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Peer evaluation of whole-class teaching

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Lesson evaluation can imply an assumed general model for good teaching, pre-specified for all teachers, classes and lessons, and an assumed authority by the observer to make judgements. This is often challenged by reference to the specific conditions of the class and the teacher. An alternative mode of evaluation can simply be a 'second opinion' by a peer, based on an agreed desirable model for the given lesson and class. This would also take into account the professional development trajectory of the teacher..

An example of a model of observation notes on a trial of a Thinking Maths lesson is discussed to disentangle some of the issues involved. They point to Formative Interactive Feedback being the main aspect of the peer-tuition in evaluation.

Types of lesson evaluation

Observation of classroom teaching may have various implicit or explicit foci. For example the focus of ***lesson development*** observations (see e.g. Adhami et al, 1999) is the appropriateness of an activity for a an intended 'typical' group of children This is distinct from ***pedagogic observation*** in conducting a fully developed lesson where the focus is teacher's management of classroom interactions.

Within the pedagogic observation, some observations may have *specific research foci* such as recording the types of questions asked or 'pupils' time on task'. More often, however, observation has a *general pedagogic purpose*, i.e. the evaluation of the effectiveness of teaching, which by implication is evaluation of the teacher. That is broadly the function of observation by the teacher trainers, LEA advisors, and ofsted inspectors. This paper addresses tensions in this type of observation, what is possible to evaluate through a single lesson observation., the realistic criteria for meaningful evaluation, and the possibility of moving to collaborative or peer-evaluation..

Scores of observation forms has been devised in the last few years, often with many details and scores to be recorded under several headings. This is similar to the now abandoned checklists for pupils assessment. But classroom practice is even less amenable to detailed recording than progression in topics, and there is no one model of good teaching. Significant in this respect is how the ofsted Evidence Form used for lesson observation has moved away from six separate sections (1993) towards a single one for notes (1999). That seems a recognition of the integral, 'organic' or 'holistic', nature of classroom events where aspects overlap. We seem to be moving to more thoughtful identification of what is more or less significant in the art of teaching, what are surface or deep features, and how to combine intuitive judgements with recorded instances.

But ofsted observations remain of a ***summative*** nature, and ends with the four scores for Attainment, Teaching, Learning and Attitudes. This seems to undo its real value for the teacher. Oftsed recent documents and courses call for inspection to be sensitive and informative. But that undermined by the fact that inspectors themselves have no unified clear view of what good teaching is. In a recent inspectors' course the convenor indicated that scores from 3 (better than satisfactory) to 5 (less than satisfactory) for a videoed lesson are common and not to be worried about. There is no general explicit model for effective teaching amongst practitioners of various styles, partly due to the diversity of aims of different lessons, some of which may not be pupils' acquisition of given skills, preferred by ofsted, but are as, or more significant. Correspondingly there is little agreement of what constitute valid evaluation of classroom teaching.

Role of peer observation in professional development

It seems appropriate to extend the notion of formative assessment from its domain in the feedback to pupils about their learning to the feedback to teachers about their development. ***Formative*** evaluation of teaching is the field of ITT tutors, LEA advisors, NNS consultants, and paired teaching cum peer-tutoring. But all these imply some agreement of the potentials of the given lesson, class, resources and the teacher herself/himself.

Although Numeracy materials and training deal with procedures, and not reasons or underlying model of learning, they go some way to being used, possibly, to give formative evaluation of teachers' realisation of the Numeracy Aims. This can be carried out by consultants, and also by peers acting as tutors. The latter is a spreading practice which opens a route for continuous professional development of teachers which is at once collaborative and autonomous. Approaches like CAME and CASE have contributions to make in this field, since part of the research efforts is making optimal but real classroom practices explicit. Arriving at a shared conception of this optimal model requires researchers and teachers collaborating and agreeing descriptions based on real events. This a process that starts with lesson simulation in a teachers' group, followed by delivery in the classroom normally with the collaboration or observation of colleagues, followed by collective reflection, and refinement of written guidance. In this process the researchers are essentially peers, often even less capable in crucial aspects, and what they contribute is used by the teachers within the overall structures the practitioners are constructing and describing.

