UK Approach to Developing Thinking Skills in Curricula: Focus on Geography

Nick Hutchinson
Macquarie University

Teaching scenarios from David Leat

Let me paint a scenario from geography classrooms in the UK, penned by David Leat, now Director for Centre for Learning and Teaching, University of Newcastle upon Tyne. It seems eerily familiar. The lesson begins with ten minutes of rambling introduction followed by 30 minutes of student scrutiny of a lavishly illustrated textbook double-paged spread (Leat, 2000). The teacher is all too often a non-specialist geography teacher or overburdened head teacher. 'Books written to be virtually 'teacher proof', requiring minimal skilled intervention by the teacher, do not increase teacher professionalism and actually serve to encourage the creation of an unspoken pact in which teachers demand little, for which, in return, the pupils do not misbehave' (Leat, 1997).

Compare this scenario to the lofty aims of quality teaching in NSW public schools classroom practice guide:

- Pedagogy that promotes high levels of *intellectual quality*
- Pedagogy that establishes a high *quality learning environment*
- Pedagogy that generates *significance* by connecting students with the intellectual demands of their work (State of NSW, Department of Education and Training, 2003)

I want concentrate on the element higher-order thinking in the dimension *intellectual quality,* on the contributions to higher-order thinking by the Thinking Through Geography group, and, on teaching geography thinking skills within the context of the UK Leading in Learning whole-school programme for teaching thinking skills at Key Stage 3 (11-14 year-olds).

A conjuncture of pedagogical practice

David Leat's powerful productive pedagogies in curriculum development (Leat, 2002a) and his seminal contributions to the Thinking Through Geography group (Leat, 1998, 1999, 2001) are unconsciously supportive of the Quality Teaching model. Indeed, there appears to be a conjuncture of pedagogical practice that indicates that teaching thinking is a powerful force in global curriculum developments. There are two main disciplines feeding the field of teaching thinking: philosophy and psychology (Harpaz, 2003). There are examples of teaching thinking at various scales. Let's spiral up:

- Consider a contribution from a public school in Northern Territory.. Larapinta Primary School (Larapinta Primary School, 2005) online has succinct references to: multiple intelligence, Bloom's taxonomy, Krathwol's taxonomy, Learning Styles, Habits of Mind, Graphic Organisers, deBonos's Thinking Hats, and Ralph Pirozzo's Matrix (combining Blooms and MI).
- At a State level the Tasmanian Education Department is embracing teaching thinking in a substantial fashion. Its weblinks are wide ranging and impressive (Department of Education, Tasmania, 2006).
- An English as a Second Language site from New Zealand has an extensive list of Teaching and Learning Strategies and Tasks, including two strategies related to metacognition (Ministry of Education, New Zealand, 2006).
- Then there are the conference presenters and professional development gurus including Julia Atkin (Atkin, 2000), and Eric Frangenheim (Frangenheim, 2005).
- But the most impressive and most specifically relevant to geography teaching is the UK National Strategy , 'Leading in Learning developing thinking skills at Key Stage 3' (11 to 14 year olds) (DfES, 2005a).

The rationale for Leading in Learning

This Strategy owes much to David Leat's work. Leat was working for the DfES in the KS3 Strategy as a Regional Director 2001-2004 as a consequence of his initiatives in Thinking Through

Geography. The rationale for the Leading in Learning project is an interesting story. The initiative is not a revolution, says the DfES, but rather 'the culmination of decades of experimentation by educators who believed that it is important for students to be equipped to be good learners and thinkers.' (DfES, 2005a)

The psychological and social-cultural perspective

The psychological perspective, which informed the Strategy, acknowledged Piaget's contribution. This viewpoint informed the successful UK Cognitive Acceleration through Science and Maths Education programs. The social-cultural perspective recognised Vygotsky's contribution. The Russian social anthropologist regarded language as an instrument of thought which acted as a catalyst for cognitive development. Vygotsky also developed the concept of a Zone of Proximal Development (ZPD), translated more recently as 'Zone of Potential Development'. 'The ZPD is the gap between what an individual is able to do alone and what they can do with an adult or peer who is more knowledgeable or skilled. This gap closes as the child gradually masters and internalises the thinking that they managed with peers or an adult. Vygotsky laid the foundations for believing that children could be taught to be better thinkers and learners, through the medium of language.' (DfES, 2005a)

