ANIT:

Hello!
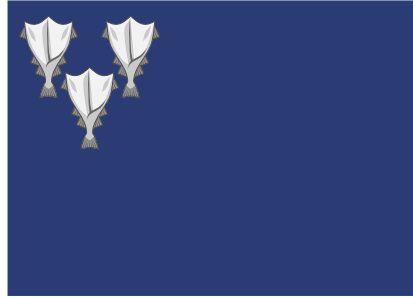
Welcome to our presentation for OCCE 2021. Andrew and I will be talking about proposed changes to the curriculum in Australia.

What did the Vikings ever do ... for Australia?

ANDREW:

We wanted to establish some rapport at the start of our 10 minute presentation…

Jørgen Jørgensen

Iceland's first flag

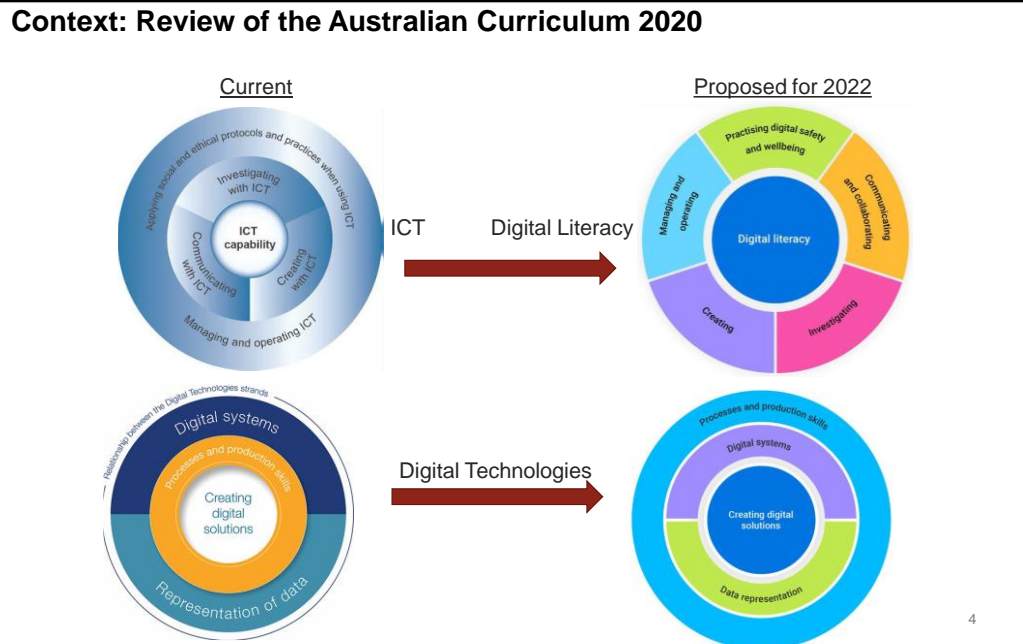1801 – helped found Hobart, capital of Tasmania, island state of Australia

June-August 1809 – (King) Protector of Iceland

1826-41 Retired to Tasmania, married and died

3

ANDREW:

Jørgen Jørgensen was actually Danish, but was an important historical figure linking Scandinavia and Tasmania…. Recent archeological diggings may shed more light on these links.

Context: Review of the Australian Curriculum 2020

Current — Proposed for 2022

ICT → Digital Literacy

Digital Technologies

4

ANIT:

So, now onto the main focus of our presentation. We will talk about recent relevant activity in Australia, then turn immediately to the four questions at the focus of this symposium.

As you can see, computers are part of the Australian Curriculum in two different ways. At the top you can see the general capability, where computers are used to enhance learning in every subject. It is proposed to rename this from ICT (information and communications technology) to Digital Literacies.

Below, you can see the discrete Digital Technologies subject in which students create digital solutions. This corresponds to Informatics or Computer Science. Digital Technologies is provided for all students from Kindergarden to Year 8. It is only optional for Years 9-12.

ANDREW:

So, in Australia, what are the drivers for the separate Digital Technologies subject?

