PDST
Professional Development Service for Teachers | An tSeirbhís um Fhorbairt Ghairmiúil do Mhúinteoirí

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An Roinn Oideachais
Department of Education

National Workshop 4

Day 1 (of 2)

LEAVING CERTIFICATE
COMPUTER SCIENCE

Schedule

Session 1	Computers and society I
11.30 - 12.00	Tea/Coffee
Session 2	Algorithms II
13.30 – 14.30	Lunch
Session 3	Computer systems III

Key Messages for NW4

There are many ways to use the LCCS specification.

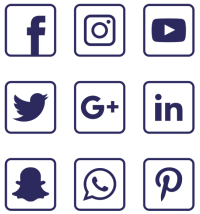
The study of Computers and Society is one of the overarching principles of LCCS.

LCCS can be mediated through a constructivist pedagogical approach.

ALTs

ALTs provide an opportunity to teach theoretical aspects of LCCS.

Critical reflection will be a central component of the student experience and the LCCS teacher's PD journey.

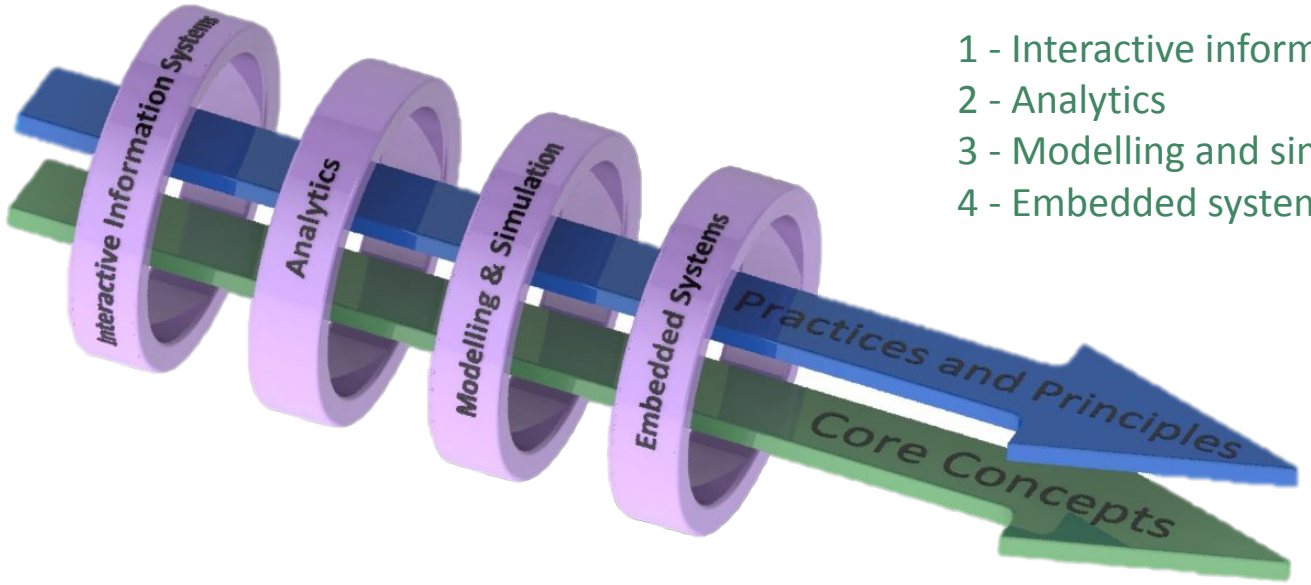


Digital technologies can be used to enhance collaboration, learning and reflection.

LCCS Interwoven

The four applied learning tasks explore the four following contexts:

1 - Interactive information systems
2 - Analytics
3 - Modelling and simulation
4 - Embedded systems.



Key to remember:

Explore and teach the LOs through the lens of ALTs.

