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APG Fieldwork & local learning benchmarking study: Innovation in fieldwork

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Introduction

This benchmarking study is the result of three months of research and visits to determine the current scope of Geography fieldwork in schools. It aims to give a broad overview of good practice in fieldwork, with a particular emphasis on innovation in fieldwork technology and topic coverage. The findings of the study have fed directly into the creation of a module plan for the fieldwork and local learning pages of the Geography Teaching Today website. The final section of the study, 'The role of the APG in advancing innovation in fieldwork', highlights how the findings of the study can be used as a catalyst for further developments in geographical fieldwork through the Action Plan for Geography.

The role and value of fieldwork

Victoria Cook, a PhD student at the University of Leeds, has conducted extensive research into the role and value of fieldwork. Her research focuses on schools in the Bradford area. She has found that the role of fieldwork can be grouped into five categories (using a categorisation proposed by Job et al. in 1999).

- i) Fieldwork supports the geography curriculum by promoting geographical knowledge and understanding, bridging the gap between the classroom and the outside world and reinforcing students' understanding of geographical concepts.
- ii) Fieldwork promotes the development of a range of transferable skills, including enquiry, numeracy, literacy and communication.
- iii) Fieldwork encourages students to develop an appreciation for a range of different environments, with implication for the conservation of sites and linking to education for sustainable development.
- iv) Fieldwork encourages students to consider and respect a range of perspectives on social, political and environmental issues, while giving them the confidence to justify their own opinions.
- v) Fieldwork encourages students to become independent learners and to develop teamwork, communication and leadership skills.

Victoria also highlights the value of fieldwork as a tool for raising the profile of geography within a school, and its potential to inspire and motivate a future generation of geographers.

Innovation in fieldwork

1. GIS

The potential to use GIS for fieldwork is great. Data collected by students can be inputted into programs either in the field using PDAs or back in the classroom. Students can then use the GIS software to generate maps showing patterns, trends and comparisons. Additional secondary data can also be applied to the program, encouraging students to work independently and draw their own conclusions about their findings. The use of GIS for fieldwork studies is becoming increasingly popular in schools as the price of software decreases and the provision of ICT facilities improves. However, this is not the case in all schools as many still lack the funds to invest in GIS materials and resources. Many teachers also lack the knowledge and / or confidence to integrate GIS into new or existing fieldwork activities.

There is a range of GIS programs available to schools. The most popular of these are ArcView, InfoMapper and Aegis, with other schools using MapsDirect, Memory-Map, Digital Worlds and others. Some LEAs provide schools in their area with free access to a particular GIS program, for example InfoMapper is available to schools in the South West Grid for Learning.

There is also the potential to use GIS through free applications available online. Google Earth is an obvious example of this. Students can explore places around the world and zoom in to get a closer look. For some locations, the resolution is so high that individual buildings and cars can be seen. The application also has a measuring tool, so it is possible to calculate distances between places. Noel Jenkins, author of www.juicygeography.co.uk has put together a comprehensive list of ideas for using Google Earth in the classroom, including a decision making exercise on locating a new hospital in San Francisco, and an activity to study glacial retreat.

- **Case studies:**

Students at Bishop's Stortford College are introduced to GIS on arrival at the school in Year 9, and it forms an important part of their geographical education until Year 13. The program used is ArcView. In Year 10, students use GIS to complete their GCSE coursework. Their investigation is an urban study of Bishop's Stortford, to see whether the town fits an urban land use model. The students collect land use data by hand, and input the data into the computer on their return to school. They then use secondary data such as socio-economic census data, historical maps and relief maps to analyse the structure of the town and to draw conclusions about the historical build up of housing and industry. They apply their findings to the urban land use models of Hoyt and Burgess. The use of GIS ensures that more able students were stretched and were able to work independently, while at the same time the program was accessible for less able students. The uptake of Geography at GCSE and A-level at the school is high. 75% of students study Geography GCSE, and of these, 50% continue the subject at AS/A2 level.

