

# A dialogic approach to plenary problem synthesis

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## The professional context of the research

- Our current research involves devising resources to help mathematics and science teachers develop effective use of dialogic approaches to classroom teaching and learning.
- A ‘dialogic’ approach is one that takes different points of view seriously (Scott, Mortimer & Aguiar, 2006), encouraging students to talk in an exploratory way that supports development of understanding (Mercer & Sams, 2006).
- Dialogic classroom communication is:
  - collective (in pupil group or whole class),
  - reciprocal (through considering all viewpoints),
  - supportive (of free expression and mutual assistance),
  - cumulative (in chaining and developing ideas) and
  - purposeful (towards particular curricular goals)

(Alexander, 2008)

## The practical issue motivating the study

- Orchestrating discussion to advance the learning of the whole class is acknowledged to present significant challenges:
  - facilitating public expression and respectful examination of students' thinking;
  - focusing – but not funnelling – discussion to prevent it becoming overly fragmented and incoherent;
  - guiding students towards accepted disciplinary norms of reasoning and communication
- Helping teachers meet this challenge involves finding productive and efficient ways to 'read' and shape classroom discourse.
- What can serve as operational indices of dialogic discussion and as effective mechanisms for sustaining it?

## Triadic structure in classroom discourse

- The triadic structure of conventional classroom discourse has long been documented (Bellack et al., 1966; Mehan, 1979; Sinclair & Coulthard, 1975).
- The opening move within a classic triadic exchange is an Initiation, typically by the teacher posing a question.
- The second move of such an exchange is a Response, typically from a student nominated by the teacher.
- In the third move of such an exchange, the initiator acknowledges the response and typically reacts to it by providing Evaluation, Feedback or Follow-up.
- Hence this triadic structure is often referred to as IRE or IRF.

## Triadic discourse reappraised

- Until recently the pervasive assumption has been that triadic discourse acts against dialogic discussion.
- However, researchers have come to realise that triadic interaction pervades the whole spectrum of pedagogical activity.
- In particular, it serves as an important mechanism through which the teacher can manage turn-taking by students to secure a coherent flow of classroom exchanges.
- Fostering interactive, multivocal, dialogic discourse depends on shifting from using the triadic structure to provide authoritative evaluation or feedback within the E- or F-move towards using the F-move and possibly an ensuing I-move to promote further reflection or discussion.

## An episode of plenary problem synthesis

- One of the classroom activity structures that we have been examining is the commonplace one in which a problem situation is introduced to the whole class, students tackle it together in small groups, and a plenary discussion then synthesises ideas.
- The *Proceedings* paper reports the first stage of an analysis of a particular episode of this type, chosen as a promising example to bootstrap reflection on dialogic teaching in action.
- Analysing this case has helped us to scaffold discussion of it with teachers during professional development activity, and has provided input to construction of an analytic instrument for purposes of research and training.

## Some triadic markers of dialogic talk

- High frequency of teacher I-moves which:
  - Simply nominate next speaker, or
  - Make organisational or reflexive solicitation, and/or
  - Revoice problem or previous contribution.
- High frequency of student R-moves which involve:
  - An extended turn from at least one student, and/or
  - Multiple student turns, concurrent or consecutive.
- Absence of teacher E-moves.
- High frequency of teacher F-moves which:
  - Offer neutral acceptance, and/or
  - Revoice student contribution

## Limitations of the IRF model

- Difficult to apply to exchanges involving multiple student contributions without intervening teacher moves.
- Provides very limited resources for characterising argumentative structure and pedagogical function, and attempts to elaborate it have led to greatly increased complexity:
  - As shown by Nassaji & Wells' (2000) extension, modified by Truxaw & DeFranco (2008) for new context and concerns
- Ultimately a linguistic model of spoken interaction rather than a pedagogical model of topical exchange:
  - As shown in Bellack et al's (1966) alternative SOL-move which is required to be substantive unlike the I-move.
  - As shown in Coulthard & Brazil's (1992) revised model of exchange structure which differentiates between interactional slot and communicative function.



## Operationalising dialogic teaching

- While the IRF and cognate models can throw some useful light on classroom interaction, they have a further limitation as a framework for use in the professional development of teachers.
- Working with teachers has highlighted the need for a model of dialogic teaching which focuses more directly on crucial teacher actions, interactions and decisions in a form much closer to teachers' everyday pedagogical thinking.
- This calls for empirical analysis at a rather different level, undertaken with a view to guiding teachers towards establishing contextualised patterns of classroom action and interaction.

## Illustrative section of teaching activity analysis

T: *Katy*.

S[Katy]: There's three different outcomes but there's two ways of getting one outcome so that outcome has a higher probability than the other two.

T: *Okay*. So Holly, does that make, does that make any difference do you think? *Katy's saying that* although there are only three outcomes [pause]

T: *All those people who are getting restless think of something that you can tell us that will convince people of what's going on, convince them of what you believe*, because the majority of you are saying that there's a fifty per cent chance they will have the same grouping as their parents. *We have some people who don't agree, and they have good reasons for not agreeing...*

Teacher solicits contribution from student who has shown shift to sound idea

Teacher accepts this contribution without explicit evaluation

Teacher invites revised contribution from student who expressed confusion

Teacher revoices contribution from student expressing sound idea

Teacher asserts norm of being open to other views, and making constructive contributions aimed at persuasion



## Facets emerging from teaching activity analysis

- *Supporting interanimation of ideas*
- *Hedging epistemic authority*
- *Maintaining dialogic norms*
- *Managing progression in reasoning*
- *Prompting shifts in reasoning*

## *Supporting interanimation of ideas*

- Teacher leads identification of distinct answer types offered
- Teacher solicits justification for each answer type
- Teacher accepts unsolicited student contributions
- Teacher allows extended student contributions, according to her assessment of relevance
- Teacher bars counters to allow completion of contributions, but then allows counters
- Teacher revoices student contributions to summarise them, make them more clearly relevant, and establish connection to earlier contributions

## *Hedging epistemic authority*

- [Teacher makes contributions that are predominantly organisational and/or reflexive]
- Teacher distances herself from authorship of problem
- Teacher accepts student contributions without evaluation
- Teacher declines student invitations to evaluate contributions, asserting norm of class agreement
- Teacher affirms revised student contributions by elaborating on them
- Teacher frames revoicing of student contributions as collaborative with the student
- Teacher scaffolds through prompts and initiations but fades to allow development by students



## *Maintaining dialogic norms*

- Teacher asserts norm of seeking to achieve reasoned class consensus
- Teacher asserts norm of being open to other views, and making constructive contributions aimed at persuasion
- Teacher affirms norm of being open about holding views that diverge from emerging consensus
- Teacher encourages reflection and self-monitoring



## *Managing progression in reasoning*

- Teacher solicits further contributions to justification [in light of quality and clarity of reasoning to date]
- Teacher monitors persistence of views diverging from emerging class consensus
- Teacher solicits contributions from students who have shown sound understanding [without making this explicit through evaluation]
- Teacher invites revised contributions from students who have shown confusion, uncertainty or fallacious reasoning [without making this explicit through evaluation]



## *Prompting shifts in reasoning*

- Teacher prompts connection with earlier problem
- Teacher prompts attention to mathematical principle
- Teacher prompts use of mathematical tool
- Teacher reacts by soliciting specific substantive clarification