effective practices and practices to strengthen
  - Internal assessment
    - Assessment design (validity, accessibility)
    - Assessment decisions (reliability)
  - External assessment
    - Teaching and learning
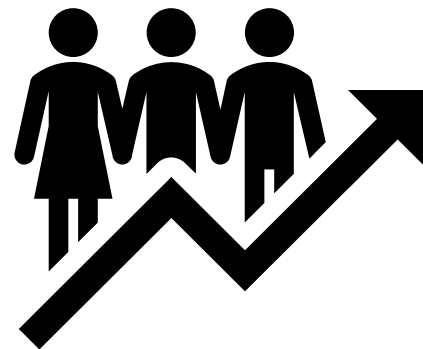
Structure of the webinar

CELEBRATE   UNPACK   REFLECT   STRENGTHEN   QUESTIONS

Internal assessment

Percentage of instruments endorsed in Application 1

Number of instruments submitted	IA1	IA2	IA3
Total number of instruments	184	184	175
Percentage endorsed in Application 1	28%	45%	28%

Number of samples reviewed and percentage agreement

IA	Number of schools	Number of samples requested	Number of additional samples requested	Percentage agreement with provisional marks
1	174	921	128	68.97%
2	174	892	113	65.52%
3	174	909	106	72.99%

IA1: Investigation — technical proposal (20%)

Assessment design: Validity and accessibility

Assessment priorities in assessment instruments featured:

Effective practices

- assessable evidence aligned with syllabus
- a range of appropriate authentication strategies
- clear and concise task instructions
- contexts authentic to student experience.

Practices to strengthen

- single, specific technology context
- limit scope and scale of stimulus datasets
- use syllabus language
- provide relatable contexts.

IA1: Investigation — technical proposal (20%)

Assessment decisions: Accuracy and consistency

The match of evidence revealed some effective practices and practices that need strengthening:

Effective practices

- matching individual elements of evaluation
- matching communication characteristics.

Practices to strengthen

- symbolisation of algorithms
- synthesis of relevant information and ideas to determine …
- referencing
- sufficient information about variations to responses.

For all Queensland schools

IA1: Investigation — technical proposal (20%)

Assessment decisions

The student work has the following characteristics:	Marks
• coherent and logical synthesis of relevant information and ideas to determine data elements, user interface and algorithm components for digital solutions • purposeful generation of a technical proposal for relevant user interfaces and algorithm components of the low-fidelity non-coded prototype digital solution • critical evaluation of impacts, components and low-fidelity prototypes against effective prescribed and self-determined criteria to make refinements and astute recommendations justified by data.	5–6
• simple synthesis of information and ideas to determine possible data elements, user interface and algorithm component[s] • adequate generation of a [...] of the low-fidelity non-cod[...] • feasible evaluation of imp[...] and self-determined criter[...] data.	

The student work has the following characteristics:	Marks

• discerning decision-making about, and fluent use of
  – written, visual and/or spoken features to communicate about a solution
  – language for a technical audience
  – grammatically accurate language structures
  – referencing and investigation conventions.
	2–3

• variable decision-making about, and inconsistent use of
  – written, visual and/or spoken features
  – suitable language
  – grammar and language structures
  – referencing or investigation conventions.
	1

• does not satisfy any of the descriptors above.	0

Effective practices

- matching individual elements of evaluation
- matching communication characteristics

IA1: Investigation — technical proposal (20%)
Assessment decisions

The student work has the following characteristics:	Marks
• accurate and discriminating recognition and discerning description of data sources, programming elements, user-interface components and useability principles • adept symbolisation of algorithms and user interfaces and discerning explanation of ideas and interrelationships between proposed data structures and user experiences of the identified problem.	4–5

System inter-relationships and programming features (Unit 3, Topic 1)

symbolise, explain and use advanced data processes, including table joins, referential integrity, redundancy reduction and anomaly updating

System inter-relationships and programming features (Unit 3, Topic 2)

symbolise well-ordered and unambiguous algorithms using pseudocode for
- procedural code that processes data for insertion into a database or manipulates or displays retrieved data
- user interaction, data validation and data presentation

