

# Going SOLO to enhance learning and teaching

Simon and Rob explore how use of the SOLO technique has enhanced learning, teaching and assessment in their geography department.



Accompanying online materials

... I like using SOLO because it makes you think about some of the easier ideas first and then gets you to think more about why I think the way I do ... (year 7 student).

'SOLO' stands for the 'Structure of the Observed Learning Outcome'. The SOLO taxonomy was devised by Biggs and Collis (1982) and developed by Hook and Mills (2011). It describes the stages through which a student comes to understand a subject, classified as levels of increasing complexity (Figure 1). We believe that SOLO provides an holistic approach to learning, teaching and assessment by giving teachers and students a common language for

learning. This allows students to confidently self and peer-assess progress; and supports teachers in differentiating planning, questioning and resources in the short and medium-term. Through worked examples, this article explores how SOLO has enhanced learning, teaching and assessment in our geography department and shows how this simple, robust taxonomy has been applied to the 2014 National Curriculum.

## Higher order thinking (HOT) SOLO hexagons

HOT SOLO hexagons, devised by Pam Hook (Hook and Mills, 2011) are a useful adaptation of the tried and tested 'mysteries' technique, as the hexagons do not restrict students to linear sequences: they change the emphasis from sequencing to the justification for the geographical links between a wide range of geographical concepts.

... I like it because there isn't always a 'right or wrong' answer and [it] gets you to think about why one card links to lots of others which means I get to relational [level] really quickly... (year 9 student).

### What were the consequences of the Haiti earthquake for Mrs Antoine?

The example below outlines how SOLO taxonomy, applied to a mystery, can help students quickly scaffold their ideas and encourage them to 'think like a geographer'. This example is part of an assessment for our 'Earthquakes, Volcanoes and Tsunamis' scheme of work, the mystery investigates the plight of Mrs. Antoine, a victim of the earthquake that struck Haiti in January 2010. A hexagon template can be downloaded from <http://pamhook.com/solo-apps/hexagon-generator>.

Following a brief introductory video to set the scene, students are given a pack of hexagons with prepared statements on them (these can be downloaded from the online resources accompanying this article). The pack also includes additional blank hexagons and sticky notes.

... Sometimes I use hexagon cards to solve mysteries. When you see all the cards you think – where do I start? ... Though what I now do is start with an idea and build it up with other hexagons ... (year 9 student).

Students at the **prestructural stage** will begin to read the statements on the hexagons but may have very little awareness of how they can be connected. We find that students at this stage begin to loosely categorise by name or geographical concept(s) but are not confident in explaining the relationships between them.

At the **unistructural stage**, students begin to make confident links through one geographical

## Level of thinking and learning

### Prestructural

'I am not sure about...'



Students have no prior knowledge, or are unsure of, the key words in the question stem and fear they may misinterpret the question – that there may not be a connection between their understanding and the question.

### Unistructural

'I have one relevant idea about...'



A student may just be able to define or describe one aspect of the question but will be unable to explain its relevance or significance.

### Multistructural

'I have several ideas about...'



Here a student may be able to define or describe at least three aspects which they think relate to the question but will be unable to explain connections between these points or with the question.

### Relational

'I have several ideas about...  
I can link them to the question.'



Students can explain/synthesise their ideas and confidently link these to the question.

### Extended abstract

'I have several ideas about...  
I can link them to the question.  
I can look at these ideas in a new and different way'



Students can reflect and make inferences, generalising beyond the specific question to other contexts. This encourages them to think synoptically, making connections with other topics and real-world issues. It prompts students to think like geographers.

