Year 8 Students' Conceptions of Sustainability

In this article **Nicola Walshe** discusses a small-scale research study into concepts of sustainability revealed by a class of year 8 students.

Environmental education seems to have developed at a rapid pace within the UK; only 30 years ago the term 'environmental education' was relatively uncommon within the literature, and yet now it forms the basis of major national and international environmental strategies (e.g. Department of Environment, 1990). Though a relatively more recent concept, sustainability is now considered a key aspect of environmental education. In fact, the term itself now more commonly includes reference to sustainability – for example, 'education for sustainable development'. However, despite this focus on sustainability, it is a potentially difficult and fairly abstract concept to define. This has significant implications for those teachers who have responsibility for teaching sustainability to students in schools.

The National Curriculum gives geography the major responsibility for education for sustainable development; indeed, one of the three main areas of knowledge and understanding stipulated is 'environmental change and sustainable development' (DfEE/QCA, 1999). As a result, sustainability has recently become a distinctive concept within geography. For example, the Programme of Study for key stage 3 geography for 2008 includes within the key concept of environmental interaction 'exploring sustainable development and its impact on environmental interaction and climate change' (QCA, 2007). However, Gerber (1996) argues that, although dictionaries and textbooks inform teachers and students what this concept means, it is likely that their understandings of it vary both from the textbook definitions, and according to the context in which they are being learnt.

It has been my experience that students do have some difficulty in understanding the concept of sustainability. However, through examination of sustainability through a variety of contexts, such as sustainable communities or sustainable tourism, students have shown significant advancement in their understanding. Indeed a greater understanding of sustainability has sometimes even seemed to improve the ability of students to consider the relationship between people and their natural environment, thereby developing their overall geographical skills. Despite this somewhat anecdotal evidence as to the benefits of understanding sustainability in the geography classroom, I have a concern that there are issues associated with teaching sustainability; for example, how do students *really* understand the concept of sustainability? For this reason, I undertook this research to ask 'What are year 8 students' understandings of sustainability?'.

How can we define sustainability?

The DfES (2006) suggests that:

> *'The goal of sustainable development is to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life, without compromising the quality of life of future generations'.*

The Sustainable Development Education Strategy expands on this idea, describing three 'pillars' which make up sustainable development: social equity, environmental quality and economic prosperity (Figure 1) and stating that there are five fundamental principles of sustainability:

- living within environmental limits
- ensuring a strong, healthy and just society
- achieving a sustainable economy
- using sound science responsibly
- promoting good governance.

This model begins to include a range of 'stewardship' or 'social responsibility' ideas, suggesting that students must learn to be responsible for sustainable development. For example, 'using sound science *responsibly*', and 'promoting good *governance*', both encourage students to take informed responsibility themselves. Although not included within the general DfES model, the idea of the 'future' also appears significant in defining sustainability; in particular, this has featured strongly in recent developments in geography education. For example, 'futures' is one of five core concepts underpinning the new GCSE Geography (Westaway and Rawling, 2003), and forms an important component of the Geographical Association's *Global Dimension* project (Geographical Association, 2006). Within this research, I was interested in how students' actual

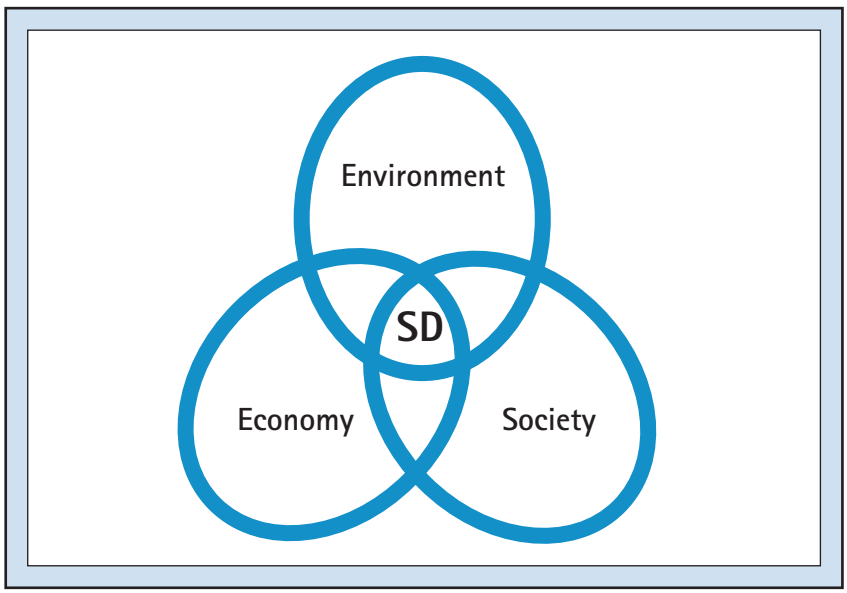

Figure 1: The relationship between the three pillars of sustainability (DfES, 2006).

understandings of sustainability reflect (or fail to reflect) these key ideas within sustainability education and, more specifically, geography education.