Practices to strengthen

- symbolisation of algorithms
- synthesis of relevant information and ideas to determine…
- referencing
- sufficient information about variations to responses

Adept: very/highly skilled or proficient at something; expert

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IA1: Investigation — technical proposal (20%)

Excerpt 1

User interaction

Retrieval

Presentation

Validation

ALGORITHMS

Displaying hotpot exclamation mark pins on the map after a starting and destination address has been entered.

```
START
    CONNECT TO googleMaps API
    SET startingAdress = [startAddress]FROM form
    SET destination = [destination] FROM form
    GET route[] = GENERATE route using google API
    GET hazards[] = RETRIEVE hazards from the route

    OUTPUT route overlayed on the map

    SET i = 0

    FOR i < hazards[].length
        IF ((SELECT latitude, longitude FROM
        crash_overview WHERE latitude =< location on
        route AND longitude =< location on route)) > 5)
        THEN
            OUTPUT exclamation pin overlayed on map
        END IF
    NEXT i
END
```

Example SELECT Statement

SELECT latitude, longitude FROM Crash_Overview
WHERE longitude >= route AND latitude >= route

Example SQL Statement
(Includes group by, having and an aggregate function)

SELECT crash_overview.latitude, crash_overview.longitude,
crash_overview.Nature_ID, location.suburb
FROM Crash_Overview
INNER JOIN location ON crash_overview.crash_ref_num =
location.crash_ref_num
WHERE longitude >= route AND latitude >= route //('route' will
be replaced with actual coordinates)
GROUP BY Nature_ID HAVING sum(location.street > 5) *// 5 is
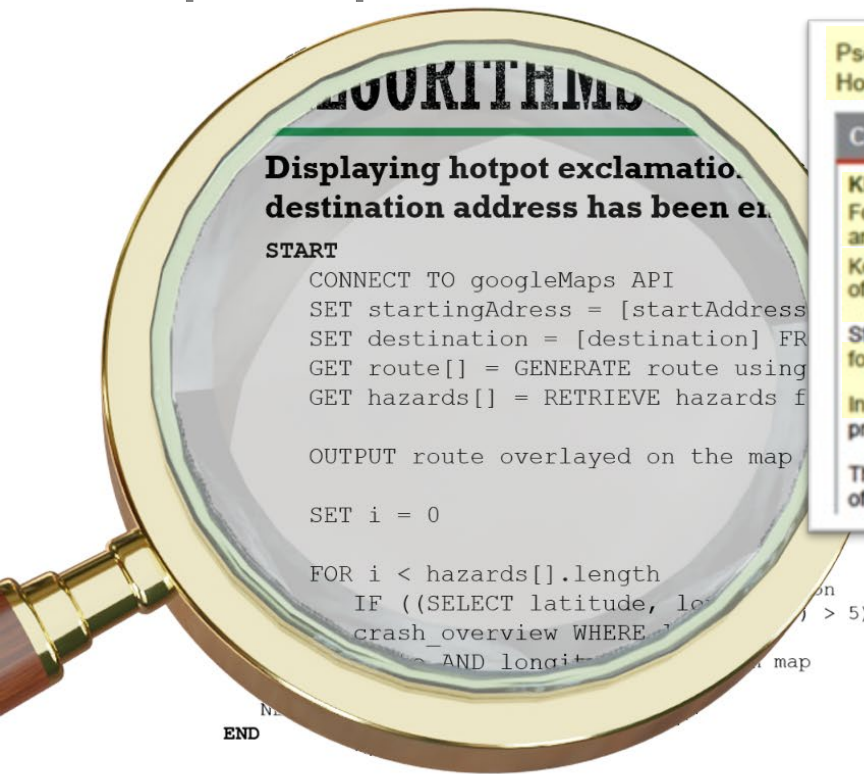the minimum number of crashes for a hotspot to be recorded*

For all Queensland schools

IA1: Investigation — technical proposal (20%)
Sample response

Pseudocode does not have a standard format and varies from programmer to programmer. However, a number of conventions are generally used.