ArcView is also the program used by Leeds Grammar School. GIS has been integrated as a tool across the curriculum, and students are introduced to the technique in Year 6. The Geography department is currently piloting the use of PDAs to record data in the field. Year 8 students are taken on a day trip to Wharfedale where they complete a village study. Data on land use is inputted into the PDAs in the field, and is transferred into the ArcView package on return to school. Students are able to generate coloured maps based on their data findings, and can use historical, current and relief maps to draw conclusions about the development and use of the village over time.

The Geography department at South Molton College in Devon is provided with access to InfoMapper by their LEA. Students in Year 8 undertake an 'virtual' field enquiry into the proposed development of a tourist heritage centre in Exmouth. This is a real and controversial issue in the area. The InfoMapper package used by the students for this exercise incorporates a range of different maps, historical maps, aerial photos, weblinks and information about different stakeholders (letters, talking heads, raw economic data, etc.) in layers connected to a map of the area in the form of 'hotspots'. Students click on the hotspots to study the information and use it to weigh up the arguments for and against the proposed development. The final outcome of the project is a mock public enquiry, which may be run with other schools in the area. There is scope for this virtual project to include actual field data, as students are able to add their own data to the program. This may be in the form of questionnaires, environmental quality surveys, annotated photos or video clips.

2. Other new technologies and approaches

- **Video**

Dan Raven Ellison from Langtree Comprehensive School in Oxfordshire has been awarded an RGS-IBG Innovative Teaching Award for his use of video in geography. Students have been involved in filming explanations of geographical landforms and processes in the field, for example Durdle Door in Dorset. Students have also built plasticine models of the landforms back in the classroom and filmed animations of them undergoing change.

- **Digital photography**

David Rayner from The Grammar School for Girls in Wilmington, Kent has worked with digital photography to create 'virtual' fieldtrips. Students annotate digital photos with notes about the processes and landforms they saw on their trip.

Tools like Photostory 3 can be used to create stories using digital photos. Students can download their fieldtrip photos into the package, and then record a commentary to describe and explain the

processes seen. You can also add a soundtrack, turning your photos into a movie! Using a video editing website like Jump Cut, the film can be edited to allow annotations to be added.

• **Virtual fieldwork**

Des McDougall in the Department of Geography at Worcester University has produced 3-D images of his field sites for students to use for preparation and follow-up work, not to replace actual fieldwork. The images are produced using digital photography using a special tripod which allows photos to be taken in all directions from a fixed point. The photos are then stitched together using computer software, and the 3-D image is produced. It is possible to add annotations to the image, or alternatively students could record a commentary of the site. The images can also be used prior to a trip for student-centred risk assessments.

Dr Nick Hedley at Simon Fraser University, BC, Canada has developed even more advanced 3-D visualisation techniques, including desktop web interface, desktop 3D, immersive VR, and mixed reality interface to recreate landscapes. The outcomes of his work are used in a variety of settings, including formal educational settings with students from schools and universities. He is also working on projects to improve public understanding of geospatial topics such as avalanche hazards, groundwater mechanisms and impacts of use and tsunami hazards and risk mitigation.

Google Earth has very high resolution aerial photography coverage for places like London, allowing you to zoom in to street level. CASA, the Centre for Advanced Spatial Analysis at UCL are working on developing photo-realistic 3-D models of London which will enable students to walk down streets in London 'virtually', on the screen.

• **Data-logging**

The Geography Department of Uffculme School in Devon has invested in an electronic weather station linked into the school computer network. The weather station is installed on top of one of the school buildings. It is solar powered and transfers data via a wireless link. The data is processed and displayed on a monitor in the Geography Office which students can see as they walk past. Data is also displayed on the school website, where it can be used for homework tasks and by the local community. Data is archived, allowing analysis of trends over time. Although the students are not involved in actively collecting the weather data themselves, there is the potential for linked field activities to be developed.

• **Experiential learning**

Students from South Molton College in Devon 'experience' the landscape in a very hands-on way on their fieldtrip to the Lake District. They participate in 'scree cuddling', in which students lie face down on a scree slope and repeat a chant about the formation of scree and the principles of frost shattering! Other similar events in the trip include 'erratic rolling' and 'grike snorkelling'.

