

Conclusion

We found that similar ability friendship groupings encouraged exploratory talk among all pupils but that this was seen more with girls and high interpersonal skill pupils in general. We also found that pupils were more likely to value peer assessment feedback given by friends. We saw that in some situations a high interpersonal skill pupil can support less skilled pupils in using exploratory talk, but we need to develop this line of research further.

We found that several strategies supported pupils in developing their use of exploratory talk. These included use of 'ground rules', open-ended tasks with shared marking criteria, peer assessment and tokens.

Outcomes of the project

- In response to findings both from the research knowledge base and our own research findings, we have developed staff guidelines on setting up and supporting collaborative group work.
- We have incorporated into our schemes of work several tried and tested activities and resources to encourage pupils to communicate in an exploratory and supportive way.
- We have received positive feedback from pupils regarding their response to working in groups and to being involved in the research process.
- There is evidence of increased staff confidence in accessing and using research to inform their own investigations.
- Members of the research team have increased confidence in using a variety of methods of data capture including audio and video capture and analysis, observation schedules and pupil questionnaires.
- There is now increased staff willingness to be involved in joint planning and peer observation, both within and across subject departments.
- The research team has used video recordings and written summaries to communicate findings at department, school, and network learning community level via teacher workshops, bulletins and websites. We have shared the presentations with other research groups nationally via the Research Lesson Study group (part of the Networked Learning Community initiative).

References and Further Reading

- Feldman, G. (1980) *Beyond Universals in Cognitive Development*. New Jersey: Ablex.
- Fuchs, L. S., Fuchs, D. et al. (1998) High-Achieving Students' Interactions and Performance on Complex Mathematical Tasks as a Function of Homogeneous and Heterogeneous Pairings. *American Educational Research Journal* 35(2):227-267.
- Gillies, R. M. and Ashman A. F. (1995) *The Effects of Gender and Ability on Students' Behaviours and Interactions in Classroom-Based Work Groups*.
- Good, T. L., Mulryan, C. et al. (1992) *Grouping for Instruction in Mathematics: A Call for Programmatic Research on Small-Group Processes*
- Johnson, D. W., Maruyama, G., Johnson, R. T., Nelson D., & Skin, L. (1981). Effect of Co-operative, Competitive and Individualistic Goal Structures on Achievement: A Meta-Analysis. *Psychological Bulletin*, 89(1), 47-62
- Mercer, N. *The Guided Construction of Knowledge: talk amongst teachers and learners*, Clevedon: Multilingual Matters
- Zarjac, R. and Hartup, W. (1997) Friends as Co-workers: research review and classroom implications, *The Elementary School Journal*, 98, 3-13

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National Teacher Research Panel
engaging teacher expertise

How can we encourage pupil dialogue in collaborative group work?


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This summary was commissioned by the National Teacher Research Panel for the Teacher Research Conference 2006, which explored and celebrated teacher engagement in and with research. All conference materials are available at www.standards.dfes.gov.uk/ntrp

Aims of the project

- To investigate how different pupil groupings affect pupil dialogue.
- To develop and evaluate strategies and resources to support collaborative group work and pupil dialogue.

Dimensions of the study

Schools:

Sweyne Park School Rayleigh Essex	The Woodlands School Basildon Essex
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Teachers:

Sweyne Park School
Corina Seal, AST
Sue Donovan, AST
Karl Musson, Head of Mathematics
Christine White, Mathematics teacher

Woodlands School
Jane Coleman, Deputy Headteacher
Peter Gibbon, AST

Pupils

24 year 8 pupils	Maths set 4 out of 4
30 year 8 pupils	Maths set 1 out of 4
26 Year 10 pupils	Maths set 1 out of 9
15 year 9 pupils	Maths set 4 out of 5

Summary of main findings

- Homogeneous groupings (based on gender, ability or level of communication skill) led to a higher incidence of collaborative, constructive dialogue.
- Pupils reported that working collaboratively increased their confidence in problem solving.
- Successful strategies to support dialogic learning included:
 - provision of 'ground rules for working in groups';
 - sharing assessment criteria;
 - the use of self and peer assessment; and
 - the use of tokens or points to purchase information.

Background and content

Sweyne Park School is an 11-16 comprehensive school in Essex. It is a Science Specialist College and Training School. Woodlands School is an 11-18 comprehensive school and also a Training School and Specialist College. Both schools belong to the South Essex Networked Learning Community (SENLC).

Mathematics GCSE and national test results at Sweyne Park School exceed national results. However, a whole school focus on literacy skills had helped the Mathematics Department to highlight the difficulty many pupils found when communicating their thinking and reasoning in extended investigative tasks and GCSE coursework. An increased emphasis on proof and justification in the mathematics curriculum also brought the need to develop pupils' clarity of reasoning and communication to the top of our list of priorities.