Conventions for writing pseudocode

KEYWORDS are written in bold capitals and are often words taken directly from programming languages. For example, IF, THEN and ELSE are all words that can be validly used in most languages. **OUTPUT** and **COMPUTE** are from the language COBOL and **WRITE** is from the language Pascal.

Keywords do not have to be valid programming language words as long as they clearly convey the intent of the line of pseudocode.

Statements that form part of a **REPETITION LOOP** are indented by the same amount to indicate that they form a logical grouping.

In a similar way, IF, **THEN** and ELSE statements are indented to clearly distinguish the alternative processing paths.

The end of **REPETITION LOOPS** and IF, **THEN** and ELSE statements are explicitly indicated by the use of **ENDWHILE** and **ENDIF** at the appropriate points.

Displaying hotpot exclamatio. destination address has been en.

```
START
    CONNECT TO googleMaps API
    SET startingAdress = [startAddress
    SET destination = [destination] FR
    GET route[] = GENERATE route using
    GET hazards[] = RETRIEVE hazards f

    OUTPUT route overlayed on the map

    SET i = 0

    FOR i < hazards[].length
        IF ((SELECT latitude, lo
    crash_overview WHERE
            AND longit
```

INNER JOIN location ON crash_overview.crash_ref_num = location.crash_ref_num
WHERE longitude >= route AND latitude >= route //('route' will *be replaced with actual coordinates*)
GROUP BY Nature_ID HAVING sum(location.street > 5) // *5 is the minimum number of crashes for a hotspot to be recorded*

(syllabus, section 1.2.5)
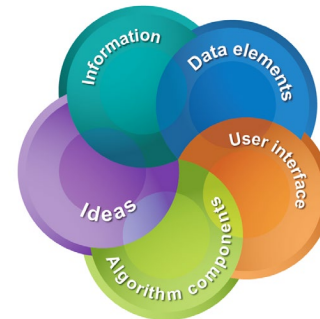
IA1: Investigation — technical proposal (20%)
Assessment decisions

The student work has the following characteristics:	Marks
• coherent and logical synthesis of relevant information and ideas to determine data elements, user interface and algorithm components for digital solutions • purposeful generation of a technical proposal for relevant user interfaces and algorithm components of the low-fidelity non-coded prototype digital solution • critical evaluation of impacts, components and low-fidelity prototypes against effective prescribed and self-determined criteria to make refinements and astute recommendations justified by data.	5–6
• simple synthesis of information and ideas to determine possible data elements, user interface and algorithm components for digital solutions • adequate generation of a technical proposal for some user interfaces and algorithm components of the low-fidelity non-coded prototype digital solution • feasible evaluation of impacts, components and low-fidelity prototypes against some prescribed and self-determined criteria to make refinements and fundamental recommendations justified by data.	3–4
• rudimentary synthesis of information or ideas to determine possible data elements, user interface and algorithm components for digital solutions • generation of elements of the low-fidelity non-coded prototype digital solution • superficial evaluation of impacts, components or low-fidelity prototype against criteria.	1–2
• does not satisfy any of the descriptors above.	0

Practices to strengthen

- symbolisation of algorithms
- synthesis of relevant information and ideas to determine …
- referencing
- sufficient information about variations to responses

IA1: Investigation — technical proposal (20%)
Assessment decisions

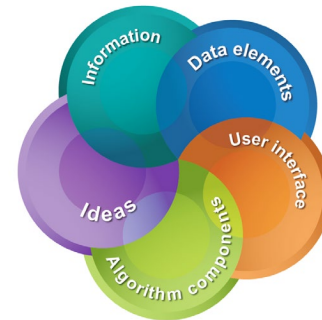| The student work has the following characteristics:	Marks
• coherent and logical synthesis of relevant information and ideas to determine data elements, user interface and algorithm components for digital solutions • purposeful generation of a technical proposal for relevant user interfaces and algorithm components of the low-fidelity non-coded prototype digital solution • critical evaluation of impacts, components and low-fidelity prototypes against effective prescribed and self-determined criteria to make refinements and astute recommendations justified by data.	5–6
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• does not satisfy any of the descriptors above.	0