The CAME researchers work in the domain of teachers' professional development and the relationship between researchers and practitioners can be seen to be moving along the lines of, and drawing on a number of significant other recent research efforts. Important to note, but not possible to discuss here in details, are the works of Joyce and Showers (1988), Clarke (1994), Simon (1996), Loucks-Horsely et al (1998), Lampert (1998), Bishop (1998), Jaworski (1999) and Wood (1999).

Contextualising evaluation

Some of the disadvantages of Ofsted-type summative evaluation can be avoided if the pair involved (teacher-teacher; Adviser-teacher, etc.) share a publicly stated theoretical model of a particular form of maths teaching, which has, moreover, been applied in advance to the specifics of the lesson to be taught, so that both know what is being aimed at. They could also discuss beforehand some of the relevant specifics of the class. When it come to the sharing of feedback, then the teacher can defend some of his/her strategies by arguing that that was one valid way of addressing the agreed specific aim. Much of the 'personal' aspect can be side-stepped by both partners referring to the shared norms of that kind of lesson.

The theoretical model of learning and development seems a necessary condition for evaluating the teaching quality as separate from whether the particular lesson has achieved some given learning objectives measured by immediate pupils' outcomes. The aim in CAME is to promote cognitive development through pupils striving for maths understanding. This involves what we term a social, Vygotskian aspect in the management of small group work and whole-class discussion within the ZPD both communal and individual. That in turn involves what we term the cognitive, Piagetian aspect of matching the demand level of each stage of the lesson activity to each group of pupils. That is necessary for the teacher to be able to interpret pupil's reactions and respond to them optimally. The teaching quality therefore may be seen as the extent of satisfying both of the cognitive and the social agenda simultaneously.

An example of a competent teacher's first trial of a TM lesson

Observations of a Y5 class working on a newly developed Thinking Maths lesson on Networks are used here. The cognitive and social agenda of the lesson have been clarifies in group which included both the observer and the teacher. This is essentially a 'scenario' constructed from prior trials in typical Y6 classes. My brief as an observer, therefore, was mainly pedagogic evaluation. I used a framework for evaluation notes that we are developing as research instrument. I was to identify two types of instances: one to exemplify features of the CAME approach the teacher is actually using, the other to exemplify weaknesses for the teacher to attend to.

The 'optimal model' for the Networks activity (Fig 1).

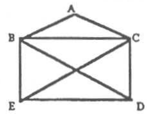
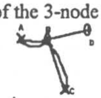
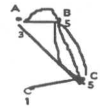
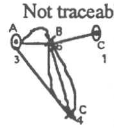
This is an activity on <u>branched reasoning</u> in the context of networks. It relies on mathematising a concrete visual situation through identification of relevant variables, exclusion of irrelevant ones, and the selection of the combination of variables that are necessary and sufficient for a general mathematical model. The 'traditional' school mathematics elements e.g. following diagram rules, odd/even meanings in space and addition relationships, are of a much lower level than the levels in the chains of logical reasoning involved.

As with many of the Thinking Maths lessons this has three episodes, each of which covering an identifiable round of thinking in a range of levels. An episode starts with a focusing phase, followed by a phase of small group exploration and construction of ideas, then by a phase of collective refinement and abstraction. These higher order elements then become the starting focus of the next episode.

Episode one focuses on pupils understanding the one-way networks through practice on them, and introducing visual common ways of circling and numbering stations. Pupils find which nodes can be 'starters' and which cannot, in carefully sequenced examples, and handle 'why?' questions. This episode is best done as a whole class activity with 1-2 minutes for pair-work on examples on sheets.