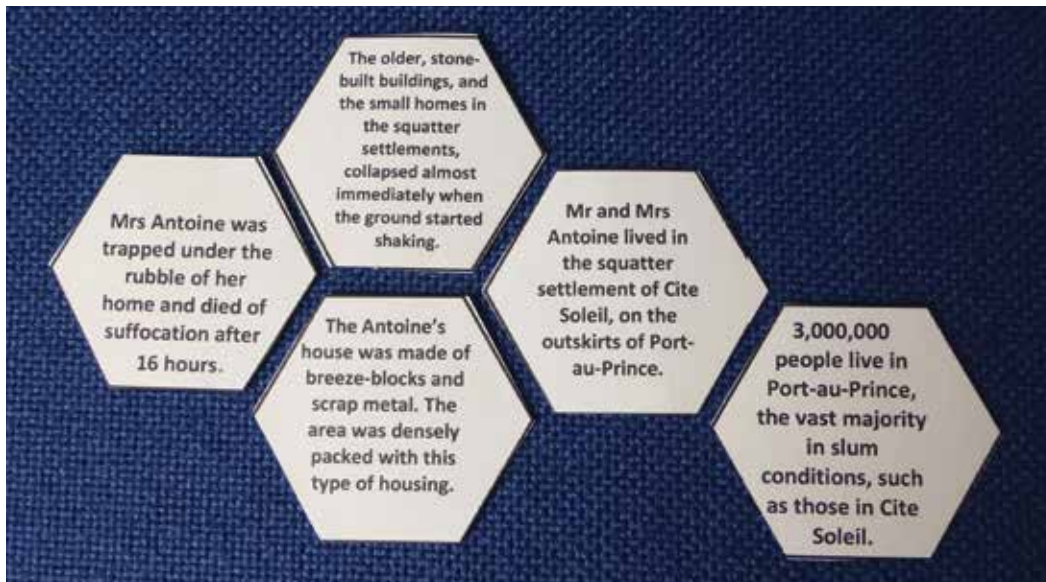


Figure 2: Students at the unistructural stage show they are able to make connections. Photo: Ruth Totterdell.



Figure 3: At the relational stage students are able to make connections between geographical ideas. Photo: Ruth Totterdell.

idea and are able to explain the connections. In this instance, they have understood that Mrs Antoine is trapped beneath the rubble and made the geographical link with cards which describe the vulnerability of squatter settlements to earth tremors (Figure 2). Other cards allow students to make inferences about population density and how long it took before Mrs Antoine was found.

At the **multistructural stage**, students have developed a sequence for two other concepts: the causes of the earthquake, and the challenges facing international aid agencies responding to the crisis. This stage of the process allows students to categorise their thoughts on the causes and effects of seismic activity and responses to it and gain confidence in their geographical thinking by focusing on developing one idea at a time.

A key aspect of SOLO is to encourage students to think more deeply about their learning and recognise how 'loose ideas' in the initial stages can lead to 'connected ideas' at the relational level, enabling them to confidently tell their geographical story. In this instance, students have linked the plight of Mrs Antoine to the time it took international aid to reach Haiti and made generalised links to the physical,

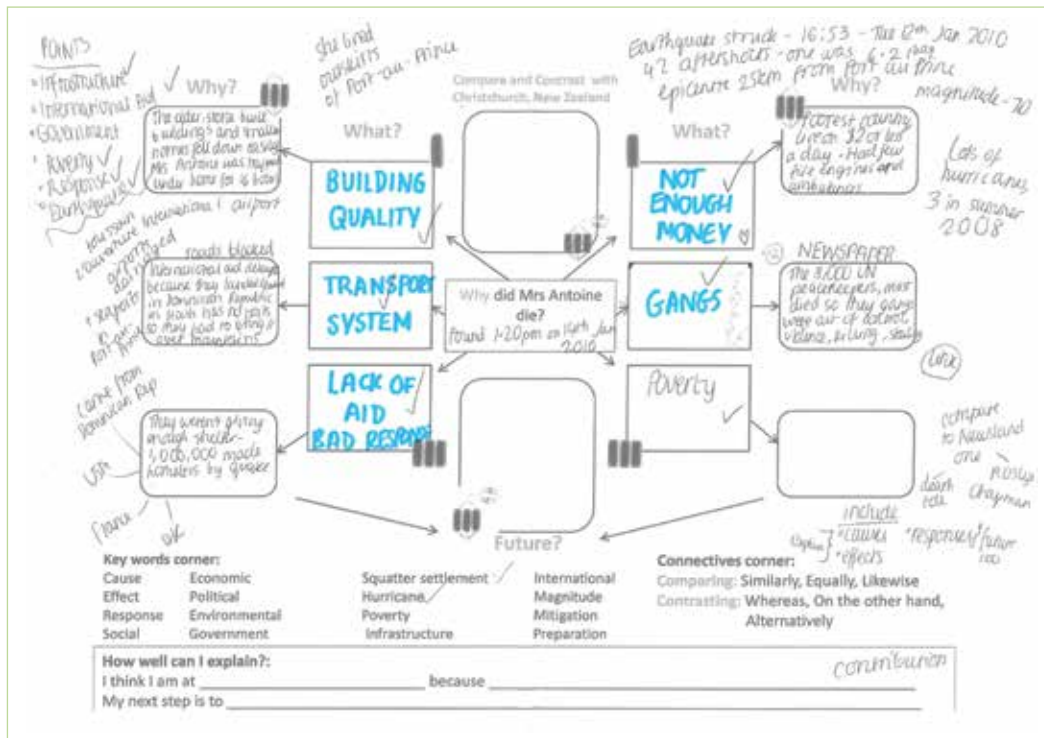
human and social factors which led to the death of Mrs Antoine.