For advice about difficult decisions, email:

DigitalSolutions@qcaa.qld.edu.au

Practices to strengthen

- symbolisation of algorithms
- synthesis of relevant information and ideas to determine …
- referencing
- sufficient information about variations to responses

IA1: Investigation — technical proposal (20%)

Assessment decisions

The student work has the following characteristics:	Marks
• discerning decision-making about, and fluent use of – written, visual and/or spoken features to communicate about a solution – language for a technical audience – grammatically accurate language structures – referencing and investigation conventions.	2–3

The investigation will include referencing conventions using a recognised system of referencing.

The investigation will include the following assessable evidence:

• recognition and description of

Conditions

- Length: multimodal presentation, 9–11 minutes
- Other:
  - the reference list is not included in the presentation time
  - schools implement authentication strategies that reflect QCAA guidelines (see Section 1.3.2).

Practices to strengthen

- symbolisation of algorithms
- synthesis of relevant information and ideas to determine …
- referencing
- sufficient information about variations to responses

IA1: Investigation — technical proposal (20%)

Assessment decisions

> **❗ Important**
>
> Apply for variation where the student response, or part thereof:
>
> - is unavailable for upload (e.g. lost or inaccessible)
> - is incomplete (i.e. missing components or elements required in the confirmation submission information).

Reason for request *

○ The school cannot submit a response for this student

○ The school can provide some evidence of a response for this student

Provide details *

Note: only 0:00 – 11:00 marked 11:01 onwards redacted.

* Video does not contain sound

IA2: Project — digital solution (30%)

Assessment design: Validity and accessibility

Assessment priorities in assessment instruments featured:

Effective practices

- a technical proposal attached as a PDF, with headings and language aligned to syllabus

- accessible user personas.

Practices to strengthen

- reference an external data source

- scope and scale of problem-solving required for a particular problem

- technology context aligned with IA1

- repetition of instructions

- use of jargon

- scaffolding.

IA2: Project — digital solution (30%)

Assessment decisions: Accuracy and consistency

The match of evidence revealed some effective practices and practices that need strengthening:

Effective practices

- generation of user interfaces and programmed components

- individual elements of evaluation.

Practices to strengthen

- recognition and description of all elements (this is not 'define')

- contextualisation of response

- use of annotations/code comments

- recognised referencing style including in-text.

IA2: Project — digital solution (30%)

Assessment decisions: Accuracy and consistency

The project will include the following assessable evidence:

- recognition and description of
  - programmed and user-interface components
  - useability principles, including accessibility, effectiveness, safety, utility and learnability

explanation of

- internal and external data components and data structures using appropriate symbols, code, data samples and screenshots from the prototype digital solution with annotations
- the solution from a user-experience perspective communicated by way of a collection of annotated images of the user-interface components
- how programming elements and user-interface components connect communicated in an annotated diagram
- the functionality, useability and efficiency of the coded components communicated through code comments and annotations

The student work has the following characteristics:	Marks
• accurate and discriminating recognition and discerning description of relevant programming elements, user-interface components and useability principles • adept symbolisation and discerning explanation of algorithms and relevant programming information and ideas, data structures and interrelationships between user experiences and data of the digital prototype.	7–8

Practices to strengthen

- recognition and description of all elements (this is not 'define')
- contextualisation of response
- use of annotations/code comments
- recognised referencing style including in-text

Elements: constituent parts of a more complex whole

Components: made of two or more elements that make up a whole system and perform a specific function

IA2: Project — digital solution (30%)

Excerpt 2

The calculation results function is essential in displaying accurate results to all users. This algorithm is purposed with adding the greatest of two scores from a competition add them together and display all scores in descending order to all users. This algorithm is responsible for displaying accurate scoring results to generic users (parent and student), administration users and organisation users.

