The hazards of enquiry learning

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Introduction

Asked recently to revise my school's schemes of work on natural hazards to meet the criteria of the new GCSE and A-level specifications, I encountered a significant challenge: is it possible to teach the new OCR B GCSE specification and the OCR A-level specifications using geographical enquiry?

Roberts (2006) sets out four essential aspects of enquiry learning:

- creating a need to know
- using geographical data as evidence
- making sense of data
- reflecting on learning.

I wanted to encourage my students to connect with a range of natural hazard case studies to develop their geographical knowledge while improving their data-handling skills. I decided to introduce an enquiry-based approach to my teaching; my rationale was that this would encourage students to enquire actively into a range of natural hazards rather than passively accept the conclusions of others (Naish *et al.*, 1987).

This article summarises some of the approaches I developed and captures students' responses to the challenges set.

Activity 1: Mystery

Mysteries are based around one central mystery question (Leat, 2001) and require students to work in groups using sets of geographical data to solve the mystery. Mysteries meet each of the four essential aspects of enquiry learning: students' interest is captured with an unusual question; they are provided with a set of mystery cards containing geographical data as evidence; they process this data and make sense of this data to solve the mystery; and finally they reflect on what they have discovered via a de-briefing process. Mysteries are not designed to encourage students to reach 'right' or 'wrong' answers; rather, they enable students to appreciate the complex nature of geographical problems and recognise the multiple perspectives that can influence situations.

Lesson example: The Italian Earthquake (Key stage 4)

'Why is Dr Maurizio wearing a new costume to work?' was the question posed to students during this lesson. It was based on a news story following the 2009 earthquake in L'Aquila, when doctors dressed up as clowns to cheer up child survivors of the disaster (BBC News, 2009).

As a starter activity, I used 'think, pair, share' to draw out students' initial ideas on the question. At this stage students were encouraged to use their imaginations, but were also challenged to think geographically. For example, some suggestions from my year 10 students were that Dr Maurizio had designed a lava-proof outfit or that he was being sponsored to wear a costume to raise money for a hazard relief project.

During the main part of the lesson, students were provided with a set of cards containing a range of information about the Italian earthquake (available to download from the TG pages of the GA website). The mystery cards provided them with varied information about the earthquake that needed to be organised and analysed to solve the mystery. Working in small groups, students divided their set of cards evenly between group members and read their cards out to each other, which encouraged active participation from all. A series of questions, shown in Figure 1, was then displayed on the whiteboard and each group of students worked to analyse the information and discuss their ideas and answers.

Finally, the groups shared their findings and the overall mystery question was discussed in the whole class. To consolidate learning, students then recorded their answers using the evidence they had processed and sorted from the cards as support.

Activity 2: Decision-making in role

Groups of students, in role as stakeholders (e.g. local residents or government officials) work through a series of problem cards (such as the one shown in Figure 2). For each problem they must make and justify a decision using supporting data; they can then use a newspaper article or textbook to discover what really happened. Decision-making in role covers the four essential elements of enquiry learning: students develop a desire to know what really happened after making their own decisions, they are provided with a range of geographical data which they must interpret in order to inform their role-play choices, and once the truth has been discovered students can compare their own decisions and reflect on the choices they made.

Why is Dr Maurizio wearing a new costume to work?

- 1. Who is Dr Maurizio? Where is he from?
- 2. What happened in the 2009 earthquake? What caused the quake?
- 3. What effect did the earthquake have on L'Aquila and its people? What were the primary and secondary effects?
- 4. Why is Dr Maurizio dressing up? What is he aiming to do? Who sent him and why?
- 5. Why is Dr Maurizio wearing a new costume to work? Do you feel he is helping the children? How? What else could be done?

This article explores the use of enquiry to teach about natural hazards. Three different teaching methods which use an enquiry approach are explained in detail: 'Mystery', 'Decision-making in role' and 'Who's in the bag?'. A stimulating lesson example for each of these three methods is covered (focusing on an earthquake, a cylcone and a flood respectively), with accompanying resources for the activities available to download from the GA website.

Problem 1

The Irrawaddy Delta has been badly affected by cyclone Nargis. Thousands of people have been left without food, water and shelter in urban and rural areas.

Do you...

- a) send aid to rural areas as this is where the majority of your population live?
- b) send aid to the cities as this is where important industries are located and where important wealthy people live?
- c) wait to send out aid until you have received reports on where it is needed most?
- d) send aid out to a mixture of urban and rural areas despite there not being enough aid for everyone?

Figure 2: A problem card for decision-making in role. All the problem cards for this enquiry can be downloaded from www.geography.org.uk/tg

Lesson example: Cyclone Nargis 2008 (Key stage 4)

This case study challenged students not only to consider hazard management, but also to explore how different countries such as Myanmar (formally known as Burma) are run very differently from their own. This activity involved students working in the role of Myanmar's government to decide and justify their course of action in the aftermath of cyclone Nargis, by working through a series of problems.