Research design

I studied two classes within a comprehensive 11–18 county high school. Students within the school currently undertake a 'collapsed' curriculum in which key stage 3 is completed in two years. For this reason, year 8 classes were used in this research (the oldest group of students undertaking compulsory geography); this article discusses the results from Class 8B.

In order to obtain information about students' understandings of sustainability, I used concept diagrams and interviews. Initially, each student was asked to produce a concept diagram on sustainable tourism. The decision for giving students the context of sustainable *tourism*, rather than simply using *sustainability*, was taken following a pilot study which showed that concept maps produced by students on only *sustainability* were extremely simple. On discussion, it was clear that students understood the concept of sustainability in more detail, but that they needed a context on which to base their understanding. As a result of this pilot study, I decided that students should be asked to draw a concept diagram on sustainable tourism because this was a method with which they were familiar from their recent studies. Following the concept diagram activity, I interviewed ten students, all of them chosen because their concept diagrams contained sufficient detail to indicate a reasonable knowledge of the concept of sustainability. Questions asked were:

- What do you think the word 'sustainability' means?
- What do you think the different aspects of sustainable tourism are?
- What would an unsustainable community look like?
- Do you think that it is important that sustainability is taught in school? Why?/Why not?
- In what ways do you think that you live a sustainable lifestyle?

Results and analysis

I analysed the concept diagrams and interview transcripts through the process of manual coding to identify recurring themes or concepts mentioned by the students. As part of this process, I used some of the themes of sustainable development identified by Summers *et al.* (2004) when examining student teachers' conceptions of sustainable development. Their work identified seven key strands:

- the *purpose* of sustainable development (e.g. for improvement or preservation)
- the *nature* of the development (i.e. whether it is environmental, economic or social)
- the *human focus* (who the development is for)
- the *timescale* of development
- the *geographical scale* of development
- any *controversy* or conflicting issues
- the *aesthetics* of sustainable development (maintaining the beauty of an area).

Main category	Subcategories	Description	Examples from concept diagrams
Nature	Environmental	A focus on the environment and its resources	'Cars and planes cause air pollution'
	Social	A focus on the social aspects of sustainability, such as the preservation of culture, education, crime and health care	'Replace traditional culture with modern things'
	Economic	A focus on the economy, including how money is earned or spent	'More money could be brought into the country'
Purpose	Preservation	The protection of the environment, including avoiding damage	'Don't destroy the environment for new places'
	Balance	Ensuring that the natural balance of the environment is kept through recycling, replanting, or replacing resources	'Use recycled materials'
	Conservation	The specific reference to the use of renewable resources	'If there are cars, run on chip fat or hydrogen cars'
	Improvement	Reference to progress or benefit of any kind	'Schools are paid with tourist fundings'
	Self-sufficiency	Reference to independence as sustainability	'Not becoming reliant on tourism'
Human focus	Human population	Reference to the human population and how they can affect or be affected by sustainability	'Tourists can stay local and be taught how to cook, hunt and lots more locally'
Geographical scale	Geographical scale	Reference to any geographical scale, whether it be local, global or place-specific	'Trade with other countries'
Timescale	Future	Reference to the future or long-term strategies or development	'A successful place which will be ongoing and last'
	Seasonality	Reference to the seasonality of tourism	'Seasonal tourism' or 'Making jobs all year round'
Aesthetics	Aesthetics	Reference to the appearance of a particular area and how it may be affected	'If there is too much building it will destroy the views'

Figure 2: Main and sub-categories arising from extended coding concept diagrams on sustainable tourism. The categories were based on those identified by Summers *et al.* (2004) when examining student teachers' conceptions of sustainable development in science and geography.

Figure 2 shows the categories identified in the concept diagrams, and examples of quotations for each of them.