Simon Ross of Taunton College, Somerset, introduces his students to the 'awe and wonder' of Geography. On a trip to the Chiltern Hills in Buckinghamshire, students were encouraged to stand or sit for 10 minutes and look around them and enjoy the beauty of the landscape. They wrote Their feelings about the experience were expressed in the form of words, drawings and poetry. Ross argues that if students are allowed to develop a concern for a place or environment, they become more aware of the need to protect and conserve it.

Experiential learning for secondary students can include elements of sensory activities aimed at primary students (see 'Transition into KS3' section below). Gyles Morris from The Magdalene Project in Somerset gets students to write haikus to describe their feelings about a place and to show change (either past or future) using tracing paper overlays on a photo or sketch. He also integrates experiential learning into enquiry-led fieldwork activities, with key questions for an enquiry or project coming out of students' feelings about a place. For example, he uses the Ted Hughes poem 'The Jewel' as a starter for an investigation into river studies, or has a blindfold, barefoot walk across the river channel. This qualitative approach leads into a quantitative study where measurements are taken in the traditional way. The final part to the project is 'action', in which students discuss the issue they have studied and its relevance to them, and how they can take action to make a positive contribution to the issue. Students on a recent visit to the centre were

curious as to why they didn't get any reception on their mobile phones in the area. This resulted into an investigation into mobile reception, involving the study of settlement, population, relief and the drawing of isobar maps of mobile phone signals.

• **Mysteries**

Anthony Cheetham from Highfields School, Wolverhampton, received an RGS-IBG Innovative Teaching Grant for the development of his field-based 'mystery', "Who Killed G Joe Raphical?" During the course of the weekend trip to Snowdonia, the students have to solve the mystery by investigating a number of clues. The field techniques that they use include sampling and analysing soil from the boots of the suspects, and completing a site survey of the scene of the crime.

• **Enquiry**

Ian Dixon from High Arcal School in the West Midlands has written a Year 9 fieldwork exercise in which students undertake a decision-making exercise to decide whether the land next to the school is suitable for building a supermarket on. Students also complete an independent study into a suitable location for a business of their choice in the West Midlands.

Garry Atterton from The Castle School in Thornbury has worked with Mark Jones from the University of the West of England in Bristol to create a decision-making exercise looking at planning decisions in the Bristol Harbourside area. This includes a visit to a site that has potential for redevelopment in the area.

Kathryn Stephenson from Stokesley School (part of the PilotGCSE) involves her students in an enquiry entitled "Will York ever be safe from flooding?" This is a topic which includes both classwork and fieldwork. In the field, students follow the River Ouse from the edge of the city into the centre, and sketch, take photos and evaluate the hard and soft defences in place at various locations. They also compare what they are observing with photos of times when the river has been in flood to get an idea of the height of the floodwater. Back in the classroom, students use the Environment Agency website to generate a flood map and evaluate the success of existing flood defences using bi-polar scaling. Using the information they have collected, students then complete a decision making exercise to make recommendations for future flood defences. Their proposals are put forward in the form of a presentation to City of York Council.

Twinning

There are several ways that schools can engage in 'twinning' arrangements for fieldwork.

• **Twinning with a school in a contrasting locality**

Anjana Khatwa from the World Heritage Site of Dorset and East Devon has arranged an urban-rural school linking programme, initially between two primary schools in London (Southall) and Dorset (Isle of Portland). The programme involved reciprocal fieldtrips, with the London children visiting Portland to join the local school in a Portland Limestone 'sculpture' workshop, and the Dorset children visiting St Paul's Cathedral with their London counterparts to see how Portland Limestone has been used in the building of the cathedral.

• **Secondary/primary school twinning**

Sheila Moyle and Sarah Todd from Stanchester Community School in Somerset have developed a cross-phase fieldwork project between year 7 and Foundation Nursery children. The project is a traffic survey, and Year 7 and nursery students pair up and work together to display and present their results.