One model of the brain, introduced by the Leading in Learning materials distinguishes between long-term memory and working memory. 'Long-term memory is where information is stored. It has no recognisable limits – it holds huge quantities of information. Once something is in long-term memory, it is there for our lifetime (except in the case of brain damage). Forgetting is a problem of retrieving information rather than of it being lost. The working memory is where active thinking is going on. Information enters and exits at high speed. Information from the environment arriving via nerve impulses from seeing, hearing, touching etc. interacts with information from long-term memory. At a simple level, one sees a chair and long-term memory checks to see if the incoming signals fit anything experienced before. Once the object is recognised, associated information is made available (what chairs are like, used for etc.).' (DfES, 2002)

As Leat explains, 'If no connection can be made with existing knowledge then the new information will be lost. … It is hypothesised that there is a very productive and important mid point between these conditions, where some connection is made but there is a mismatch between the incoming and the established knowledge. This is termed cognitive conflict and when and if resolved is associated with the formation of new concepts. Just occasionally we get a small window on this happening for a student, when they may say with feeling, Ah – I get it!' (Leat, 1998) The constructivist Jerome Bruner (Leat, 2002b) regarded group work as an essential ingredient in achieving this fit. He saw group work as a form of scaffolding which allows for successful completion of tasks that are too difficult for some individuals in the group.

The philosophical perspective

The philosophical perspective owes much to Matthew Lipman, who came to prominence in the 1980s. Lipman argued that young children are natural philosophers intent upon enquiry. (DfES, 2005a) 'Originally a university philosophy professor, Lipman was unhappy at what he saw as poor thinking in his students. He became convinced that something was wrong with the way they had been taught in school when they were younger. They seemed to have been encouraged to learn facts and to accept authoritative opinions, but not to think for themselves. … Lipman firmly believes that levels of sophistication in thinking are arrived at by practice in appropriate forms of thinking, not according to biological development, or to any form of stages of development, such as those identified by the Swiss psychologist, Jean Piaget. As soon as children can speak, they are using reasoning, according to Lipman.' (DfES, undated)

The fourth strand, metacognition

The fourth strand, metacognition flows from cognitive science and the legacy of Piaget and Vygotsky. In simple terms metacognition means thinking about thinking. (DfES, 2005a) It refers to student abilities to predict their performances on various tasks, to monitor their current levels of mastery and understanding. The types of learning that are congruent with metacognition as a practice involves sense-making, self assessment and on reflection of successful learning episodes

as well as their limitations.(Bransford, 1999) Metacognition is also thought increase the degree to which students transfer their learning to new settings and events. Transfer is akin to bridging. Leat refers to bridging as a long cherished ambition of educators to bring students to the point where they are able to tackle unfamiliar problems. (Leat, 2002b) Recognition of this strand alters the learning context. Jeana Kriewaldt explained, 'Integrating a metacognitive dimension into geography could only work if the delivery of the course is –to some degree- student centred and constructivist.' (Kriewaldt, 2001)

Student motivation and self-theories

The final perspective relates to research on student motivation and self-theories. 'The American researcher Carol Dweck has been especially important in building understanding in this field and making it accessible. Dweck argues that pupils' willingness to engage in challenging open-ended tasks is strongly related to the 'naïve' theory they have about ability or intelligence. Some pupils believe ability is not fixed and that you improve by learning from challenging tasks, while others believe that you are born with a fixed ability. The latter group do not like learning challenges as they risk confirming that they are not clever or that they are not as clever as they think. Such pupils like routine or predictable work, and it is success in such mundane tasks that may encourage the theory of fixed ability.' (DfES, 2005a)

Higher-order thinking

The Quality Teaching program emphasises higher order thinking. 'Higher-order thinking requires students to manipulate information and ideas in ways that transform their meaning and implications. This transformation occurs when students combine facts and ideas in order to synthesise, generalise, explain, hypothesise or arrive at some conclusion or interpretation. Manipulating information and ideas through these processes allows students to solve problems and create new (for them) meanings and understandings. When students demonstrate higher-order thinking, they may also generate unexpected concepts, ideas and products which can take the learning in new directions.' (State of NSW, Department of Education and Training, 2003)

Leading in Learning also includes a section on higher order thinking. It explains that one of the difficulties in teaching thinking skills is that it is more difficult to identify the learning that has taken place. This is where debriefing is vital to the success of such a learning episode. In order to draw out the types of thinking that has taken place it is necessary for the teacher to be very clear about the characteristics of higher order thinking.