1. As a national curriculum was recently developed, it was always planned the Technology learning area would have two parts: conventional and digital parts.
2. However, the ICT general capability was released some years earlier, which confused teachers, schools and parents.
3. Despite the general ICT capability becoming accepted in 2014, the specific Digital Technologies subject did not become available until two years later.
4. The Digital Technologies subject in Australia corresponds to Informatics, computer science or Computing in the UK.
5. The drivers for Digital Technologies are economic, environmental, social and personal activation for students.

Symposium Q2: How do students learn the core concepts?

Country	Curriculum subject	Proportion of direct coding content
Australia (proposed 2022)	Digital Technologies [F-8]	8%
Australia (current)	Digital Technologies [F-8]	14%
Singapore	Computer Applications [Secondary 1-4]	17%
India	ICT [Years 6-8]	18%
England	Computing [Years 1-11]	27%
New Zealand	Technology – Digital Technologies [Years 1-13]	28%
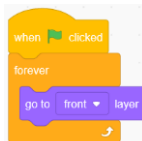
```
18  # puts the numbers in order
19  data.sort()
20  print("\n\nHere's the list in numerical order:\n", data)
21  # work out the median
22  oddness = length%2
23  half = length//2
24  if oddness == 1:
25      print("The median is:", data[half])
```

```java
public class Main {
    public static void main(String[] args) {
        System.out.println(Math.random());
    }
}
```

| Beebot | Scratch | Python | Java |

6

ANIT:

First of all, the Australian Digital Technologies curriculum has a much smaller proportion of coding than international comparison countries. It is proposed this will become even less in the proposal for 2022.

In Australia, pre-coding activities are found in Foundation/Kindergarden, then visual coding is taught from Year 3 onwards.

General-purpose programming languages like Python are taught in Years 7-8, and optional classes in object-oriented languages like Java are available in Years 9-10.

Symposium Q3: How to incorporate innovations like AI & ML?

• Robotics is found in 56% of Australian schools

• Artificial intelligence in 17% of schools

• Some opportunities to think about implications of AI in the curriculum – only one to use AI.

• Non-deterministic computing is not a prominent feature of the Digital Technologies curriculum
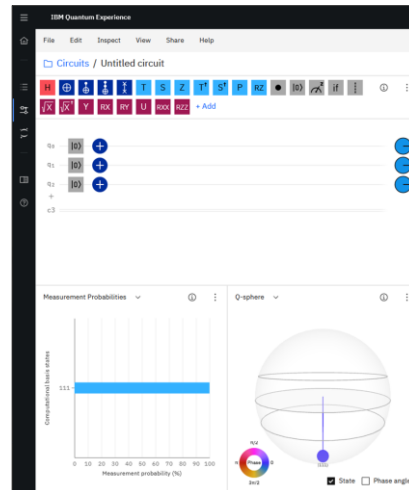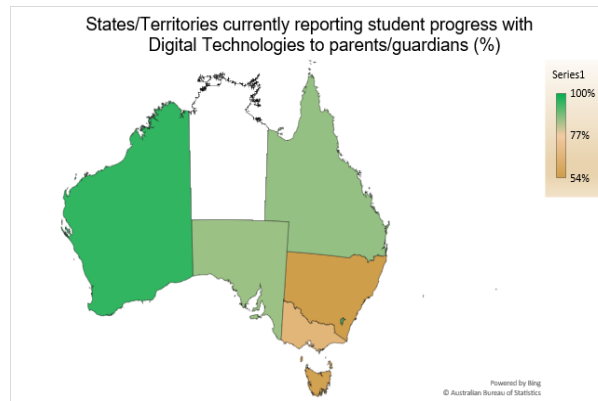
Quantum score and output

ANDREW:

Artificial Intelligence is taught in some Australian schools. The proposed curriculum for Digital Technologies has several examples where the use of AI can be discussed – for instance, in face recognition.

However, there is only one place where students might be expected to work with such a system – in Year 10, where the subject becomes an option instead of part of the mainstream curriculum.

Quantum Computing is taught in virtually no Australian schools.

