





National Workshop 6









Session 2

Creating an Inclusive Classroom: SEN in Computer Science



By the end of this session :

Participants will be enabled to:

- Develop an understanding of Inclusion, SEN and current policy.
- Make the link with Leaving Certificate Computer Science.
- Recognise the broad range of guidelines and resources available.
- Use current accessibility features and tools.
- Bring different SEN approaches for teaching CS back to the classroom.
- Develop a shared understanding of the challenges and possible strategies for a wide range of SEN categories.





What is Inclusion?



In its broadest sense, **inclusion** describes the extent to which individual pupils are integrated within the educational system. The EPSEN Act, (2004) in the Republic of Ireland and the Code of Practice (DENI, 1998) in Northern Ireland mandate the creation of inclusive learning environments in Irish schools.

https://ncse.ie/wp-content/uploads/2014/10/InclusiveEducationFramework_InteractiveVersion.pdf



Special educational needs are defined as:

A restriction in the capacity of the person to participate in and benefit from education on account of an enduring physical, sensory, mental health or learning disability, or any other condition which results in a person learning differently from a person without that condition.

The EPSEN Act recognises that special educational needs may arise from four different areas of disability: • *physical* • *sensory* • *mental health* • *learning disability.*

Current Policy



Circular No 0014/2017

The classroom teacher is responsible for educating all students in his/her class, including any student with a special educational need (point 13).



Educational Needs in Mainstream Schools







The Student Support File



- Tracks the student's pathway through the Continuum of Support.
- Documents progress and needs over time.
- Ensures continuity of support for a student, including transition from primary to post-primary school.
- Assists schools in providing an appropriate level of support to students, in line with their level of need.
- Collates all information about the support of the student: information gathered, plans and interventions, consultations and reviews.





An Chomhairle Náisiúnta um Oideachas Speisialta National Council for Special Education

Inclusive Education Framework

A guide for schools on the inclusion of pupils with special educational needs

https://ncse.ie/wp-content/uploads/2014/10/InclusiveEducationFramework_InteractiveVersion.pdf



Leaving Certificate Computer Science





CS For All – For all students who want to do it!



https://www.csforall.org/

LEAVING CERTIFICATE COMPUTER SCIENCE is designed to suit ALL STUDENTS of ALL ABILITIES

> It is structured to enable all students, of all abilities, to embrace the subject and succeed in every aspect of the course.

Students will learn • Computational Thinking • Programming Languages • Design & Collaboration • Computers & Society.

Students will gain skills that are valuable in any future career.



COMPUTER SCIENCE IS FOR EVERYONE: GIRLS, BOYS, ORDINARY LEVEL, HIGHER LEVEL, SEN.

PDS



2

'Students will explore the role that adaptive technology can play in the lives of people with special needs and how access to, and engagement with computing and technology is of ever-increasing importance to societies, democracies and human progress.

LCCS Specification p9

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.

1.17 describe the role that adaptive technology can play in the lives of people with special needs.





LCCS Classroom













SEN Guidelines & Resources



Reflection – warm up activity

What supports have you put in place for students with SEN in your classroom? (refer to your non LCCS classes if needed)







NCSE POLICY ADVICE Supporting Students with Autism Spectrum Disorder in Schools

A Guide for Parents/Guardians and Students

ICSE 2016





Delivering for Students with Additional Care Needs.

The Right Support at the Right Time in Schools A Proposed Model of Support December 2017

NCSE WORKING GROUP REPORT NO. 2



An Chomhairle Náisiúnta um Oideachas Speisialta

n Chomhairle Náisiúnta um Oideachas Speisialta National Council for Special Education https://ncse.ie/policy-advice







An Chomhairle Náisiúnta Curaclaim agus Measúnachta National Council for Curriculum and Assessment

https://www.ncca.ie/media/1980/overview_guidelines.pdf

Technology Education

General Learning Disabilities

MILD

https://www.ncca.ie/media/2508/pp_tech.pdf







FACTSHEETS ON DYSLEXIA FOR SECOND LEVEL SCHOOLS

Factsheet 1 What is Dyslexia?