The student work has the following characteristics:	Marks
• accurate and discriminating recognition and discerning description of relevant programming elements, user-interface components and useability principles • adept symbolisation and discerning explanation of algorithms and relevant programming information and ideas, data structures and interrelationships between user experiences and data of the digital prototype.	7–8

Practices to strengthen

- recognition and description of all elements (this is not 'define')
- contextualisation of response
- use of annotations/code comments
- recognised referencing style including in-text

Define: state meaning and identify or describe qualities

Describe: give an account of a situation, pattern or process, characteristics or features of something

Relevant: bearing upon or connected with the matter at hand
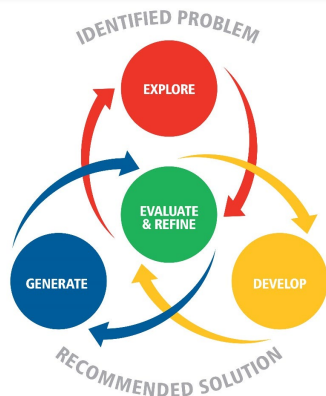
IA2: Project — digital solution (30%)
Assessment decisions: Accuracy and consistency

- explanation of
  - internal and external data components and data structures using appropriate symbols, code, data samples and screenshots from the prototype digital solution with annotations
  - the solution from a user-experience perspective communicated by way of a collection of annotated images of the user-interface components
  - how programming elements and user-interface components connect communicated in an annotated diagram
  - the functionality, useability and efficiency of the coded components communicated through code comments and annotations

IDENTIFIED PROBLEM

EXPLORE

EVALUATE & REFINE

GENERATE

DEVELOP

RECOMMENDED SOLUTION

Practices to strengthen
- recognition and description of all elements (this is not 'define')
- contextualisation of response
- use of annotations/code comments
- recognised referencing style including in-text
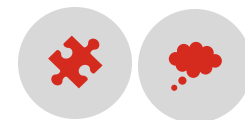
IA2: Project — digital solution (30%)
Assessment decisions: Accuracy and consistency

Description

In Digital Solutions, students document the application of the problem-solving process in response to a technical proposal document supplied by the teacher.

The project will include the following project and referencing conventions:

- headings that organise and communicate the student's thinking through the iterative phases of the problem-solving process in Digital Solutions
- a reference list and a recognised system of in-text referencing.

The project will include the following assessable evidence:

- recognition and description of
  - progra
  - useabi

- Other:
  - the reference list is not included in the page count
  - schools implement authentication strategies that reflect QCAA guidelines (see Section 1.3.2).

• variable decision-making about, and inconsistent use of
  – written and visual features
  – suitable language
  – grammar and language structures
  – referencing or project conventions.
	1–2

• does not satisfy any of the descriptors above.	0

Practices to strengthen
- recognition and description of all elements (this is not 'define')
- contextualisation of response
- use of annotations/code comments
- recognised referencing style including in-text

IA3: Project — folio (25%)

Assessment design: Validity and accessibility

Assessment priorities in assessment instruments featured:

Effective practices

- API, JSON or XML dataset
- task description aligned to Unit 4
- page count scaffolding
- spelling, grammar and technical language.

Practices to strengthen

- technical proposal as stimulus
- accessible link to sample data
- contradictory scaffolding
- list hierarchy.

IA3: Project — folio (25%)

Assessment decisions: Accuracy and consistency

The match of evidence revealed some effective practices and practices that need strengthening:

Effective practices

- description of data security processes and strategies

- generated components of the data exchange solution.

Practices to strengthen

- contextualisation of response

- adept symbolisation is about communicating subject matter

- prescribed and self-determined criteria

- internal vs external data

- sharing/displaying data.