• **HEI twinning**

Kevin Cook from St Mary's University College in Twickenham works with five local secondary schools to provide fieldwork opportunities for A-level students and a taster of higher education. The fieldwork focuses on hydrology and soils, and the college makes use of a local nature reserve where there is a low flow, safe urban river on which to introduce students to hydrological principles. There is potential to develop this linkage further, involving students from GCSE classes and even Key Stage 3. The Department of Geography, Earth and Environmental Sciences (GEES) at the University of Birmingham also has a well developed liaison programme for schools, under the direction of Ian Cook and James Evans.

- **International exchange**

Whitstone Community School in Shepton Mallet has organised an exchange with a school in Ghana. This was organised through a local company based in Ilminster, the Global and Development Education Centre (GLADE). A group of students from Year 10 will visit Ghana in February, and the Ghanaian students will make their visit the following summer. The Geography curriculum at the school has changed so that students are now taught about Ghana in Year 9, and the students involved in the exchange will make a contribution to the learning of others by giving presentations and answering questions about their experiences.

3. Subjects

In addition to new techniques in geographical fieldwork, some teachers are experimenting with innovative subject areas.

- **Food deserts**

Noel Jenkins from Court Fields Community School in Somerset has developed a fieldwork activity based on 'food deserts', areas lacking facilities for the provision of fresh food. The activity was based in the rural area Blackdown Hills in Somerset. Students interviewed local residents about their shopping habits, and used PDAs to locate and describe food shops in the area. The data was interpreted and analysed using Aegis 3. The students concluded that the area was not technically a food desert, but the activity raised some important issues about the role of the local shop in a community and access to shopping facilities amongst sectors of the community, especially the elderly and disabled.

- **Accessibility**

David Caton, author of a chapter on "Real world learning through geographical fieldwork" in the GA Secondary Geography handbook has developed fieldwork on the topic of accessibility. The students visited Bridgnorth in Shropshire and walked through the town, creating maps which highlighted points of interest as well as possible barriers for less able visitors. The maps have been published, and are now available to visitors in the Bridgnorth tourist information centre. A blindfold walk could also form the basis for an accessibility study for visually impaired people.

- **Mobile telephone range**

Students to Gyles Morris' field studies centre, the Magdalene Project, questioned why their mobile phones didn't work in the area. This led to an investigation into mobile phone reception, with students recording and mapping the quality of their signal in a wider area and drawing isobar maps to display their findings.

- **Crime**

Year 7 students at Hampstead School conduct a field investigation into crime. They used questionnaires and surveys, plus site visits and observations to plot crime 'hotspots' on a map of the local area using GIS package Aegis 3. They found that the occurrence of muggings was highest around the school, and mobile phones were most likely to be stolen. They also found that males were most likely to be the victims of crime. They presented their findings to a panel which included police officers and a representative from Camden Council. The students gave some suggestions for how they thought crime levels could be reduced in the area, and in return received some advice about personal safety.

4. Inclusive fieldwork

Gatton Park Education, an outdoor education organisation located in the grounds of the Royal Alexandra and Albert School in Reigate, Surrey have held workshops for children from local Specialist Centres to link practical experiences with literacy activities. The children watch the changing seasons and weather and have workshops with local poets and artists. They created a mosaic based on their experiences for their school.

Other field studies centres, for example Sayer's Croft in Surrey, offer fieldwork sessions for students with physical disabilities. Activities often include sensory experiences of the landscape alongside outdoor pursuits.

Examples of good practice in inclusive geography fieldwork within mainstream schools is difficult to find. This is an area which needs to be addressed.

5. Local learning

Gyles Morris has developed a range of resources for teachers to use to in the school grounds for environmental investigations. These include tables for conducting sustainability ratings and energy audits which can tie into the school's environmental self evaluation.