The frequency of occurrence for each concept mentioned by students is shown in Figure 3. Figure 3 shows that the *nature* of sustainable tourism – i.e. whether it is social, economic or environmental – was the most commonly mentioned category in the concept diagrams (gaining 55, 77 and 113 mentions respectively). These three categories were explicitly named by some students such as James (Figure 4a). Conversely, many of the concept diagrams did not refer explicitly to the three categories, but included a range of information referring to these concepts; an example of this was produced by Lizzi (Figure 4b). Within each of these categories, various subcategories were often identifiable; for example, mention of water, air and visual pollution within environmental sustainability. This could be because, when discussing sustainability in lessons, students have often been reminded to consider these three types of sustainability, whether they are referring to development, tourism or sustainable communities. This reflects the growing consensus that sustainable development involves a bringing together of environmental, economic and social factors (e.g. Sterling, 1999; DfES, 2006).

Most students also referred to the *purpose* of sustainable tourism (59 mentions in total), particularly the subconcept of *preservation*; for example, 'keep it a clean environment', 'must not be too close to the beach because it will be crowded', or 'it must not affect the natural side of a place by polluting or other such things'. One explanation for this could be the stress placed on purpose of sustainability within geography lessons and resources such as textbooks. It is often the case that students are asked to explain *why* something should be developed sustainably, thereby referring to its purpose.

However, there were several categories that were not commonly referred to within the students' concept diagrams. For example, the *geographical scale* of sustainability or interdependence between countries was only mentioned once in all concept diagrams, despite being a key concept in geography (Gardner *et al.*, 2007). Instead, most students focused on sustainability within a small area, such as a tourist resort (this could be the result of using sustainable tourism as a context, rather than simply sustainability). Timescale of sustainability, a key component of the Government's definition

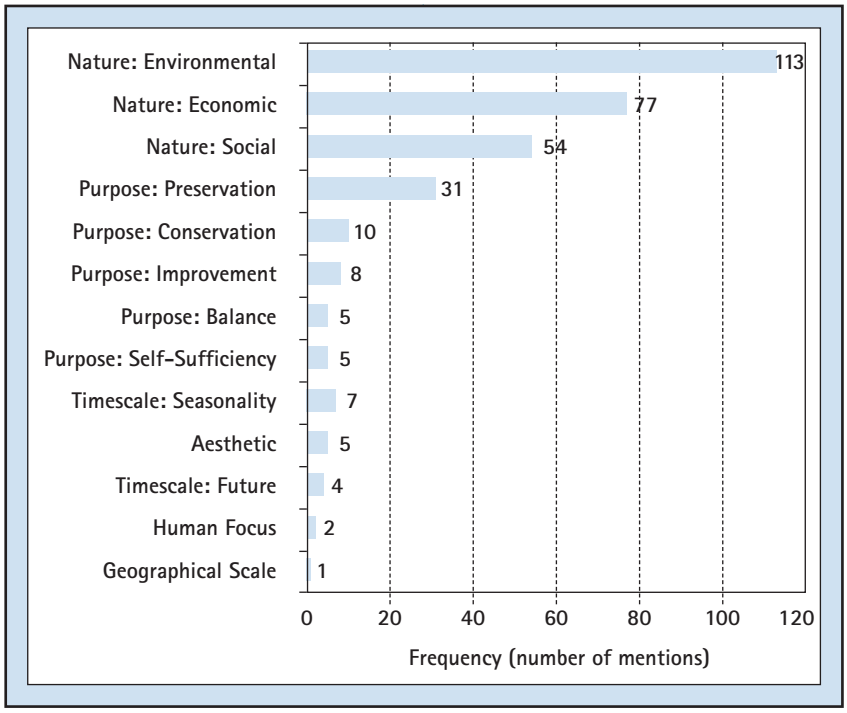

Figure 3: Frequency of subcategories of sustainability identified during second set of coding of concept maps.