Lauren Resnick (Resnick, 1987, DfES, 2004) has characterised higher-order thinking as follows:
  • higher-order thinking is not *routine* – your planned actions cannot be totally specified in advance;
  • higher-order thinking tends to be *complex* – the total path is not visible
  (mentally speaking) from any single vantage point;
  • higher-order thinking often yields *multiple solutions*, each with costs and
  benefits, rather than unique solutions;
  • higher-order thinking involves *nuanced judgements* and interpretation;
  • higher-order thinking involves the application of *multiple criteria* which
  sometimes conflict with one another;
  • higher-order thinking involves *uncertainty* – not everything that is relevant to the
  task at hand is known;
  • higher-order thinking involves *self-regulation* of the thinking process – this does
  not occur when someone else tells you what to do at every step;
  • higher-order thinking involves *imposing meaning* or *finding structure* in apparent disorder;
  • higher-order thinking is *effortful* – there is considerable mental work involved in
  the kinds of thinking and judgements required.
  (Resnick, 1987, DfES, 2004)

Thinking Through Geography

Thinking Through Geography is a powerful vehicle for higher-order thinking. It has set three broad aims (Leat, 1997):

- to devise adaptable strategies and curriculum materials that make geography lessons more stimulating and challenging;
- to help pupils understand some fundamental concepts and develop some important cognitive skills in geography in an explicit way so that these can be transferred to new contexts;
- to aid the intellectual development of pupils so that they can handle more complex information and achieve greater academic success

Consider the enthusiasm of a Dutch geography teacher: 'After the workshop at the Free University in Amsterdam I used a TTG (Thinking Through Geography) strategy in an upper secondary school during the last hour of a Wednesday afternoon. It is unbelievable what happened. Normally this is not an easy hour, but this time they worked very hard. There was an energetic discussion about a migration case between Mexico and the USA. They all wanted to know the correct answers. It was a relief for them to learn during the debriefing that there was not one but there were several correct answers depending on the way of thinking. All pupils were involved because everybody could give an answer. So, it was an eye-opener and really great fun. And after all those years as geography teacher this is a new challenge for me as a geography teacher too for I am rethinking geography and teaching.' (van der Schee, 2003)

A variety of teaching materials was developed by the Thinking Through Geography group:
1. **Mysteries** are student centred tasks. The mystery being an open ended question with data supplied on a number (usually twelve to thirty) cards displayed face up to groups of students.
2. **Living graphs** bring such diagrams to life by encouraging students to annotate the graph with statements or possible events that pertain to the data and relationships depicted on the graph.
3. **Mind movies** are a more risky strategy involving quick motivating responses and insights into students thinking through the development of visual memory skills.
4. **Odd one out** is also beautifully simple involving students picking the odd one out from a list of words.
5. **Story telling**, (using the narrative element in the Quality Teaching model) is a powerful and effective way of conveying geographical information.
6. In **Fact or Opinion** judgements about the veracity of geographical information need to be made.
7. **Classification** asks students to identify attributes and to group these objects or events.
8. **Reading Photographs** is of course, concerned with visual literacy rather than regard the photographs as adjuncts to text.

More Thinking Through Geography added
1. **Most Likely To,** relies on data in a similar form to Mysteries, a set of assertions that encourage students to build, test and modify their understanding of generalisations.
2. **Maps from Memory,** are explained in the Internet link (Leat, 2006).
3. **Making Animals, (and plants)** is a fun way of applying some of geographies essential questions in order to understand environments. There is an intriguing exemplar using this framework to examine Mexican migration to California.
4. **Five Ws,** again focuses on essential questions (what? where? who? when? why?) It involves students to ask questions and to consider the underlying logic of asking particular questions in particular ways and in a particular order.
5. **Taboo,** is another simple activity similar to odd one out. It is a game involving describing given words without being able to use the ones that come most readily into a student's vocabulary.
6. **Layered Decision Making,** underlying idea is to introduce students to successively complex, realistic, challenging and unpredictable events to mirror the kinds of decision making that takes place in the real world.
7. **Concept Maps** are not brainstormed diagrams, they are graphic organisers of the relationships between component concepts embedded in a theme or issue.
8. **Predicting with Video** is a strategy which builds on many student's enhanced visual and auditory intelligences. (McKenzie, 1999)

