Curriculum Design and Epistemic Ascent

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Aim of this Talk

- To indicate the different kinds of knowledge relevant to curriculum design
- To map their relationships
- To trace the novice-expertise trajectory in curricula
- To look at some problems in curriculum design

The Concept of Epistemic Ascent:
the movement from novice to expert in terms of a body of knowledge
Three Kinds of Knowledge

- **Acquaintance** – encounter through perception
- **Propositional** – grasp of a proposition
- **Practical** – knowing how to perform an action

Acquaintance Knowledge

- I see a person, hear a symphony, smell a flower and taste a fruit
- Often a necessary element in understanding a phenomenon
- Fascimiles do not always provide a strong or detailed enough acquaintance

Propositional Knowledge

- I know that London is the capital of England (p)
- Know = to have justified true belief that p (the JTB thesis)
- But very often p is accepted through reliance on testimony (where is the J?)
- Propositions tend to form a system
Practical Knowledge

- John knows how to ride a bike
  - John can ride a bike
  - There are right and wrong ways of riding a bike
  - Riding a bike is appraisable
  - Riding a bike is an intentional activity
  - Know how involves: ability, normativity, intentionality

A Significant Ambiguity in English

- A knows how to F can mean either:
  - A can actually perform F
  - A can give an account of how F is performed

Types of Practical Knowledge

- Skill: ability to perform circumscribed tasks
- ‘Adverbial verbs’: eg: planning, communicating, evaluating. They can be done using different skills
- Project management: seeing through an extended intention from conception to evaluation
### Is singular propositional knowledge a myth?

*The table in the kitchen is brown*

Entails:
- It is not green
- It is coloured
- It has spatial dimensions

This is a general point, particularly relevant to systematic knowledge.

### Exploring Conceptual Relationships

- This is not usually a matter of formal logic
- "The kind of inference whose correctnesses essentially involve the conceptual contents of its premises and conclusions may be called, following Sellars, "material inference." (Brandom 1998, *MIE* p. 97)

### Contingent and Systematic Propositional Knowledge

- Even "The table in the kitchen is brown" entails other propositions
- But much knowledge is organised systematically (e.g., curriculum subjects)
- Entailment relationships are more systematic and hierarchical than in the case of contingent knowledge
An Observation About Concept Formation

- There is a strong element of connectedness in the way in which concepts are acquired.
- It does not follow that complete conceptual grasp is attained in one step.

Hirst’s Forms of Knowledge Thesis

- Central organising concepts
- Central propositions
- Propositions which bear inferential relationships with each other (usually systematic)
- Ways of validating knowledge
- Ways of acquiring knowledge

More on Hirst

- Understanding conceptual and propositional relationships involves inference – a practical ability.
- We don’t merely learn facts or ideas but the relationships between them – otherwise they are of little use, even at an elementary level.
Transitions...

- Testimony-derived knowledge also entails knowledge of inferential relationships.
- But before too long the need to separate knowledge and belief in one's understanding becomes evident.
- This brings the question of justification to the fore.

A Potential Problem

- On the view outlined here, the development of know-how is absolutely central to progression in knowledge of a subject.
- This is widely accepted, but begs the question as to what kinds of practical knowledge and when should they be introduced?

A conservative approach to the issue

- Recognition of the interdependence of the three kinds of knowledge within the curriculum.
- Recognition that there is an optimum sequencing of their introduction.
- Recognition that this does not necessarily correspond to the most elegant account of the conceptual structure of a subject.
A modest proposal

- explore the non-negotiable constraints that the conceptual structure of any subject might impose on pedagogically and cognitively coherent schemata of epistemic ascent
- go on to explore the implications of such constraints within particular conceptualisations of individual subjects

Epistemic Ascent within a Subject: a worked example - Science

- Introduction to basic conceptual structure – draws on and builds on non-systematic conceptual frameworks in everyday life.
- Cause and effect; matter; energy; force
- How these are related through appropriate exemplification, explanation etc.

Some Pedagogic Observations

- The systematic nature of the subject is significant – it should be reflected in the way that it is taught
- This suggests that *ad hoc* approaches to knowledge acquisition will lead to a loss of the sense of systematicity and significant gaps in knowledge
A Rylean Move

- “The surgeon must indeed have learned from instruction, or by his own induction and observations, a great number of truths” (The Concept of Mind, p.49)

- But would the surgeon be allowed to learn in an *ad hoc* manner before being allowed to practice?