The Royal Alexandra and Albert School has extensive grounds which they regularly use for fieldwork. Year 7 students are taken on an introductory walk around their grounds when they start at the school to find out more about their surroundings. They visit areas which are normally out of bounds, complete a quiz and locate photos of the grounds on a map. The school has recently invested in 6 satellite navigation systems, and hopes to integrate the use of these into the visit for next year. Year 7 also participate in a recycling themed day in the grounds. They spend half the day learning about natural forms of recycling, for example composting, the use of manure and the recycling of nutrients by trees. The second half of the day is spent in the classroom making paper and designing a 'green' packed lunch with minimal packaging.

The school currently offers a BTEC in Countryside Management, a very practical course worth 2 GCSEs which has some very geographical content, for example soil characteristics, the components of an ecosystem, the hydrological cycle and elements of recreation and tourism. The Geography department is planning to introduce a joint Geography and Countryside Management field day in the school grounds for Year 9 students, so that they can find out about the two courses. They will do some practical conservation / land management work in the school grounds, for example repairing fencing and clearing areas of land.

The school also makes good use of its local area for fieldwork. Year 7 students visit the Reigate Caves where they find out about local history (the caves were used as a bomb shelter) and also complete a town study of Reigate. Year 9 students are taken 6 miles by coach to Boxhill and walk back along the North Downs. They choose a site for a possible campsite (which back at school they design a website for in ICT), write a limerick about Leith Hill and describe the towns of Reigate and Redhill as sandwiches. They also identify plants, label a field sketch and practice orienteering skills.

Burntwood School in Tooting, south west London, takes Year 7 students on a visit to the London Wetland Centre at Barnes. Here, they learn about sustainability and in particular, sustainable gardening. On their return to school, they complete a decision-making exercise to select a suitable site for a sustainable garden within the school grounds, and draw and justify their plans for the garden. In 2004, students' plans were entered into a competition to design a sustainable garden for the Chelsea Flower Show. The students won, and their garden was built and exhibited at the Show. The school received £6000 prize money, which they put towards building their own sustainable garden. Other recent projects include a faith garden, designed by students with the help of the organisation Learning through Landscapes.

The Geography department of Crispin School in Street, Somerset, has involved students in local planning issues. The local council plans to build housing on an area of green space next to the school. The students have conducted fieldwork to analyse the advantages and disadvantages of using the site for housing, and have drawn up their own, alternative plans based on their findings. The students' proposals were presented to the planning department of the local council.

Alphington School in Exeter, Devon, has linked geography fieldwork to whole school issues through the development of their school travel plan. Students completed a survey of travel to school and used mapping technologies to identify hotspots of flows of people. They used their findings to identify the most suitable routes for 'walking buses'. Students also made a video to promote sustainable travel to school.

6. Fieldwork at the transition into Key Stage 3

Some recent developments in fieldwork at primary level have focused on multi-sensory experiences of place. Activities include:

- **'My special place'** – finding a place in the environment (or school grounds), standing in it for several minutes and experiencing the sights, sounds and smells of it.
- **'A sensory walk'** – one child is blindfolded and led around by a partner. The child is encouraged to use touch, smell and sound to describe the place and the features he/she encounters.
- **'Nature's pallet'** – children collect items from the environment and use these natural colourings to draw a picture or map of where they are.
- **'Smelly cocktails'** – children collect natural items, e.g. leaves and bark and describe the smell of these items and what the different smells remind them of / make them think of.
- **'Sound maps'** – Children mark their position in the centre of a piece of paper and draw lines to show the direction of any sounds that they hear. The thickness of the line represents the volume of the sound, with a thin line for quiet sounds and a thick line for loud sounds.
- **'Memory maps'** – On their return to the classroom, children draw maps from memory of the place that they have visited. They share their maps with other children, describing them and explaining what is important to them about the place,

Change over time can be explored through activities such as adopting a tree through the seasons, taking photos of it, writing poems about it and taking bark rubbings or collecting leaves and seeds to describe how it changes throughout the year. Children might also be asked to imagine what a place might look like in 50, 100 or 500 years, or what it might have looked like in the past.

Children can also be introduced to the study of environmental issues through investigations into pollution (litter, noise, air) in the school grounds / local area. This can be linked to a study of change – what change would they like to see in their area. Children can use simple pollution detectors to monitor air pollution.

