

Climate Change Education to Support the New Curriculum for Wales:

Delegate Focus Groups

This report is a summary of the Focus Group led by Dr Helen Ross
Active educational academic researcher, education consultant
and active classroom teacher

Comments from teachers have been collated by
Dr Jennifer Rudd science communicator, active scientific academic researcher

Executive Summary and Recommendations

A focus group was designed and lead by Dr Helen Ross at the request of the event organiser Dr Jennifer Rudd. It was felt that allowing time for the teachers to reflect on their current teaching practices on the topic of climate change was important.

The questions were framed to allow this reflection to occur, by covering barriers, knowledge and best practice as well as future lesson planning. This report has been collated by Dr Jennifer Rudd.

Based on the information obtained from the teachers during the focus group I would like to make the following recommendations:

Recommendation 1:

There is a UN climate change teacher accreditation programme that is free for teachers to complete - <https://www.educateglobal.org>. Wales should have a UN accredited climate change teacher in every school, at minimum. They should be given the time to complete the training (30-40 hours) and then encouraged to support other teachers in developing new climate change lesson plans to use within the school.

Recommendation 2:

As a result of the climate change education event a set of lesson plans have been collated by Dr Rudd and are available free of charge at www.youandco2.org Each lesson plan has a cover sheet detailing the age range it is appropriate for and how it links to the New Curriculum for Wales. These resources should be translated into Welsh and circulated to all schools in Wales.

Recommendation 3:

Repeat the "climate change education" event in a number of geographical locations around Wales on an annual basis. This allows best practice to be shared and creates a community of practitioners who feel supported and inspired in promoting climate change education. Wherever possible ensure that the event is a collaboration between teachers, the third sector and academia in the locale.

Recommendation 4:

There was some feedback regarding students wanting to know about timescales with regards to climate change. When will it affect me? When will it get catastrophic? If it is necessary to answer these questions I think somebody should work with (Welsh) climate science academics to put together one lesson on this topic. The lesson would be differentiated and fit within the New Curriculum for Wales. This way the science is sound and every student receives the same information. This way it's also possible to ensure that the lesson is taught with hope, rather than despair.

Summary of Feedback from Teachers

This is a short summary of the feedback received from teachers. Full feedback is detailed in the report.

What are the barriers to teaching climate change?

The delegates felt that the main barriers to teaching climate change were a lack of support from colleagues and senior management at their schools. Teachers felt that the idea of teaching climate change was overwhelming and they were worried about upsetting/inducing anxiety in their students. This was compounded by a lack of resources to teach climate change and a lack of time in the curriculum.

What do students already know about climate change?

At primary school level many students confuse plastic pollution for climate change and struggle to grasp big concepts. At secondary school students are able to understand the causes (particularly fossil fuels) and some effects of climate change. However, by GCSE level students learn to pass exams and don't necessarily fully engage with the subject material. At all ages students are picking up information from the press and social media without fully understanding what they are reading. This leads to misconceptions and, in some cases, the spreading of conspiracy theories. It was also noted that if students were scientifically minded they found it easier to understand the problems caused by climate change. However, all students lacked knowledge of solutions.

What do students want to know about climate change?

Students would like to understand practical solutions to climate change. They would also like to know the timescales upon which climate change will affect them. [JAR comment here, this is hard to answer because on one level climate change is already being felt in Wales, on another level scientists are still disagreeing about the timescale of catastrophic sea level rise, food shortages etc. See my recommendation above on how to teach this.]

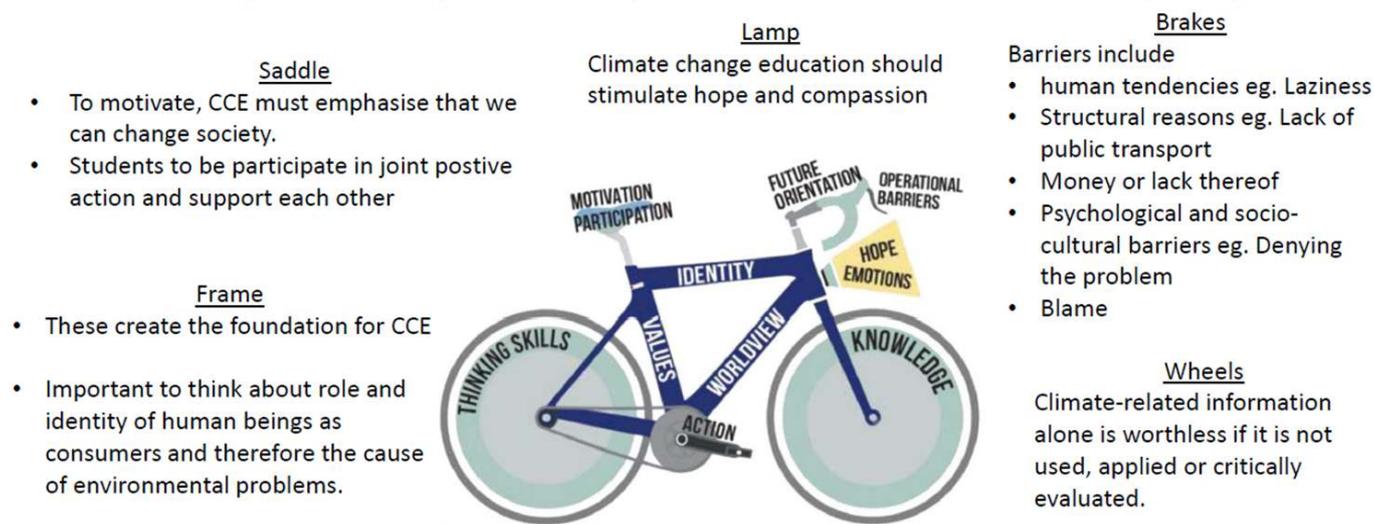
What does good teaching of climate change look like?

