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Why use GIS?

This article compares year 7 students' learning using GIS to their learning from watching a DVD. It provides an example of a Google Earth enquiry on the River Severn, the format of which could be adapted to different topics of study. Both the author and the students highlight the benefits of using GIS as a tool for promoting independent learning and motivating students. The worksheet which accompanies this enquiry can be downloaded from the GA website.

GIS is fast becoming a feature of secondary school geography. It appears in three out of the four key processes in the 2008 National Curriculum for Geography. In support of GIS, Ofsted says that 'The use of geographical information systems is revolutionising and extending students' experiences in geography... Satellite technology can bring landscapes to life.' (Ofsted, 2008) However, it wasn't until I was required to use GIS with one of my classes (for an assignment while I was doing my PGCE at the Institute of Education) that I realised quite how beneficial a learning tool GIS can be.

I used Google Earth with a challenging year 7 class in an inner-London school and found there to be several benefits for learning:

- the students developed a greater sense of place than they had through video-based learning on the same topic
- students' spatial orientation developed
- using Google Earth promoted peer teaching
- nearly all students were more motivated to focus on learning
- more open and independent learning took place than during previous lessons with the class.

I had spoken to geography teachers who feared that using GIS could be too complicated, for themselves and for students. However, I found the opposite to be true. Moreover, it was easy to incorporate GIS into existing schemes of works, it didn't incur any additional costs and, importantly, it didn't require too much extra planning and preparation.

Teaching and learning strategies

My year 7 students were studying rivers, so this GIS activity was a structured Google Earth enquiry into the River Severn, but a similar enquiry could be devised for learning about any river, as well as numerous other physical or human topics (e.g. coastal landforms, location of shopping provision, land use in National Parks).

Prior to the Google Earth lesson, the students had studied:

- the shape and features of a river drainage basin
- the characteristics of a river's course
- river processes (erosion and deposition)
- the River Severn, from source to mouth, through watching a BBC education DVD.

The purpose of the latter was to enable a comparison between the learning achieved watching a video and the learning achieved using Google Earth. My assignment was to test the hypothesis: 'Students' learning is enhanced by using GIS'.

For the main activity in the GIS lesson, students followed a 'trail' of markers along the River Severn (see Figure 1) to answer questions on a worksheet. The questions were designed to reinforce prior learning on river features and processes, and to enable students to measure scale, direction and height above sea level. I hoped that, by doing this, they would build up a sense of the shape of a river basin and identify how the river changes shape along its course. In addition, I included questions to encourage the students to view the River Severn as a 'real place', running through a lived-in and living landscape (see Figure 2). They were required to apply their geographical and non-geographical knowledge to explain what they could see in the images. The worksheet can be downloaded from the TG pages of the GA website – see the end of this article.
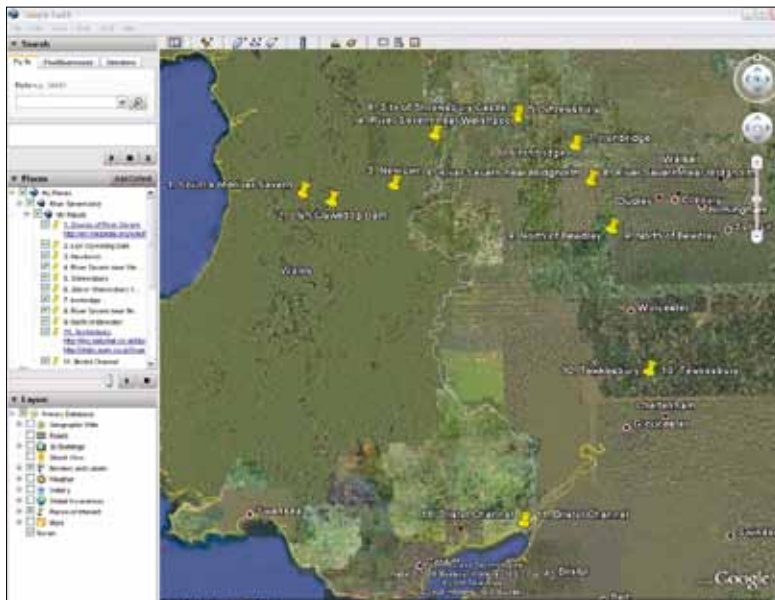
Planning for a Google Earth enquiry

When planning the Google Earth enquiry, I found it useful to consider a number of questions:

- In which of our topics could using GIS enhance students' learning?
- Where is the enquiry located? What is the Google Earth coverage in that area like? – e.g. is there 'street view' and if so will the students need to use it?

Figure 1: The trail of markers along the River Severn. Source: Google Earth © 2009 Europa Technologies © 2009 Bluesky, Infoterra Ltd & COWI AS © 2009 Tele Atlas © 2009 Infoterra Ltd & Bluesky.

In short, my students' learning experiences supported previous research into the benefits of using GIS – for example, Freeman (2005), who argues that GIS can provide opportunities to deepen and further students' learning.

- What do I want students to learn in terms of geography and Google Earth skills?
- What questions need to be asked for them to learn this?
- Do I need to teach the students how to use Google Earth?
- How can I assess students' learning?
- Are there any ICT limitations? (For example, the school IT support staff warned me that a class of students all using Google Earth at the same time would make the system run slowly. I was therefore able to explain at the start of the lesson that students' images might take longer than usual to focus, avoiding repeated questions about it later on.)
- How will students access the 'trail' I've created on Google Earth? (I was able to save my route to the school intranet so students could open it and save it to their own user areas, allowing them all to use it simultaneously. IT support staff should be able to advise on the best way to do this.)