There are many Thinking Through Geography lessons posted on the Internet. Some support the two texts but others have been posted by individual teachers. The lists are staggering. (Kington, 2006, Leat, 2006, Russell, 2004, Wilson, 2003, Phipps, 2002)

Leading in Learning developing thinking skills at Key Stage 3

'Leading in Learning is a whole-school programme for teaching thinking skills at Key Stage 3. The programme takes a cross-curricular approach, rather than separately timetabled lessons or programmes confined to a particular subject. The main reason for this is the desire to maximise transfer of learning – to help pupils develop and use their thinking skills in all subjects and in other aspects of their lives. The model is innovative in requiring planning across departments, using cycles of **three lessons**, one in each of **three subjects**. For the occasional lesson teachers are invited, without abandoning their subject, to set subject content in a context where the objective is to develop a selected thinking skill and explore how it might be used in other subjects or in real life.' (DfES, 2005a)

These ten teaching strategies adopted have all been tried and tested in UK classrooms:
1. Advance organisers
2. Analogies
3. Audience and purpose
4. Classifying
5. Collective memory
6. Living graphs and fortune lines
7. Mysteries
8. Reading images
9. Relational diagrams
10. Summarising

(DfES, 2005a)

Another document 'Leading in Learning Exemplification in geography' contains detailed instructions and templates in order to initiate teaching thinking in the geography classroom. (DfES, 2005b) Another, offers ESL support for Leading in Learning. (DfES, 2002b)

Something to think about

Geographical educators in the UK and scientists in the US both advocate teaching thinking in a subject context rather than in a stand alone program. John Morgan and David Lambert assert that, 'if pupils are to think' it is surely school subjects that give them *something to think about'* (Morgan, 2005). The US Committee on Developments in the Science of Learning maintained that, 'In-depth understanding requires detailed knowledge of the facts within a domain. The key attribute of expertise is a detailed and organized understanding of the important facts within a specific domain. Education needs to provide children with sufficient mastery of the details of particular subject matters so that they have a foundation for further exploration within those domains.' (Bransford, 1999) David Leat and the Thinking Through Geography group have another worthy aim: to make geography more popular in the middle school and increase the number of students electing geography in post compulsory education.

References

Atkin, J (2000), *An Outline of Integral Learning* Retrieved April 2006
http://www.learningtolearn.sa.edu.au/Colleagues/files/links/IntegralLearning.pdf.
Bransford, J.D. (1999) *How People Learn: Brain, Mind, Experience and School* Washington D.C.: National Academy Press Accessed April 2006
http://newton.nap.edu/html/howpeople1/ch1.html
Department of Education, Tasmania (2006) *Effective Teaching: Thinking* Retrieved April 2006
http://ltag.education.tas.gov.au/effectteach/Thinking/default.htm
DfES (2005a) *Leading in Learning developing thinking skills at Key Stage 3 Handbook for Teachers* Retrieved April 2006 http://www.standards.dfes.gov.uk/keystage3/respub/ws_lil_ts
DfES (2005b) *Leading in Learning Exemplification in geography,* Retrieved April 2006
http://www.standards.dfes.gov.uk/keystage3/respub/ws_lil_ts

DfES, (2004) *Pedagogy and Practice: Teaching and Learning in Secondary Schools Unit 16: Leading in learning,* Retrieved April 2006
http://www.standards.dfes.gov.uk/keystage3/respub/sec_pptl0

DfES (2002a) *Training materials for the foundation subjects Module 11 Principles for teaching thinking* Retrieved April 2006
http://www.standards.dfes.gov.uk/keystage3/respub/fs_trmat

DfES (2002b) Access and engagement in geography – EAL, Retrieved April 2006
http://www.standards.dfes.gov.uk/keystage3/respub/fs_ge_eal