In the event the first 50 minutes of the lesson with this Y5 mixed ability class were needed to cover the first episode in this model scenario. The class then moved to consider the second and third episodes of the lesson in the last 10 minutes. But this aspect can be 'filtered', since this is due to the stage of the development of the lesson, rather than to the teacher.

Fig 1: Reasoning steps in the activity

Cognitive level			NC level of reasoning
Early formal. Extended Abstract Processing of a logical structure. with several variables.	**3b Generalising for larger networks** • Exploring general rules by adding other nodes, or any network.		6
	3a Conditional rules for 4-stations • Explore adding fourth station • Formulating IF rules for connecting to either types of the 3-node networks 	 Not traceable  OK	
Concrete generalisation/ Relational Overall mathematical relationship	• Recognising that some network are not traceable at all.		5
Mature concrete/	**2 Counter example of all even, Either/Or** • Looking at an examples where even stations can be starts. Producing other examples with that case. • Attempting to clarify what happened to the first rule and formulate another rule. • Sharing rules, refining the two rules.	'The rule is wrong!' 'Sometimes wrong and sometimes right' 'If all the stations are same it is OK.' 'All must be even' 'Two different rules They don't mix'	
Multi-structural Mathematical rule linking number and space elements	**1b Formulating rule, meaning of odd/even** • Each station can be given a number. • Discuss the meaning of odd/even in terms of lines in each station.	'Always two starters' 'Sometimes you start from middle' 'EVEN is for in and out, in pairs, ODD is only in or out'	4
Early concrete/ Uni-structural Familiar mathematical objects one at a time	**1a Elements of a network** • Single track networks of 3 stations. Which stations can be starter and which cannot? • The three stations can be in any position or distance from each other without their properties being different.	'It isn't important if stations are far away' 'If you add a line the start stations change' 'Can't start from middle'	3

Framework for observation. This must reflect the cognitive and social aspects of the approach, with an added resultant 'culture of learning' aspect. We adapted a form requiring notes in 9 cells produced by the three dimension in each of three phases of episodes of the lesson. This differs from linear descriptive observation in attending to these dimension separately from each other by separating the aspects present in any one scene. So the fact that children were coming to the board or the teacher was using a chain of interactive questions is cryptically recorded on the form separately from the actual content of these interactions, i.e. how valuable or challenging the ideas contributed are. Also separately noted, the messages about mathematics and learning explicitly or implicitly conveyed through such a scene.

Figure 2 shows a summary representing about half of the notes written at the time for readability , and omitting the scores of 1-4 in each slot, a feature we since abandoned as counter productive. The points for suggested future attention for the teacher are starred.

Figure 2: Formative evaluation of a CAME lesson

Summerville. Tram Links (One way networks) ***Tue 8.2.0, .11-12 am***

	Whole class preparation	Independent / pair or group work	Whole class sharing
Cognitive Appropriate **challenge** **Integrity** & progression **Interest**/ motivation Other	*20 mins* Clear introduction. Good progression from start-stations to numbers, to rules to using 'Why'. Using conflicts. Good Aims. But could be improved. **(1)**	*25 mins, 5 mins interrupt.* Pupils draw own networks Whole task in one sheet. Checking rules. ' Task adjusted/clarified half-way. Faster pace?(2)	*15 mins* 'Another rule ' shift for all evens. Fourth station . Open ended-ness . Light-hearted end!
'Social' Appropriate material/ **models** Range of **contributions** Teacher **Responsiveness** Other	Good use of board and poster. Supermarket & Train system example **(3)** Probing questions . Girls from all tables contribute Pupils explain to each other. Should Ps come to the board only for significant ideas? **(4)**	Notesheet same as poster. 'Odd and even numbers' by Emma highlighted as a new focus Pair work is suitable. Is class ready for 2-pair group work?	Asking what they liked about it in writing Continued full involvement . T. accepting all,
Norms Communicating **mathematics** norms Communicating **learning** norms. Other	Vocabulary Aims OK but dominant? **(1)** Using numbers as a mathematical shift. TM Maths in mixed ability groups!	Girls were clearly learning from each other. Idea of Disproving/ counter example?	'Never ending investigation / lesson'. ' Checking rules

Feedback to the teacher in lesson observation

The lesson had no major weaknesses and each of the positive points can be expanded to make explicit aspects of the CAME approach. But for the purpose of this paper the points for improvements, or queries for discussion, (Numbered in brackets) are selected.. A brief summary of these would help to clarify the relationship between CAME and 'Good Practice'.