There were a number of responses to this question. A minority of responses detailed specific topics to teach such as food miles or the effect of temperature rise on habitat and wildlife. The majority of responses focussed on how to teach climate change effectively. Students should be empowered, stimulated and inspired by climate change education. This can be effected by asking them to come up with solutions, enabling them to feel in control and part of a team [rather than working in isolation]. One respondent stated that students love innovation and technology and so looking through innovative and technological solutions to climate change would be really inspiring. A large number of respondents said it was important to make climate change education relatable and relevant and this meant taking the students' backgrounds into account. It was also suggested that students were introduced to role models within their community that they could identify with.

The feedback given by the delegates in the focus group aligns with a recently reported model for climate change education (Cantell et al. Environmental Education Research, 2019) The model is depicted as a bicycle. I (Dr Rudd) have summarised the research paper very briefly as the text surrounding the bicycle.

Climate Change Education (CCE)

• The Bicycle Model (Cantell *et. al.*, Environmental Education Research, 2019)



The workshop was supported by Welsh Crucible and financial contribution (in the form of staff time) came from Swansea University, including the ERDF-funded Reducing Industrial Carbon Emissions project.

Schools represented were:

- Ysgol Dyffryn Aman
- Pontarddulais Comprehensive
- Brynteg Comprehensive
- Cefn Hengoed Community School
- Coedcae
- Alderman Davies Church in Wales Primary
- Gower College
- Cyfarthfa
- Sketty Primary
- Bryngwyn
- Bishop Vaughan
- Penyrheol Comprehensive
- Penyrheol Primary
- Llanidloes High
- Ysgol Glan-y-Mor
- St John Lloyd Catholic Comprehensive
- Ysgol Pen-y-Bryn

Charities represented were:

- Cae Tan
- Ynni Sir Gar
- Cows on Tour
- TYF
- Size of Wales
- Dolen Cymru

Academics from Swansea University, representing ESRI, SPECIFIC, School of Geography

Swansea and Carmarthenshire councils and the Seren Network were also represented. Mr Geraint Davies (MP Swansea West) gave the opening talk by video link

Two teachers presented by video link:
Dr Meryl Batchelder, Corbridge Middle School and Mrs Emma Honey, Ickford Primary School

Full results:

Methodology:

The delegates formed small groups (4-6 people per group) and were given post-it notes. As individuals they were asked to note onto the post-it notes what they felt were barriers to teaching climate change. Afterwards, as groups, the delegates were asked a series of questions regarding the teaching of climate change.

The questions were written by Dr Helen Ross and the entire focus group exercise was in the style with which teachers would be familiar. Answers to the group questions were written onto flip chart paper and have been collated into this report.



1. Opinions of other members of staff/management opinions (limited enthusiasm)/management not trained in climate science
2. Relatability of climate change to students in poorer socio-economic context/lack of political, class, race awareness and understanding.
3. Telling the truth for fear of causing upset/concerned about the well-being impact of teaching the climate change facts/anxiety inducing. This also came with a sense that teaching climate change was overwhelming. On the opposite side, "making it real! Videos and images are not enough"
4. Lack of understanding
 - from pupils and their families
 - from teachers (a feeling that climate change knowledge is subject specific to science or geography
 - cross curricular responsibilities/delivery should include science and social science e.g. behaviour change
5. Lack of time in the curriculum
6. Lack of resources/Making the lessons age appropriate and relevant/adjusting lesson plans that have been developed for KS3 to primary school level.

Other things mentioned – lack of student agency, people not regarding climate change as a crisis, decline in number of students studying geography (negative attitudes) and a lack of engagement from pupils.

One teacher drew the diagram pictured below.

Interpretation of the diagram by Dr Helen Ross is as follows "The diagram shows the 4 areas of the new curriculum and that agency and resilience are important factors for engaging with climate change education. However, the teacher felt that students didn't have agency (autonomy) or ability to act. The teacher thought that the lack of critical thinking, combined with the human nature of politics and complexities of political systems, makes teaching climate change hard."