Since my students had never used Google Earth in a lesson before, I incorporated some basic software instructions into the lesson (shown on the accompanying PowerPoint slides on the TG pages of the GA website). This enabled students to work more efficiently and avoided the pitfall of them being unable to access the geography due to a lack of ICT skills.

I anticipated (correctly) that the students would want to find their homes as soon as they opened the software, so I factored five minutes' 'playing time' into the start of the lesson. This gave the students an opportunity to familiarise themselves with the controls, and it meant that, when I asked them to start the enquiry, they had to 'fly' from their home to the source of the River Severn. This allowed them to develop a sense of the river's location in relation to a known reference point, thus developing their spatial awareness.
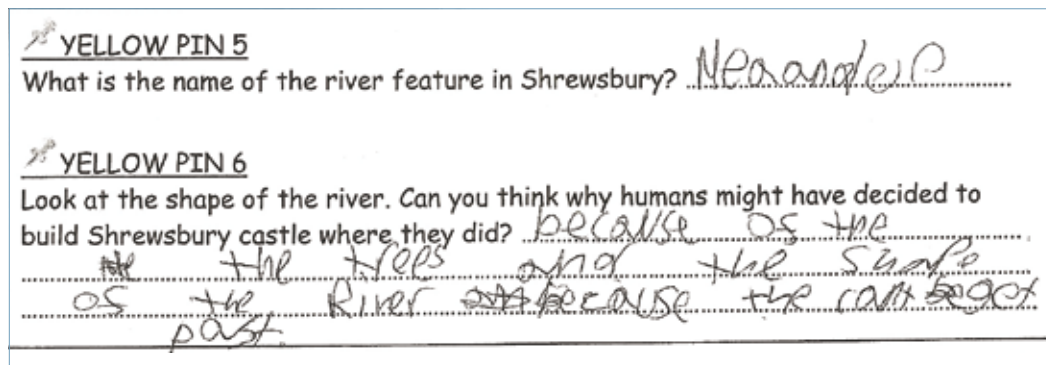
Learning opportunities

The students completed end of lesson evaluations. In these they highlighted two benefits of using Google Earth:

1. It allowed them more freedom
2. It was more fun.

As many as 71% of the class said they had learnt more using Google Earth than by watching the video, giving reasons such as 'Instead of watching it on TV and not going where you want, Google Earth can take you wherever you want to go' and 'I like looking about where it is and facts about it.'

The emphasis in these quotes is on students being in control of their own learning. By making sense of new information themselves, the students were better able to contextualise the information. For example, one boy made cross-curricular links with history to explain why Shrewsbury Castle was built on a meander. There was, then, a positive influence on their geographical learning, with the students using enquiry and thinking skills to generate individual answers, rather than recording generic answers. I found this to be in contrast to the students' behaviour watching the River Severn DVD, when they seemed to accept the facts they were presented with, rather than thinking for themselves.

🖉 YELLOW PIN 5
What is the name of the river feature in Shrewsbury? ...Meander...

🖉 YELLOW PIN 6
Look at the shape of the river. Can you think why humans might have decided to build Shrewsbury castle where they did? because of the the trees and the shape of the river because the can see past.

Many students commented that they found using Google Earth a more interesting way of learning (than the DVD) because it was 'fun'. This is in line with other research (Ofsted, 2008; Mitchell, 2009) and shows how motivating GIS/ICT can be. I noticed that the students who often caused low-level disruption were more on task than usual. This, of course, allowed other students to focus better on their learning. For example, one boy with dyslexia who struggled with written work and often lost focus by the end of a lesson worked solidly throughout, even wanting to continue working at the end of the lesson. The standard of his answers was also higher than usual (see Figure 3).

Assessment opportunities

The learning objectives for the Google Earth lesson were:

- to practise using GIS (see the online PowerPoint slides for the lesson)

- to develop a sense of place about the River Severn.

I assessed the former during the lesson by asking students to show me how they were finding the information for their answers. The latter was assessed through a homework task in which the students had to write a postcard from any location along the River Severn. They were asked to include as much detail as they could about the place and to describe what they could see using geographical terms.

I found using a non-GIS assessment task a useful way of checking the geography that the students had learnt. Leat (2001) suggests that tasks that require students to process information in order to 'transform' one thing into another are more challenging for the students.

The postcard proved that the students had learnt more than ICT skills alone, and it may, in fact, have been a more rigorous assessment of the students' geographical learning, as they had to synthesise their knowledge and present it in a different format.

Conclusion

Google Earth is available free and is easy to use. My experience showed how easily it can be incorporated into existing schemes of work. Using GIS created a palpable sense of excitement among the students, while undertaking an enquiry allowed them to be more independent learners. In the words of one year 7 student I worked with, 'I find it [Google Earth] interesting as you can find out things for yourself.' | **TG**

Online resources

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

- River Severn Google Earth Enquiry worksheet
- PowerPoint

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References
Freeman, D. (2005) *GIS in Geography Teaching and Learning*. Think Piece for the Geographical Association website, available at *www.geography.org.uk/projects/gtip/thinkpieces/gis/#3* (accessed on 30 May 2009).
Leat, D. (2001) *Thinking through Geography* (2nd edition). Cambridge: Chris Kington Publishing.
Mitchell, D. (2009) 'GIS: changing life and work – geographic information systems' in Mitchell, D. (ed.) *Living Geography – Exciting Futures for Teachers and Students*. Cambridge: Chris Kington Publishing. pp.131–43.
Ofsted (2008) *Geography in schools: changing practice*. London: Ofsted.