Photograph tasks, such as 'spot the photo', can encourage children to develop navigation and observation skills. Children are given a photo of somewhere / something in the school grounds, and they have to locate it. They may also be given a map and asked to locate the site of the photo on the map. To develop this task further, into a study of change, children can write on their photos the things that have changed since the photo was taken ('spot the difference') or take current photos and do a comparison using ICT to annotate them.

Gatton Park Education, based in the grounds of the Royal Alexandra and Albert School in Reigate, Surrey, has developed a range of programmes for primary schools. Funded by sponsorship from a range of local organisations, the programmes are open to schools in the Surrey area. The activities include a recycling workshop, where children are taken to visit a local landfill site and the offices of the activity sponsor to find out about their recycling programme and then create recycled art (stained glass windows made from carrier bags) with the help of a local artist. Many of the activities that are run by the organisation combine creativity with numeracy and literacy, and encourage cross-curricular links between science, geography, art and drama. The organisation also runs after school environmental clubs at local primary schools, and has recently produced a document with resources for teachers to run their own clubs.

The role of the APG in advancing innovation in fieldwork

The Action Plan for Geography has a significant role to play in the advancing of geographical fieldwork. One of the particular strands of this is to advertise the innovation that is currently occurring in some schools and centres, as outlined in this study. The Geography Teaching Today website aims to become an online centre for geographical education, which teachers across the country can consult for ideas and advice. Many of the people whose work has been cited in the study have been contacted, and it is hoped that they may contribute ideas and case studies of good practice to the fieldwork and local learning pages of the Geography Teaching Today website.

In addition to this, the Action Plan for Geography aims to make further developments in terms of subject content and fieldwork technology. For example, links will be made with the Action Plan's Key Stage 3 resources for the new National Curriculum in topic areas such as the London 2012 Olympics and spectacular landscapes. There will also be a strong emphasis on local issues, encouraging teachers to take students into their local area and to focus on topics that concern them. These topics may include planning and regeneration issues, transport and environment, and will highlight themes studied in Citizenship schemes of work. Links with Education for Sustainable Development (ESD) will also be made, especially where students are working within their school grounds. Fieldwork based on environmental and energy audits, pollution and sustainability may contribute to schools' environmental self assessment.

In terms of technology, fieldwork case studies will aim to include elements of GIS using a range of software packages – including free applications such as Google Earth – plus 3-D imaging for virtual fieldwork. Other technologies that will be introduced via fieldwork activities include data-logging, mapping and innovative use of traditional techniques.

As well as focusing on subject content and fieldwork technology, the Action Plan for Geography aims to introduce new approaches to fieldwork. Through links with Higher Education Institutions, teachers will get the opportunity to work alongside academic geographers and to integrate current research on sites and topics into their teaching. Students will benefit from an insight into Higher Education and may be encouraged to pursue geography at Key Stage 4 and beyond. There is a role for undergraduate ambassadors to work alongside students in the field, easing some of the burden on teachers organising and leading trips.

The Action Plan for Geography will also address fieldwork at the transition into Key Stage 3. Geography is seldom a priority within Key Stage 1 and 2 curricula, and yet the profile of the subject may be raised through out-of-classroom learning. The Action Plan for Geography aims to develop and pilot new approaches to fieldwork that will create a link between Geography at primary and secondary Key Stages. Twinning projects will also be encouraged between primary and secondary schools.

A particular constraint to taking students out on fieldtrips is the administrative task of ensuring that activities comply with health and safety guidance, and that risk assessments are completed for activities and sites. Teachers may choose to avoid fieldtrips because of the bureaucracy involved. The fieldwork and local learning pages of the Geography Teaching Today website aims to remove this barrier to fieldwork through providing clear and simple guidelines and checklists for organising trips and pro-forma for risk assessments.

An area which requires further research and innovation is that of inclusive fieldwork. Fieldwork should be made available to students with a wide range of physical, educational and behavioural needs. The Action Plan for Geography aims to develop field-based activities that involve students with a range of needs, including stretching gifted and talented students.