Students can move very quickly from the uni or multistructural stage to the relational stage. They become less preoccupied with the 'right answer' and more interested in the loose connections they have made between geographical ideas (Figure 3).

The addition of blank hexagons enable students to add more ideas and the sticky notes are so they can pose higher-order questions and consolidate and evidence high-level understanding. Including a 'So what ...?' hexagon prompts students to generalise and make inferences, thus reaching the **extended abstract stage** and 'thinking like geographers'.

In this example, a comment on a sticky note linked to a hexagon outlining the breakdown of community cohesion suggested that extreme poverty made the situation desperate – that the residents have 'nothing to lose'. A pertinent question – 'What is Haiti's government doing about this?' – encourages students to elaborate on their inferences and conduct further research. This process allows all students to consider alternatives as well as ask questions, so their discussions are focused and inclusive.

**Figure 4:** Example HOT SOLO 'map' (middle ability year 9 student).



### Recording geographical ideas

HOT SOLO maps or graphic organisers allow students to visualise their geographical ideas and structure their thoughts in a systematic way by completing an arrangement of boxes. The range of 'maps' cater for the whole ability range: more able students are encouraged to progress beyond the relational stage, to generalise, predict and justify their views; less able students are supported by clear suggestions of how many points and links are required to move to the next stage. A 'key word corner' on the 'map' provides further guidance which supports literacy and suggests initial geographical ideas. Figure 4 is an example from a middle ability year 9 student's preparation for an assessed extended piece of writing following the hexagon mystery activity about Mrs Antoine.

*... I like the boxes sheets when I've been using SOLO [hexagons] ... I like the key word corner because there are words there that I can use to help me think why; to help me to explain and get to relational. The boxes also have the SOLO diagrams so it's easy to see ... how much I've learnt when I do a review at the end of the lesson ... (year 9 student).*

### Recommended reading

Hook, P., & Mills, J (2011). *SOLO taxonomy: A Guide for Schools. Book 1: A common language of learning.* Invercargill: Essential Resources Educational Publishers Limited.

Hook, P., Wall, S & Manger, R. (2015). *SOLO taxonomy: An Action Research Project using SOLO Taxonomy. Book 1: How to introduce and use SOLO as a model of learning across a school.* Invercargill: Essential Resources Educational Publishers Limited.

Pam Hook provides a wide range of online resources at <http://pamhook.com>.

### References

Biggs, J. B. and Collis, K. F. (1982). *Evaluating the Quality of Learning: The SOLO taxonomy (Structure of the Observed Learning Outcome).* New York: Academic Press. (Out of print)

### Online resources

Go to [www.geography.org.uk/tg](http://www.geography.org.uk/tg) and click 'Autumn 2015' to download the hexagon mystery cards, a HOT SOLO map and an example piece of extended writing following these SOLO activities.



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### Reflections

HOT SOLO 'maps' are a very effective way of enabling students to visualise their geographical ideas and structure their thoughts systematically. They can record, sequence and substantiate their points from the SOLO hexagons, as well as accurately self or peer-assess their level of progress and steps for improvement, using simple SOLO level descriptors. Crucially, this provides a simple framework for progression and a common language for learning.

We have found SOLO hexagons and HOT maps an excellent way to determine a student's prior knowledge, as well as challenge and deepen their understanding; though we have also used them to begin a new learning experience.

The 2014 National Curriculum provides an opportunity to extend our use of SOLO by scaffolding learning, progress and outcomes in our schemes of work; as well as open a dialogue in teaching and learning with our feeder primary schools as they come to grips with the new key stage 2 geography Programmes of Study. | **TG**