This lesson started with students analysing a photograph of cyclone damage in Myanmar, such as the image shown in Figure 3. Students were asked a range of questions about the photograph, with an emphasis on how the victims of the cyclone might have felt



Figure 3: The damage caused to Labutta by cyclone Nargis. Photo: International Federation of Red Cross

ring 2010 D Teaching Geography Students were then divided into groups of four and given a card providing some background information on Myanmar's government. In the role of Myanmar's government, students were asked to work through four consecutive problems. The problem cards were placed in the four corners of the room and a different group member collected the problem card each time, as and when their group was ready, to encourage them to manage their own learning. To ensure all students had an influential role in the decision-making process, the student who collected the problem card was responsible for reading the problem to the group and managing the group's discussion. The background information on Myanmar and a full set of problem cards can be downloaded from the TG pages of the GA website.

The problem was discussed in groups until a consensus had been reached, without taking a vote. Students found themselves forced to fully explain and justify their point of view, drawing on evidence to deepen their understanding of the issue (Ginnis, 2001). When groups reached a consensus, they recorded the problem, their group decision and an explanation in a summary table. This 'blank fill' table (available to download from the TG pages of the GA website) challenges students to understand the problem rather than simply copying from the problem cards (see Figure 4.). When the groups had finished making their four decisions, each group was provided with a sheet entitled 'What actually happened in Myanmar', containing news articles adapted from the BBC (available to download from the TG pages of the GA website). They could then read what actually happened in the country and complete the table.

The lesson ended with a class discussion on the success of different groups' decisions and their justifications. I found that my students had made a range of different decisions. This resulted in an interesting discussion on government decision-making across the globe. Students were also asked to consider the group decision-making process and why they thought there were differences between their decisions and the ones actually made in Myanmar by the government.

Activity 3: Who's in the bag?

This approach uses a drama activity known as 'Who's in the bag?' to introduce student to a range of stakeholders. Groups of students are given 'character bags', each containing a mixture of everyday items and geographical data. Students sort through the items and answer questions based on the 'five Ws' (who, what, why, where and when) to reveal the identity of the stakeholder, which they then present to the class.

The lesson continues with a hot-seating session in which selected students take on the role of $\boldsymbol{\alpha}$ stakeholder and answer questions posed by the rest of the class. The lesson finishes with a debriefing to draw out students' feelings towards the stakeholders. This activity also contains the four essential elements of enquiry learning by creating a need to know with everyday objects, which also serve as data to be processed. Students are required to interpret data to work out their stakeholder's identity, and then participate in a debriefing to enable them to reflect on their learning. I have found that chunking this type of lesson into three clear sections helps students to develop a much deeper understanding than if only one part of the activity is completed.

Lesson example: The 1999 Yorkshire floods (Key stage 5)

This activity allowed students to discover how real people were affected by flooding and encouraged them to empathise with flood victims and management agencies. This lesson sought to provide students with a real-world example and was taught after students had learnt about the generic causes of flooding.

For the main part of the lesson, the class was divided into four groups. Each group was given a bag containing facts about, and various pieces of property belonging to, one particular stakeholder who had been affected by the 1999 Yorkshire floods (available to download from the TG pages of the GA website).

Problem	Your answer (a, b, c or d)	Explain why	What actually happened in Myanmar? (a, b, c, or d)	Explain why
1. Should be sent to or areas?				
2. Should accept?				
3. How should you get to village communities?				
4. Should you let foreign into your country?				

Students analysed the items inside their bag in order to discover who their stakeholder was, what had happened to them and what problems they were now facing. Items included a tankard and beer mats for a landlord, train tickets for a commuter and a suit jacket for a flood manager. Students recorded information about their stakeholder on a write-up work sheet (available to download from the TG pages of the GA website).

Each group then presented the information they had discovered about their character orally to the rest of the class. As each group explained who was in their bag, the audience noted down information about the three other characters. When the whole class had been introduced to all of the stakeholders, groups then came up with questions they would like to ask the stakeholders during the hot-seating session. While constructing questions for the flood victims, each stakeholder group was instructed to choose one person to play the role of their stakeholder in the hot seat.

Four students came to the front of the classroom to sit in the four hot seats and respond to the questions from other students. This produced lively discussion among students around the lack of management and funding for flood defences in this area prior to the 1999 flood. To consolidate students' learning, and to encourage students to make connections between the different stages of this lesson, they were then set an exam question requiring relatively extended responses evaluating the effects and management of this flood.

Final word

The strong emphasis on the four elements of enquiry embedded into these activities resulted in the full engagement of both my year 10 and year 13

students. Creating a 'need to know' via big questions, interesting resources and unusual processes seemed to genuinely motivate students. They used geographical data enthusiastically to complete the tasks set, and follow-up work demonstrated the students' capacity to draw on a range of geographical evidence and make connections between different areas of their geographical understanding. As well as engaging students by using the enquiry approach, these activities also enabled them to work with real-world examples as required by the OCR B GCSE and OCR A2 specifications. 'Mystery', 'Decision-making in role' and 'Who's in the bag?' all successfully challenged students to enquire into the case studies of recent natural hazards, and their active involvement in the learning process resulted in more informed understanding. | **TG**

Online resources

Go to *www.geography.org.uk/tg* and click on 'Spring 2010'. Italian Earthquake

The Italian Earthquake mystery cards

Cyclone Nargis 2008

- Myanmar extra information
 and problem cards
- What actually
 happened in Myanmar
- Myanmar write-up table

The 1999 Yorkshire

- floods
- Stakeholder identity
- Who's in the bag?
- PowerPoint

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Figure 4: Write-up table for Myanmar decision-making exercise.

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