DfES (undated) *History of thinking skills development*, Retrieved April 2006
http://www.standards.dfes.gov.uk/thinkingskills/guidance/567257?view=get

Frangenheim, E. (2005) *Reflections on Classroom Thinking Strategies Practical Strategies to Encourage Thinking in your Classroom* London: Paul Chapman Publishing

Harpaz, Y. (2003). *Approaches to teaching thinking: Toward a conceptual mapping of the Field Mandel School,* Jerusalem, Israel, Retrieved April 2006
http://www.learningtolearn.sa.edu.au/Colleagues/files/links/Approaches_to_Teaching_Thi.rtf

Kington, C. (2006) *Chris Kington Publishing* Retrieved April 2006
http://sharedweb.srv.poptel.org.uk/chriskingtonpublishing/acatalog/Geography.html

Kriewaldt, J (2001) A thinking geography curriculum, *Interaction,* 29.4, Retrieved May 2005
http://www.gtav.asn.au/Interaction/issues/v29n4_dec01/metacognition.htm

Larapinta Primary School, (2005) *Thinking Toolbox* Retrieved April 2006
http://www.schools.nt.edu.au/larapsch/toolbox.htm

Leat, D. (2006) *Thinking with maps* Ordnance Survey UK, Retrieved April 2006
http://www.ordnancesurvey.co.uk/oswebsite/education/teachingresources/mapwork/thinkingwithmaps.html

Leat, D. & Higgins, S. (2002a) The Role of powerful pedagogical strategies in curriculum development, *The Curriculum Journal*, British Curriculum Foundation,13.1.71-85

Leat, D (2002b) Raising attainments in Geography, Smith, M (ed.) *Teaching Geography in Secondary Schools* London: Routledge/ Open University

Leat, D. , Kinniment, D. & Nichols, A. (2001) *More Thinking Through Geography* Cambridge: Chris Kington Publishing

Leat, D. (2000) The importance of 'big' concepts and skills in learning geography, Fisher, C. & Binns, T. *Issues in Geography Teaching* London: Routlege

Leat, D. (1998) *Thinking Through Geography* Cambridge: Chris Kington Publishing

Leat, D. & Nichols, A. (1999) *Mysteries Make You Think* Sheffield:P Geographical Association

Leat, D. (1997) Cognitive acceleration in geographical education, Tilbury, D. & Williams, M. (eds.) *Teaching and Learning Geography* Routledge: London

McKenzie, W (1999) *Multiple Intelligences Inventory,* Retrieved April 2006
http://surfaquarium.com/MI/inventory.htm

Ministry of Education, Wellington, New Zealand (2006) ESOL Online, Retrieved April 2006
www.tki.org.nz/r/esol/esolonline/strategies_e.php

Morgan, J. & Lambert, D. (2005) *Geography*: *Teaching School Subjects 11-19*, London: Routledge

Phipps, K (2002) *Thinking Through Geography*, Swanshurst Beacon School, Retrieved April 2006
http://www.geoworld.co.uk/teacherguidance.htm

Resnick, L (1987) *Education and learning to think*, Washington D.C.: National academy of Sciences, printed in DfES, (2004) *Pedagogy and Practice: Teaching and Learning in Secondary Schools Unit 16: Leading in learning,* Retrieved April 2006
http://www.standards.dfes.gov.uk/keystage3/respub/sec_pptl0

Russel, K (2004) *Thinking through geography*, Staffordshire Learning Network, Retrieved April 2006
http://www.sln.org.uk/geography/thinking_through_geography.htm

State of NSW, Department of Education and Training (2003) *Quality Teaching in NSW Public Schools A Classroom Practice Guide* Ryde: Professional Support and Curriculum Directorate, Retrieved April 2006
http://www.curriculumsupport.nsw.edu.au/qualityTeaching/index.cfm?u=2&i=6

van der Schee, J. et al. (2003) The International Challenge of More Thinking Through Geography, *International Research in Geographical and Environmental Education* 12.4.337

Wilson, D.R. (2003) *Reflective Curricula: Thinking Skills in Geography,* Retrieved April 2006
http://www.tomwilson.com/david/NC/Thinking/Ge.html