IA3: Project — folio (25%)

Assessment decisions: Accuracy and consistency
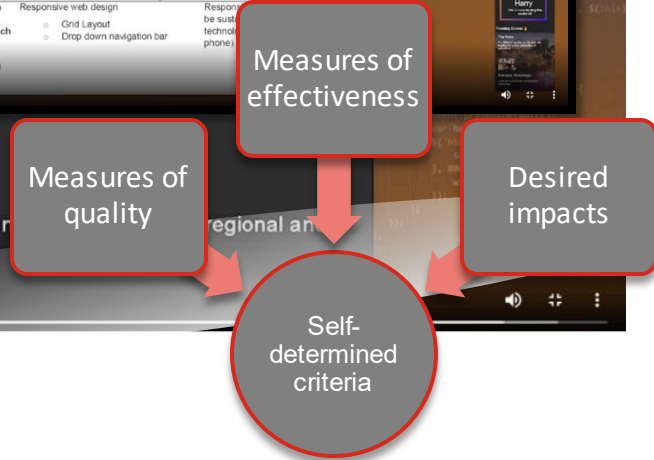
- evaluation against prescribed and self-determined criteria of the impact of data transmission on personal, social and economic needs

The student work has the following characteristics:	Marks
• coherent and logical synthesis of relevant information and ideas to determine selected data, algorithms and coded components of data exchange solutions • purposeful generation of efficient components of the data exchange solution • critical evaluation of impacts, coded components and a data exchange solution against essential prescribed and self-determined criteria to make discerning refinements of code and astute recommendations justified by data.	7–8

Practices to strengthen
- contextualisation of response
- adept symbolisation is about communicating subject matter
- prescribed and self-determined criteria
- internal vs external data
- sharing/displaying data

Criteria: characteristics by which something is evaluated or appraised. The teacher or client (prescribed) or students (self-determined) develop criteria, e.g. specific needs, identified purpose, impacts quality or effectiveness of solution.

IA3: Project — folio (25%)
Assessment decisions: Accuracy and consistency

Practices to strengthen
- contextualisation of response
- adept symbolisation is about communicating subject matter
- prescribed and self-determined criteria
- internal vs external data
- sharing/displaying data

IA3: Project — folio (25%)
Assessment decisions: Accuracy and consistency

Term	Explanation
external data	data that is from a source external to the digital solution; it includes open data, flat files, databases managed by a DBMS, data streams or logs collected from remote sensors and media collections
internal data	data that is part of the digital solution; it includes data stored in memory, entered by the user through the user interface or collected by local sensors, and may also include local files or databases created by coded components of the digital solution
data structure	a particular way of organising data in a computer so that it can be used effectively, e.g. lists, dictionaries, arrays and objects; the aim is to reduce the space and time complexities of different tasks

- generate
  - a well-ordered and unambiguous algorithm to solve defined problems using pseudocode
  - a prototype digital solution that uses appropriate data structures including JSON or XML, to exchange data
- manipulate data from an external source

Does your task provide opportunity for students to demonstrate JSON or XML formatted data?

Practices to strengthen
- contextualisation of response
- adept symbolisation is about communicating subject matter
- prescribed and self-determined criteria
- internal vs external data
- sharing/displaying data

IA3: Project — folio (25%)

Assessment decisions: Accuracy and consistency

- determination of prescribed and self-determined criteria
- synthesis of data, algorithm and coded component ideas to generate components of a data exchange solution that simulates the exchange of data between two digital systems; the solution will receive data in one format and programmatically transform it into another format for sharing/displaying

- evaluation of the
  - accuracy of code after testing to identify errors and actions to make improvements
  - digital data exchange solution against prescribed and self-determined criteria
  - functionality, useability and efficiency of the components of the digital solution
- make refinements and justified recommendations for current and future improvements.

The student work has the following characteristics:	Marks
• coherent and logical synthesis of relevant information and ideas to determine selected data, algorithms and coded components of data exchange solutions • purposeful generation of efficient components of the data exchange solution • critical evaluation of impacts, coded components and a data exchange solution against essential prescribed and self-determined criteria to make discerning refinements of code and astute recommendations justified by data.	7–8

Practices to strengthen
- contextualisation of response
- adept symbolisation is about communicating subject matter
- prescribed and self-determined criteria
- internal vs external data
- sharing/displaying data

Useability principles: principles used to improve the user experience

Reflection

Contact details

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For all Queensland schools