A comprehensive summary of KS3, GCSE and A-Level knowledge was given by one group as follows:

KS3

- Some students (the minority) are aware of political influence
- Knowledge on some effects of climate change e.g. global temperatures, sea level rise
- Some knowledge on the strategies/combating climate change
- Knowledge on causes of climate change can be good across years 7-9 but this depends on what has been taught at KS2.
- Some KS3 students disengage [if they have previously studied climate change at KS2] due to repetitive content.

GCSE

- Learners are more ethically informed at this stage
- Learners know “what they need to know” to gain a GCSE in Geography [Dr Rudd interpretation: students learn to pass the test but don’t necessarily retain the information beyond the exam or engage with it emotionally]

A Level

- Geographers and STEM students have reasonable knowledge of problems but not solutions
- Less scientific students are often confused by the issue [of climate change]. They’ve heard stories/media views but don’t fully understand challenges. Some buy into conspiracy theories.
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Other comments from other groups were as follows:

- Pupils seem comfortable with making connections between fossil fuels and climate change
- Warmer weather and misconceptions, polar bears and penguins, plastics, acid rain, the plight of the bees, extreme weather and sea level rise.
- By 2050 there will be more plastic in the sea than fish.

Primary school children in particular see climate change as plastic pollution, they find it hard to grasp bigger concepts.

- That renewables are better than fossil fuels, and are aware of disadvantages and advantages.
- Greenhouse effect
- Rhetoric, extinction rebellion, social media (which could be “fake news”)
- “terms but lack of understanding, misconceptions” [Interpretation by Dr Rudd: I think this means that students know terminology but don’t necessarily understand it and this leads to misconceptions]



- Children would like to understand practical solutions
- Children want to know timescales
- Children want to know why it's happening, what they can do and when climate change will happen



- Give credit to our children that they can make change
- KS4, 14-16 year olds; it's a crisis we need to teach the urgency.
- Case studies
- Deforestation



- Disconnection with personal impact through purchases etc.
- Need to improve depth of knowledge
- Current lack of progression of skills
- Need to take a positive approach, moving forward the younger generation.
- So that students don't confuse plastic pollution with climate change.
- Children talk a lot about personal change, that puts a lot of pressure on children rather than huge companies.



- Problem solvers investigate to find solutions
- Make it realistic and relatable, authentic and “real”.
- Make the tasks relevant to cultures/communities/their pockets [JR thinks this means relevant to the students’ financial situation, both in terms of saving the students money but also being aware of the financial situation they come from]
- Use images and questions to stimulate students asking “Why is this happening”, “What are the solutions”
- Move away from “old school” ways of delivering Geography e.g. cause, effect, response and instead consider more visual, real life contexts which may provide more authenticity
- Kids really love innovation and technology so use this to inspire.
- Ask students what solutions they can come up with
- Also think about solutions that stop things at source
- Enable students to visualise the carbon cycle
- Make climate change education really positive
- Help students understand that they can create the solutions to the problems and thereby EMPOWER the students. Make the students feel like they are in control and part of a team, rather than isolated.
- Show how small increases in temperature will make huge changes to habitat and wildlife
- Teach about food miles and food wastage.
- Introduce students to role models, local to the children in their community, that they can identify with.
- Encourage the “gifted and talented”/”more able and talented” students to help their peers champion causes.
- Link projects across the curriculum

Since the climate change education event Gower College and Birchgrove Comprehensive School have planned climate action weeks.

It's hoped more schools will feel inspired to host climate action weeks in the future.

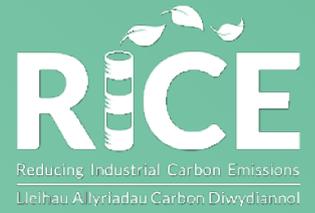
Finally the teachers were asked to plan a lesson.
Two of the completed lesson plans are outlined below.

Time: 1hr	Class 8/9	No of Students: 30
Topic	CO ₂ Carbon Footprint	
Objectives	Responsible consumption Footprint	
Learning Outcomes	Awareness Responsibility Globalisation	
Resources	Balloons Powerpoint pictures Burger packaging - Infographics - corn - water - livestock	
Links to prior learning	Science and energy transfer	
Links to future learning	Global citizenship	
Task	Activity and description	
1	Facts/pictures (shocking) / stats	
2	Q & A - Are all lives equal?	
3	Role play - all people affected	

Subject:	Carbon Neutral
Previous knowledge	Minimal
Learning objective	To understand the need for consumption To examine ways of consuming sustainably
Introduction	Start like a normal lesson Measuring consumption of everything In groups - measure different elements
Direct teaching	How to do the same lesson - reducing consumption, thus becoming more carbon neutral Repeat and measure
Independent task	Student led inquiry within groups
Plenary	Reflections - each groups findings



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