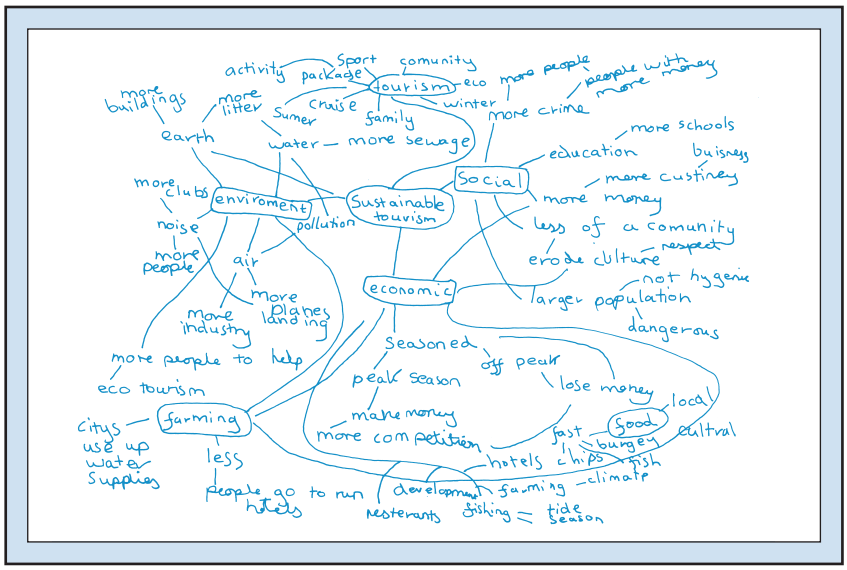

Figure 4a: Concept map produced by James, showing the three key themes of 'environment', 'social' and 'economic'.

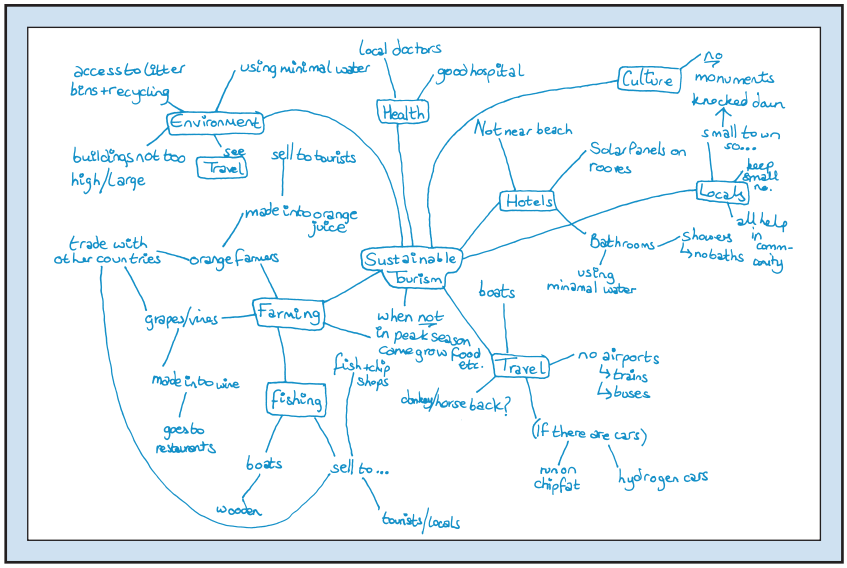

Figure 4b: Concept map produced by Lizzi, not explicitly using themes of environmental, social and economic sustainability as key concepts, but referring to many aspects of the nature of sustainability.