- Factsheet 2 Screening and Identification
- Factsheet 3 Understanding the educational psychological assessment report
- Factsheet 4 The assessment report and its implications for learning
- Factsheet 5 Supports for students with dyslexia in Irish Education
- Factsheet 6 The dyslexia friendly school
- Factsheet 7 General classroom strategies for mainstream teachers
- Factsheet 8 Developing reading and comprehension skills across the curriculum
- Factsheet 9 Developing vocabulary and writing skills across the curriculum
- Factsheet 10 Mathematics: dyslexia and dyscalculia
- Factsheet 11 Teaching mathematics to students with dyslexia and/or dyscalculia
- Factsheet 12 Teaching languages to students with dyslexia
- Factsheet 13 Educational choices for students with dyslexia
- Factsheet 14 Making information accessible, the dyslexia-friendly style guide
- Factsheet 15 Computers and assistive technology
- Factsheet 16 How parents can support the student with dyslexia
- Factsheet 17 Study tips for the student with dyslexia including a section on resources
- Factsheet 18 Useful resources for teachers



General Considerations	\odot
Deaf/Hard of Hearing	\odot
Mental Health Difficulties	\odot
Physical/Mobility Disability	\odot
Specific Learning Difficulties	\odot
Speech & Language Difficulty	\odot
Blind/Visual Impairment	\odot
Seizure Disorders	\odot



creating inclusive environments in education and employment for people with disabilities

Assistive Technology - Tools and Applications

- 1. Overview
- 2. Keyboards
- 3. The Mouse
- 4. Voice Recognition
- 5. Touch Screens
- 6. Switches and Scanning
- 7. On-Screen Keyboards
- 9. Visual Impairment
- 10. Hearing Impairment
- 11. Speech Impairment





https://www.ahead.ie/inclusiveteaching

https://www.sess.ie/resources/assistive-technology-overview





Discussion





Mentimeter

Go to www.menti.com and use the code 76 43 28

What supports have you put in place for students with SEN in your classroom? (refer to your non-LCCS classes if needed)

https://www.mentimeter.com/s/7c783eebe2234b37237a3fb0119a1d38/8e93217c3249









- 1. Immersive Reader.
- 2. Office Lens.









Vision

Need a larger screen? A brighter screen? A narrator to read text? Find out about accessibility tools and features for people who are blind, color blind, or have low vision.

Explore hearing-assistive tools >

Hearing

Neurodiversity

Innovative tools such as dictation and Windows Hello sign-in can make the digital world more accessible for those who live with dyslexia, seizures, autism, or other cognitive differences.

Learn more about assistive technologies for people living with issues

such as bipolar disorder, anxiety, PTSD, depression, or ADHD. Our

Discover tools for neurodiversity >



Learning

Our applications for people living with learning disabilities can help increase focus, concentration, and understanding-and include tools to improve reading and writing skills.



Learn about vision-related tools >



For those who are hard of hearing, have hearing loss, or have

closed captioning, mono sound, and live call transcription.

deafness, our specialized features can provide solutions including

Mobility

Our suite of products helps people living with arthritis, quadriplegia, spinal cord injuries, and other mobility issues to navigate the digital world in non-traditional ways.

Find mobility-assistive technologies >

products can help with distraction, reading, and concentration.

https://www.microsoft.com/en-us/accessibility/

View mental health assistive tools >

Mental health





https://www.google.com/accessibility/





https://www.apple.com/accessibility/

LCCS Case Studies



Teachers' Case Studies







5 minute stretch break



SEN Approaches for Teaching CS



1 - Reducing Cognitive Overload







2 - Unplugged Activities



Unplugged activities are tasks that take place away from a computer in order to model key concepts (e.g. selection, variables, algorithms) in different ways.