Learning How to Conduct Enquiries

- Experimentation involves very particular procedures, developed over centuries.

- Should pupils be allowed to discover what these procedures are by themselves?

The Perils of Prefiguration

- Acquiring basic conceptual structure is not the same as acquiring basic principles
- The former involves being able to *use the language* of, e.g., cause and effect, albeit in a relatively simple way
- It need not involve the acquisition of a principle, although it is a preliminary to doing so
More on Learning by Doing

- To be able to replicate an experiment is not to be able to conduct an experiment.
- Replication may be a necessary preliminary to conduct.
- With replication I can enactively ‘give an account’ of how it is done without actually being able to do it independently.

Experimentation as 3rd Order Know-How

- It is a form of project management.
- It involves second order activities such as planning, co-ordinating and evaluating.
- It presupposes particular skills such as those connected with observation, manipulation, reading of instrumentation etc.

A Prefigurative Fallacy?

- Expertise involves know-how in managing knowledge.
- One needs to acquire know-how in order to become expert.
- When minimal features of this know-how have been acquired, an elementary form of expertise has been acquired.
An Alternative View

- Different types of know-how are nested
- One has to acquire them in sequence
- They are significantly different in kind from each other
- One can possess the semblance of a form of know-how without possessing the substance

For example

- Planning requires skills of various kinds
- One can exercise these skills without actually planning anything
- One needs to exercise the appropriate skills in the appropriate context with the necessary degree of attention and seriousness

Example 1 – Ambiguities in the History Curriculum – KS3 Historical Enquiry and the Use of Evidence

Pupils should be able to:
- identify and investigate, individually and as part of a team, specific historical questions or issues, making and testing hypotheses
- reflect critically on historical questions or issues
- identify, select and use a range of historical sources, including textual, visual and oral sources, artefacts and the historic environment
- evaluate the sources used in order to reach reasoned conclusions.
What does this actually mean?

- It cannot mean doing this as a professional historian does, as part of a research programme
- What exactly is expected of pupils needs to be specified more carefully

Science: By Way of Contrast

- use a range of scientific methods and techniques to develop and test ideas and explanations
- plan and carry out practical and investigative activities, both individually and in groups
- obtain, record and analyse data from a wide range of primary and secondary sources, and use their findings to provide evidence for scientific explanations
- evaluate scientific evidence and working methods.

Commentary

- The descriptors for Science KS3 are more conservative than they are for History, particularly if:
  
  “develop and test ideas and explanations”
  is interpreted cautiously
But at Science KS4

- Under practical and enquiry skills (a misnomer)

  “plan to test a scientific idea, answer a scientific question, or solve a scientific problem”

- Which arguably raises problems if interpreted in the full sense – but could be interpreted as replicative activity

Design and Technology

The four areas of activity specified, from KS1 onwards are:

- Developing, planning and communicating ideas
- Working with tools, equipment, materials and components to make quality products
- Evaluating processes and products
- Knowledge and understanding of materials and components

A Reservation

- It is arguable that the know-how involved in D&T needs to build on skills and an acquaintance with the properties of various materials before such higher order forms of know-how such as planning and evaluating can be meaningfully introduced

- By the end of KS2 they should be able to engage in project management – is this feasible?
Progression in Practical Curricula

- The need to distinguish between different orders of know-how and to recognise that there is a hierarchy.
- The need to distinguish between enactive accounts of how something is done from the independent doing of that thing.

Tentative Conclusions 1

- Acquaintance Knowledge:

  extended primary acquaintance with, for example, properties of materials, may be a necessary part of some subjects eg D&T in order to build both propositional and practical knowledge.

Tentative Conclusions 2

- Propositional Knowledge:

  To pay attention to secure grasp of conceptual relationships and material inferences that embody conceptual and factual relationships.
Tentative Conclusions 3

☐ Practical Knowledge

1. To get away from ‘skill talk’ and to recognise the different kinds of practical knowledge and their relationships with each other

2. To be aware of the relationships between practical and the other kinds of knowledge