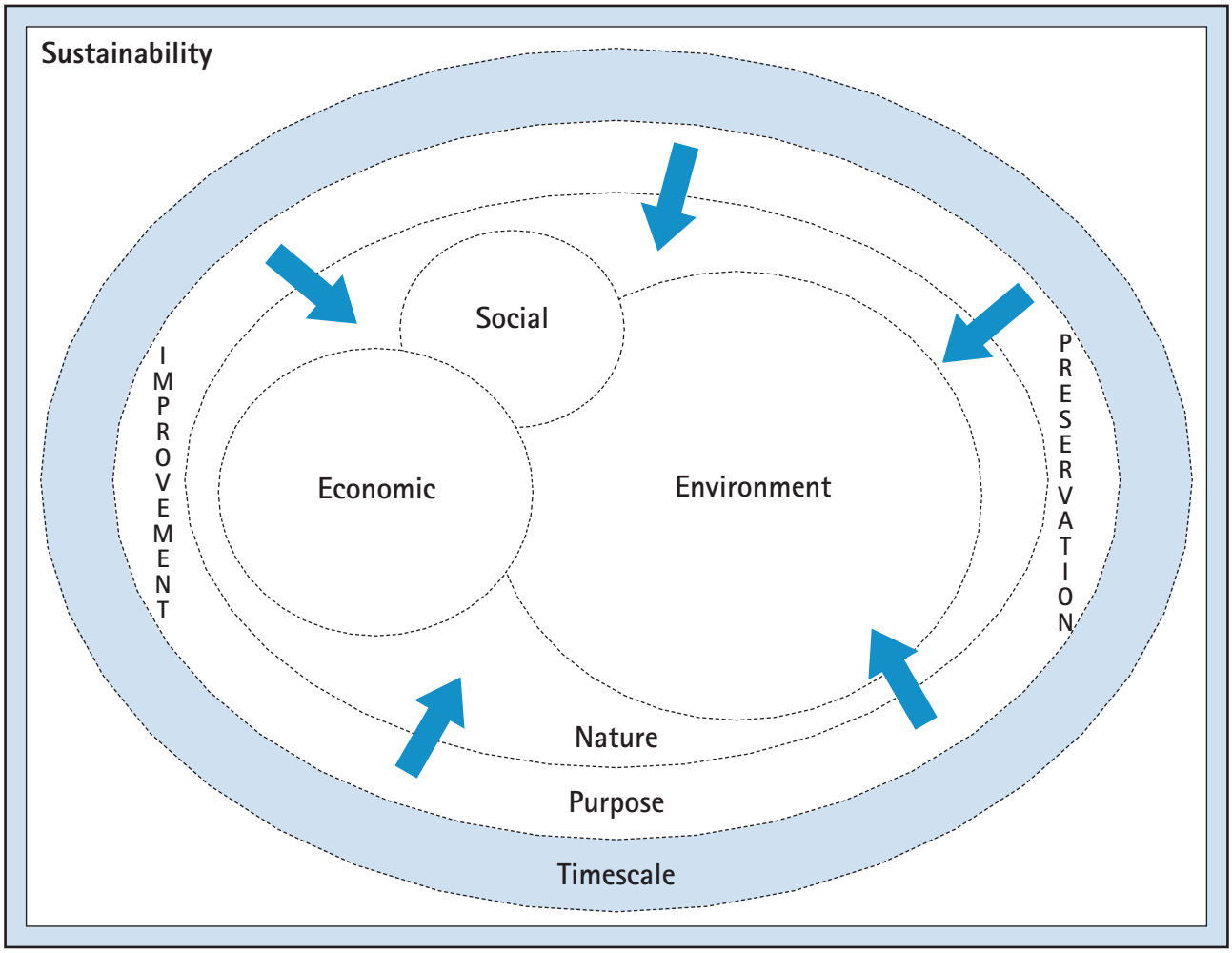

Figure 5: One suggested model of Class 8B's understanding of sustainability.

of sustainability (DfES, 2006), was only referred to 11 times within the concept diagrams. However, in contrast to this, in the interviews, all students discussed the future (timescale). For example, Lizzi says 'Sustainable tourism is something that, well, that can last for a long time', returning to the idea several times throughout the interview.

In an attempt to explore why the interviews had different emphases from the concept mapping, I re-interviewed the same students to ask them why they thought these differences occurred. All students made what seemed to be a very astute observation as to the reason why the concept of time or the future was not included in the concept diagrams. For example, Edward commented that he would 'most probably put it in economics in the way that I'd say that the money is spent on things that will last for a long time. And environment I'd put about the rubbish and then social I'd put in about the carrying capacity of a place', agreeing that the concept of time spans all other concepts. In this way, the students themselves identified the fact that the concept of time was often missing from concept diagrams, because rather than being a discrete concept itself, it referred to all other categories of sustainable tourism.

What are year 8 students' understandings of sustainability?

On examination of the students' concept diagrams in conjunction with the interviews, it appears that their main focus was on the three concepts of environmental, social and economic sustainability (its *nature*). However, these three ideas were interlinked with ideas of purpose of sustainability, as well as an overriding theme of the *timescale* of sustainability. Figure 5 illustrates one suggestion as to how these different facets of sustainability are related.

Within the model, there are three interconnecting 'layers' of understanding of sustainability:

Layer 1: Nature

Central to all concept diagrams, and many interviews, were the categories of social, economic and environmental sustainability. For this reason, these are in the central layer of the model. Environmental sustainability is the largest, as this figured most commonly in the majority of concept diagrams. This is followed in importance by economic and then social sustainability. The overlap between the three concepts shows that they are interlinked ideas; for example, Lizzi's interview links social and economic sustainability:

> *'I think farming is important, even though it might be quite an old type of farming. It then attracts more tourists, because it's more traditional farming ... And if they keep on farming, then people will go and say "Oh, where I went on holiday, they did traditional farming", so loads of people will go, and there'll be more money for the community there'.*