The term 'unplugged' originated with the CS Unplugged project in the 1990s, and it has become a popular approach to teaching computational thinking and other computer science concepts.







(A) - Making the abstract tangible

Unplugged activities can help learners understand abstract concepts through physical objects that can be touched, manipulated.

By providing a physical representation, the learner can point to and ask the question at the level of the analogy rather than having to fully verbalise it at the technical level.

> Can be of great benefit to learners with communication or learning difficulties who find abstract concepts difficult and require a multimodal approach

Unplugged activities can include a range of sensory approaches, from physical movement to music, and from manipulating objects to drawing pictures



(B) - Harnessing authentic and familiar contexts

Teachers can use familiar contexts to teach new concepts and knowledge through unplugged activities.

For example, you can introduce count-controlled loops through dance, or create search algorithms to match up odd socks.

Topics can be set in a context that relates to a student's interests and pre-existing knowledge and understanding, then that interest can drive their learning.

Curzon et al. (2018, Computer Science Education, ed. Sentance et al.)



Generalising knowledge – making links

Teachers need to spend time helping students connect new knowledge, skills and strategies to different contexts rather than expecting that transfer will happen spontaneously.

An explicit link needs to be made between the unplugged activity and the computational model that it is helping to describe.

This is good practice for all learners, but some learners with SEN may need extra support to make the connection.

For example:

When teaching the concept of selection using everyday instructions (for example, "If you have brown hair, then hop 3 times, else sit on the floor").

Discuss why we use selection in programming, and trace through existing code together to find examples of selection.

Model the key language throughout the unplugged activity, to help as a prompt when revisiting the concept.

When moving on to programming activities, refer back to the unplugged activity.



3 - Physical computing



Physical computing involves interaction with the real world, through a physical system or object.

Physical computing devices generally provide a sensory output for the code, such as movement, sound, or lights, and some also have a physical interface. This tangible input and output helps learners make the connection between their code and the outcome of the program.

In his book *Mindstorms*, Seymour Papert referred to the original floor turtles as 'objects-to-think-with' (Papert, 1980).







Dash and dot





Sphero



Botley the coding robot

Code-a-Pillar

Lego Mindstorms





Arduino



Codebug



Circuit Playground



Crumble











https://youtu.be/VdPTpv26ecM



4 - Tips for Supporting Programming







5 - Further Guidelines for CS Education







Guide to inclusive computer science education

How educators can encourage and engage all students in computer science



TEALS Program CsfotAL 🚟 CSTA 📴

https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RWuNMn



6 - General Tips



- Differentiate learning.
- Encourage support for the student from classmates.
- •Consider physical access issues such as ramps, toilets, lifts and classroom layout.
- •Incorporate advice from the SEN coordinator in the school and SENO from NCSE if applicable (student support file).
- •Use computers and audio-visual aids in the student's learning and teaching programme.
- •Specialised equipment may also be necessary such as adapted keyboards, page turners, word boards or special desks.



- Encourage communication to prevent isolation.
- •Allow students extra time to complete tasks.
- •Students may have a low self-image, therefore it is important to ensure that the student feels included and is encouraged and praised.
- •As students tend to become distracted quite easily minimise distractions in the classroom environment.



Group Activity





You have a student with SEN joining your class in September for LCCS.

Each group should research and discuss their category assigned to them.



1 - Autism /Autistic Spectrum Disorder

2 - Hearing Impairment

3 - Specific Speech & Language Disorder

4 - Physical Disability

5 - Emotional Disturbance and/or Behavioural Problems



Presentation & Debrief



What supports could be utilised?

What are your strategies for teaching CS? (theory & practical)

Can technology play a role?

Has this changed your thinking?







References:



https://www.futurelearn.com/courses/creating-an-inclusive-classroom-approaches-tosupporting-learners-with-send-in-computing-





https://blog.teachcomputing.org/episode-5-supporting-all-students-in-computing/



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