Recap on National Workshop 3

Computer Systems

Computational Thinking

Unplugged Activities

Introduction to Algorithms

Algorithms for ALT2
(mean, median and mode)

ALT2 Analytics

NCCA Resources for ALT2

ASCII and Number Systems

PC part picker activity

Hitomezashi Stitching

Hypothesis

Python Libraries for ALT2

ALT2 Investigate, Plan, Design

Curriculum Planning

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NW4 Session 1

Computers and society I

Session Overview

Section 1	Introduction to computers and society
Section 2	Introducing *Stimulate a debate*
Section 3	Group activity (*Stimulate a debate*)

By the end of this session participants will have…

gained a deeper understanding of *Strand 1: Computers and Society* (including the LOs)

explored some strategies and ideas on teaching and learning this section of the course

gained a deeper understanding of how to *Stimulate a Debate* in a classroom using the four-step process

experienced the *Stimulate a Debate* via a group activity and, in doing so, appreciate the benefits of this approach

reflected on how to teach aspects of this section of the course via group activity debrief

Strand 1: Practices and principles

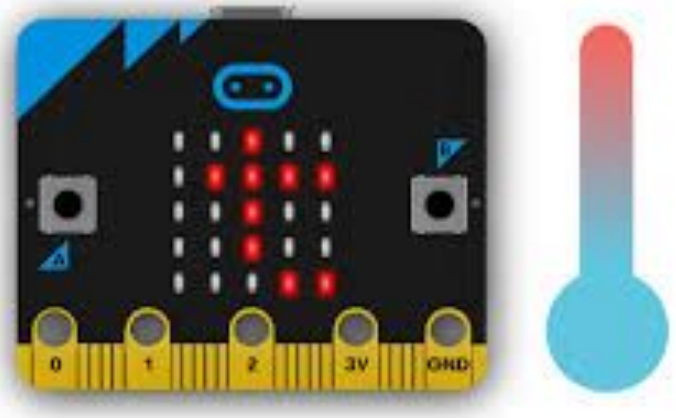
Strand 1: Practices and principles	Strand 2: Core concepts	Strand 3: Computer science in practice
▸ Computers and society ▸ Computational thinking ▸ Design and development	▸ Abstraction ▸ Algorithms ▸ Computer systems ▸ Data ▸ Evaluation/Testing	▸ Applied learning task 1 - Interactive information systems ▸ Applied learning task 2 - Analytics ▸ Applied learning task 3 - Modelling and simulation ▸ Applied learning task 4 - Embedded systems

"The practices and principles of computer science describe the behaviours and ways of thinking that computationally-literate students use to fully engage in a data-rich and interconnected world."

"Studying the role of computers in society will enhance students' attitudes towards computer science and make it more meaningful and relevant."