(1) Lesson objectives and early vocabulary. The teacher started the lesson by writing its aims 'traversible and non-traversible networks' and asking for meanings for these. While a commendable practice, the aims must be meaningful to the class otherwise may weaken the activity. I thought the aims given were too abstract and we both agreed that a better form could be 'Systematically exploring networks', or 'Finding the maths in one-way networks' All Thinking Maths lessons are systematic explorations, in which different pupils arrive at different insights at their individual level. The CAME approach emphasises the need to provide or quickly develop

agreed vocabulary and conventions of labelling items as part of the preparation phase. The abstract notion of Traversibility is not needed in the subsequent phase, and in fact was never reached with the class. But the 'starter' stations, circled or ticked , and labelled with the numbers of lines leading from or towards them are needed and accessible to most pupils. This was achieved in the lesson after about 15 minutes. In an optimal lesson could have been achieved earlier.

(2) Pressing for higher order challenges: A faster and more directed pace in the first part of the lesson would allow pupils to focus quickly on formulating complex sentences carrying the branching notion of 'either/or' with each wing itself a composite rule: Either two stations odd and one even in which case the odds are starters, Or all three stations even in which case all can be starters. This proved possible with a good Y6 class at another school, followed by adding a fourth station linked to each type of network, focusing on the If/Then branching.

(3) When contexts are needed and when not In' good practice' having a real life familiar context is advisable. The class approached the notion of a network through the examples of train stations and later on with a route through a supermarket. But is that necessary for reasoning on networks? The examples of train and supermarket networks need interpreting focus on one-way networks. On the other hand starting directly with dots (stations) and lines, and tracing routes between them is concrete and familiar enough.

(4) Using the board. Pupils coming up to the board is good practice for motivation and variety, But it should not be ritualised, since the children would recognise when it is patronising and when their contribution is genuinely used for a meaningful purpose. Ritualising pupils involvement also interferes with the pace of lessons. The teacher ensured that the board is not cluttered, and only a few relevant words or a couple of diagrams are present at any one time. But she could have planned for collecting then refining of written ideas.

Conclusions

A framework for lesson observation is being developed by a group of teachers and researchers with the aim of using formative peer evaluation of teaching to aid the professional development of individual teachers. It focuses attention on aspects relating a) to the cognitive potential of the activity, b) to general pedagogy, and c) to the cultural messages involved.

The teaching quality most needed for optimal conduct of a CAME lesson, and perhaps of any lesson, is a combination of flexible knowledge of the conceptual network and hierarchies in the topic on the one hand, and the responsiveness to the ways the particular class approaches the task at different phases of the lesson, on the other. This is an interactive quality since a flexible conceptual knowledge of a topic that is functional in the classroom can only be gained through a general predisposition to engagement with pupils' minds, while such an engagement within a given lesson dynamically enriches a teacher's conceptual knowledge, allowing him/her to adjust the agenda 'on the hoof', keeping the momentum of involvement of most pupils at the highest appropriate levels for each. That is the sense in which teaching is a dynamic optimisation process.

Using the framework for observation and formative evaluation of classroom teaching requires shared knowledge of the potentials in the classroom activity, of how 'typical' or otherwise the class is and its cultural background, and a shared agreement of the desired trajectory of the professional development of the teacher. That directs the feedback to be a dialogue in which both the observer and observed are informed by shared norms.

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