Layer 2: Purpose

The second layer within the model is that of purpose. This describes the reason for sustainability, and particularly focuses on the concepts of preservation and improvement as these were consistently the most commonly used categories identified during coding. The second layer encompasses the first nature layer, because the concepts of purpose invariably related to social, economic or environmental sustainability when discussed by students. For example, in his interview, Edward discusses preservation of both the social status quo and the environment:

> *'Because there's more people, then there'd be more crimes and the litter and all the rubbish would just spill over all the bins, and be thrown into corners, and eventually would just be a really nasty place to be, and people wouldn't go there'.*

It makes sense that when referring to the protection, preservation or improvement of something, students discuss *what* is being protected etc. – for this reason, the layers of purpose and nature are inextricably linked.

Layer 3: Timescale

The third layer within the model is that of *timescale*, or the concept of future within sustainability; this surrounds or encompasses the other two layers and all its concepts. Although the concept of time was not commonly referred to in concept diagrams, it was a key focus in the interviews. It was the students themselves that identified the fact that timescale is linked to all other concepts of sustainability; for example, Catherine stated:

> *'I think [lasting a long time] would fit under mostly all of [the other categories] because they're all about everything lasting longer in each category'.*

It is for this reason that it encompasses the other two layers within the model.

Although this is a simplified model of the students' understandings of sustainability, it clearly shows the main concepts identified within the research and could therefore be used as a summary of how students in Class 8B understand sustainability.

What are the implications for policy and practice?

QCA states that by the end of key stage 3: 'pupils should be [able] to explore the idea of sustainable development and recognise its implications for people, places and environments and for their own lives' (DfEE/QCA, 1999). Because of this, the understanding gained by students of sustainability whilst studying geography could be crucial in determining their life-long understanding of the concept.

On examination of Figure 3, it is clear that the students' main focus or understanding of sustainability was on the three concepts of environmental, social and economic sustainability. This reflects the Sustainable Development Education Strategy's three 'pillars' of sustainable development (Figure 1). This structuring of sustainability provides a simple framework through which students can understand the concept. The consideration of social, economic and environmental issues is also familiar to many geography students as they frequently consider the impacts of a particular development or place in these terms (such as the development compass rose, e.g. Roberts, 2003); this makes geography an ideal subject through which to study sustainability.

The concept of time which encompasses the ideas of nature and purpose in Figure 5 also figures strongly in governmental publications or definitions; for example, the Sustainable Development Strategy defines sustainable development as 'ensuring a better quality of life for everyone now and for generations to come'. In this way, it appears that the students in Class 8B have the basic understanding of sustainability desired by the government. However, I suggest that the students' model of sustainability goes further than the DfES' definition, as it includes the extra layer of purpose. Although the Sustainable Development Education Strategy does allude to purpose through its five 'fundamental principles of sustainability', it does not directly mention *why* sustainability is important (for what purpose). For example, the principle 'achieving a sustainable economy', does not directly mention *how* or *why*. For some students, this lack of purpose may result in them not being able to see the relevance of sustainability to their lives. For example, in response to being asked about the importance of teaching about sustainability in schools, James said:

> *'I think it's good to be taught in the way that it will help you understand from situations, but maybe it needs to be taught in a kind of a different way, if it's more to teach you about how to use it like later on in life, and stuff ... if you were just saying "You need to do this, this and this and it will be sustainable", it doesn't always work out exactly like that in there. [We need] like steps [we] could try and use.'*

Here, it seems that James recognises the need for relevance in education on sustainability, so that students can see its relevance for their own lives. For some, this would include education on *how* to be sustainable, as well as *why*. The extra layer of purpose in the students' model of sustainability is significant, therefore, because it has enabled some students to include the *how* into their understanding, potentially giving it more applicability to their own situation (even though the context could be quite different).

Within this article, I have gone some way to examine one group of students' understandings of sustainability. As a teacher, the research will impact my practice and the way that I approach the concept of sustainability with my students in the future. Specifically, the majority of students within 8B appear to know the majority of sub-concepts within sustainability. However, concept diagrams suggest that many seem to lack the true understanding of these concepts that would enable them to see the interconnectivity between them. Further, in interviews, some of the students expressed a desire to better understand the relevance of sustainability to their lives – something which is key to the 'Caring for the Earth' chapter of the Government's Sustainable Development Strategy, and which may affect any action a student takes as a result. Because of this, I will ensure that time is spent in lessons not only understanding the complexity of sustainability, but encouraging students to make more direct links to their own lives. ■

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