LCCS Interwoven

S3 - ALT 4



S1 - Computers and Society

S1 - Designing and Developing

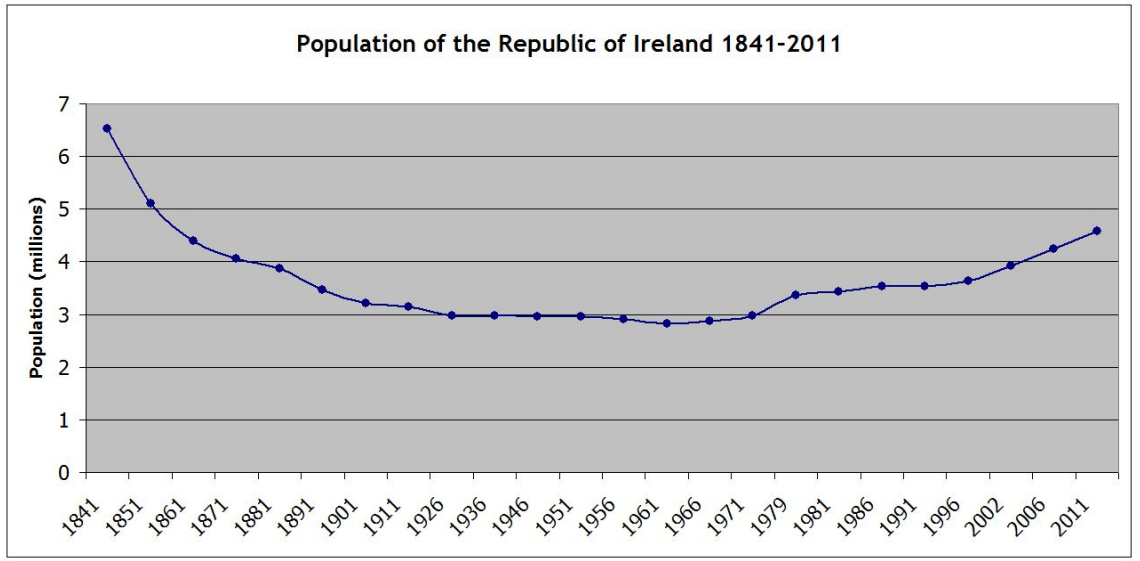
S1 - Computational thinking

S2 - Computer Systems

S2 - Evaluation and Testing

LCCS Interwoven

S3 - ALT 2



S1 - Computers and Society

S1 - Designing and Developing

S1 - Computational thinking

S2 - Data

S2 - Abstraction

S2 - Evaluation and Testing

S1: Computers and society
Students learn about:

Social and ethical considerations of computing technologies

Machine learning

Artificial intelligence

User-centred design

The Internet

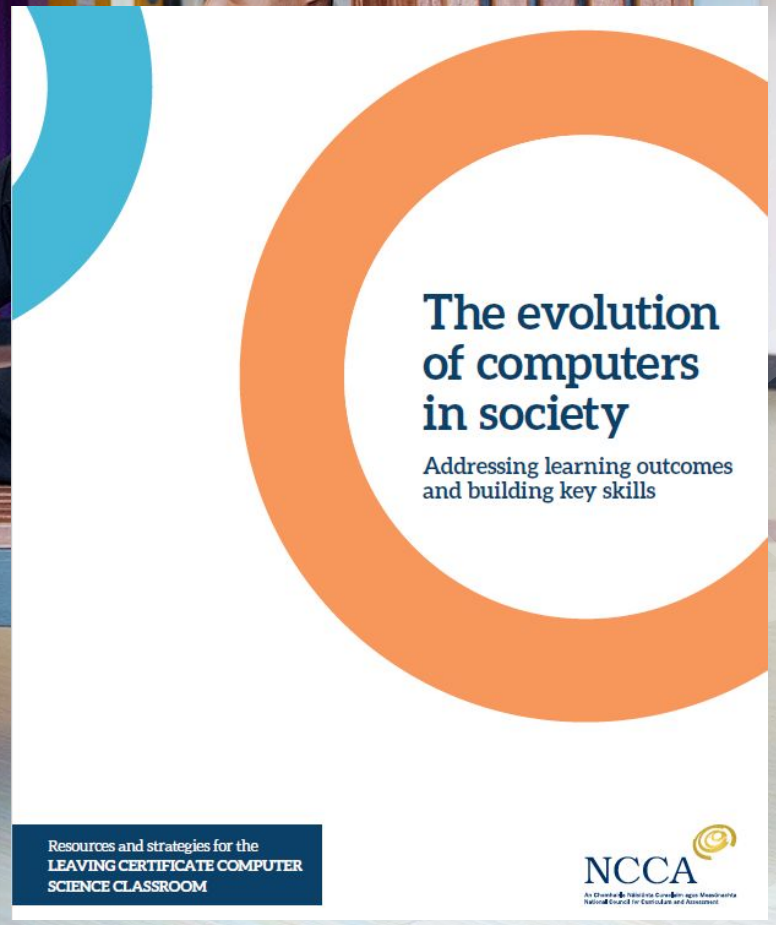
Turing machines

Students should be able to:

1.11 - discuss the complex relationship between computing technologies and society including issues of ethics
1.12 - compare the positive and negative impacts of computing on culture and society
1.13 - identify important computing developments that have taken place in the last 100 years and consider emerging trends that could shape future computing technologies
1.14 - explain when and what machine learning and AI algorithms might be used in certain contexts
1.15 - consider the quality of the user experience when interacting with computers and list the principles of universal design, including the role of a user interface and the factors that contribute to its usability
1.16 - compare two different user interfaces and identify different design decisions that shape the user experience
1.17 - describe the role that adaptive technology can play in the lives of people with special needs
1.18 - recognise the diverse roles and careers that use computing technologies

NCCA - The evolution of computers in society

This booklet provides a chronologically structured series of detailed resources and learning plans aimed at supporting LCCS teachers as they explore the topic of Computers and Society with their students.