Symposium Q4: Relationship between Digital Technologies & ICT?

• The Digital Technologies subject has not been implemented uniformly across Australia

States/Territories currently reporting student progress with
Digital Technologies to parents/guardians (%)

Series1
100%
77%
54%

Powered by Bing
© Australian Bureau of Statistics

• About 50% of the tools and websites used for Digital Technologies are actually suited to ICT instead.

8

ANIT:

A recent survey of schools showed the Digital Technologies subject is best reported to parents in Western Australia. Only about half the schools in two other states say student achievement in the subject is reported to parents. The Northern Territory appears blank in this graphic because too few schools took part in the survey.

This variation is probably due to different funding arrangements in the different states, and political priorities.

There is a lot of confusion about the differences between the specialised subject of Digital Technologies, and the use of computers to enhance learning across the curriculum. The latter is currently called the ICT general capability, but is likely to be renamed as Digital Literacies. This name change will probably increase the confusion.

Summary

- Granularity

- Coding – a small proportion

- A clear sequence for coding, starting at age 5 with small robots, then visual programming at age 9 (Year 3)

- Non-deterministic computing: some AI/ML, but little quantum scoring

9

ANDREW:

In our paper we have looked more closely at the proposed changes to the Australian Digital Technologies subject.

The proposed curriculum for 2022 breaks the subject down into many more smaller components. We think this is because so many teachers are unfamiliar with the subject, they need the learning outcomes to be described more clearly.

Coding is a much smaller section of the subject in Australia than in most other countries. We would be interested to hear your thoughts on this – is it a good or a bad idea?

Artificial Intelligence examples are found from age 7, but real engagement is not until age 15 when the subject is optional. Quantum computing is not written into the curriculum.
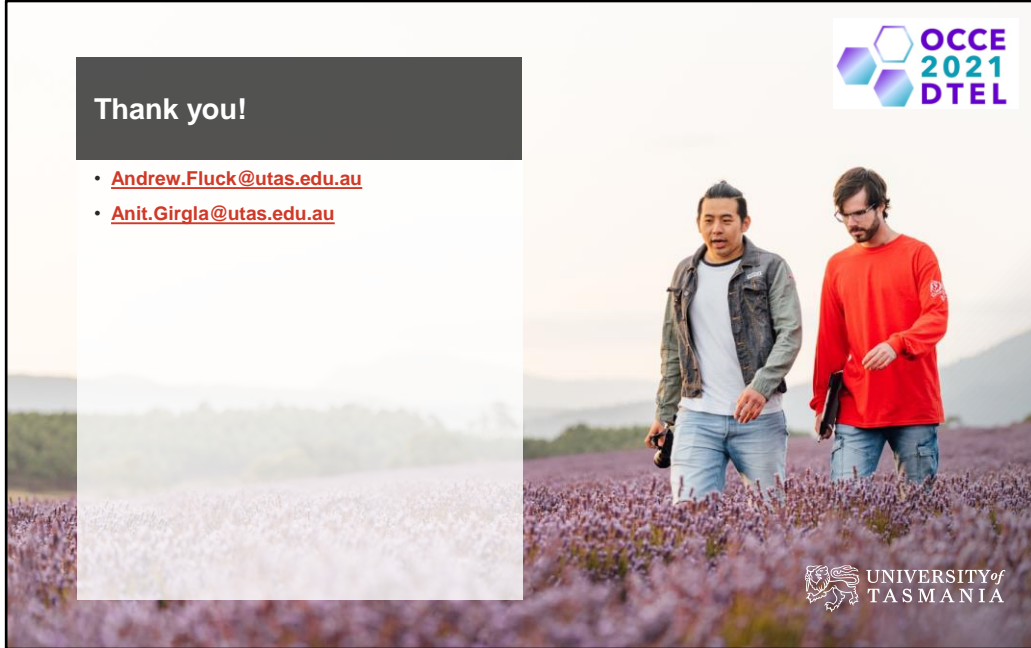
ANIT:

Thank you very much for listening to our presentation. We look forward to comments and discussion.