Stimulate a Debate strategy

We are now going to look at the *Stimulate a Debate* strategy as a pedagogical tool suited to the LCCS classroom.

We will:

1. define the strategy and the reasons for utilising it in your class
2. quickly walk through a sample *Stimulate a Debate* lesson
3. break into groups and examine specific *Stimulate a Debate* lessons from the *Evolution of Computers in Society* booklet
4. record our ideas, understandings, comments and adjustments in a shared file to which we will all have access

Stimulate a Debate strategy

A pedagogical framework through which complex ideas and concepts can be developed and understood by the class as a whole and each student separately.

Speaks to the constructivist ethos underpinning the delivery of LCCS.

Facilitation methodologies can be chosen to suit the particular needs of the students in your classroom.

Stimulate a Debate strategy

1. Watch a stimulus video/read a stimulus piece.
2. Provide prompt questions to provoke class discussion and elicit initial viewpoints.
3. Divide into research groups to explore the topic from key standpoints.
4. Choose a teaching/facilitation methodology.


Stimulate a Debate
on how much data, and the kinds of data, governments and giant multi-nationals should be allowed to keep on citizens and consumers
(NCCA booklet pgs. 51/52)

1. Watch a stimulus video or read a stimulus piece.

Ordering a pizza

2. Prompt questions to provoke class discussion and elicit initial viewpoints.

Sample prompt questions…

What were the pros and cons of the pizza company being able to access the customer's data?

Did they have too much access to data or was their usage of the data at fault?

How much data do you think governments or high-tech companies NEED to retain on citizens? Perhaps a certain amount is required for national security? Or, in the case of online medical companies, could they use AI on your data to prevent future illness, mine your data or suggest treatments?

3. Divide into research groups to explore the topic from key standpoints.

Key standpoints: for example, the ethics of data collection

Governments should be allowed unlimited access to citizens' online data.

Governments should be allowed no access to citizens' online data.

Major institutions, such hi-tech medical or financial firms, should be allowed access to all consumer online data.

Major institutions, such hi-tech medical or financial firms, should be allowed no access to consumer online data.

4. Choose a teaching/facilitation methodology

Example facilitation technique: Jigsaw

Students first research each topic in research groups of three.

Use a Jigsaw Learning Technique to create groups of three comprising one student from three different themes. Each person discusses their research within their new group.

Reassemble into original groups and discuss any new learnings.

Recapping on the four steps:

1. Watch a stimulus video/read a stimulus piece.
2. Prompt questions to provoke class discussion and elicit initial viewpoints.
3. Divide into research groups to explore the topic from key standpoints.
4. Choose a teaching/facilitation methodology.

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Group activity

Stimulate a Debate – Lesson Discussion

Main Group Activity

Stimulate a Debate – Lesson Discussion

Each group will work on a specific debate topic from the "*Evolution of Computers in Society*" booklet.

They will examine each step of the *Facilitate a Debate* strategy and discuss/comment/improve/amend as necessary.

Groups will record their work on a shared document, the results of which will be collated and shared via Slack in the coming days.

Main Group Activity

Stimulate a Debate – Lesson Discussion

Some scaffold questions have been placed in the shared slides to help you.

Please allow your own specific context and experience to guide your contributions and understanding, while creating this resource for your peers.

Each group should nominate a *timekeeper, note-taker, spokesperson* and *discussion chair* in order to facilitate successful group work and feedback.

Main Group Activity

Stimulate a Debate – Lesson Discussion

You will have 30 minutes to complete the four steps of the strategy.

We will then reconvene to share thoughts and ideas on the process as a whole group.

Group activity

Group activity

Groups 1 & 2	The positive and negative impact of military innovations on both society and technological developments.	Page 19
Groups 3 & 4	How Computer Science is changing our world	Page 29
Groups 5 & 6	How should we respond as a society to the rapid growth of Artificial Intelligence	Page 34

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