Through our university and NCSL links we were aware of research that suggested that getting children to talk about what they are doing enhances their ability to think about the task (Feldman, 1980) and so we were keen to look into how this could be applied in problem solving in mathematics and how as teachers we could encourage this talk.

Teaching processes and strategies and findings

Year 8 Maths - Research lesson 1 – observing unstructured group work

In the first Research Lesson pupils were asked to work together on a mathematical investigation – no guidelines for group work were provided. After the lesson pupils filled in questionnaires to find out how they had felt about working in groups for the lesson. We were able to analyse our audio recordings with the help of the classifications of pupil talk put forward by Mercer (1995) and found that most of the talk was cumulative (characterised by repetitions, confirmations and elaborations), with some evidence of disputational talk (involving disagreements and individual decision-making) and even less evidence of exploratory talk, where pupils explained and justified their decisions.

Year 8 Maths – Research lesson 2 – structured group work

So how could we encourage more of this exploratory talk? We started the second Research Lesson with a class discussion on the questionnaire findings and developed some 'Ground Rules for Working in Groups', for example, 'give reasons to back-up anything you say'. We also restructured some of the groups so that pupils were working with others of the same gender and of closer ability to their own. Overall there was a higher proportion of exploratory talk in this lesson.

Year 8 Maths – Research Lesson 3 – structured group work with higher ability set and 'Blip-Blop' activity

In the third Research Lesson we provided the Ground Rules and arranged pupils as far as possible in single-sex, similar ability friendship groups. This time the task – Blip-Blop problems – was specifically aimed at encouraging pupils to discuss the processes they would use to solve problems (all values had been replaced by nonsense words, for example 'Sam has baba packets of sweets. Each packet has gaga sweets in it. Sam gives away nana sweets from each pack, then he eats a total of lala sweets himself. How many sweets does he have left?'). One member of staff taught the lesson and two network colleagues observed and recorded pupil discussions.

Year 10 Maths lesson 1 – dialogue and problem solving in similar pairs and peer assessment in mixed groupings

In the first Year 10 research lesson we put pupils into same sex pairs of similar 'interpersonal' ability (based on teacher judgement). Focus groups included a pair of high-interpersonal skill girls and a pair of low-interpersonal skill boys. We provided a clearly structured problem-solving task and asked pairs of pupils to solve the problem by constructing algebraic equations. We provided pupils with open-ended marking criteria from the outset and challenged them to earn as many points as possible. We also provided the 'ground rules for working in groups'.

Each pupil pair then presented their solution to another pair for assessment. After the lesson, we gave pupils peer-assessment questionnaires to assess their feelings on both assessing and being assessed.

Year 10 Maths lesson 2 – dialogue and problem solving in mixed groups

In this lesson we formed focus groups with one 'high interpersonal ability' pupil and two 'low-interpersonal skill' pupils. We provided a problem-solving task with clear open-ended marking criteria for the groups to solve. Pupils were able to 'purchase' information with tokens worth 5 marks off their final total. We also provided the 'ground rules for working in groups' and asked the groups to complete a tally during the first five minutes of the activity to monitor whether their group was following the guidelines. Two observers each watched one of the focus groups. The observers used the same tally sheet as the pupils to monitor the occurrence of different forms of dialogue.

Findings

Even without structured guidelines (lesson 1), similar groupings (based on gender, ability or level of communication skill) led to a higher incidence of collaborative, constructive dialogue. Exploratory talk was most evident in the groups based on friendships – a finding also reported by Sarjac and Hartup (1997). Pupil questionnaires filled in after the lesson revealed that some pupils in mixed ability and mixed gender groups had felt either 'left out' of the group activity or that other members of the group had not pulled their weight.



Pupil questionnaire comments:
Target pupil B:
"They wouldn't let me talk"

Referring to target pupil B
"B didn't do any work"

With structured guidelines and similar groupings (Year 8 lessons 2 and 3) the proportion of exploratory talk was high, though more so in the girls' groups than the boys'. Pupils reported that working collaboratively increased their confidence in problem solving.

The introduction of peer assessment in the Year 10 lessons produced mixed reactions from pupils. The majority (74%) of the pupils enjoyed both assessing and being assessed, but pupils in non-friendship groups found the feedback less helpful and in some cases thought it unfair. During the first Year 10 lesson the low interpersonal skill boys engaged in very little exploratory talk.

The outcomes from the second Year 10 lesson were mixed. In one of the focus groups, the pupil with high interpersonal skills managed to encourage the other group members to play a full part in discussions with high levels of exploratory talk recorded. In the other focus group the boys dominated the decision-making and the previously articulate girl played little part in the proceedings. Interviews with the pupils later, however, found that all members of the focus groups had found the activity productive and enjoyable.

Successful strategies to support dialogic learning included:

- provision of 'ground rules for working in groups';
- sharing assessment criteria;
- the use of self and peer assessment; and
- the use of tokens or points to purchase information.

Research methods

We followed Research Lesson Study protocol throughout this study as described below. Network colleagues agreed the general focus of the study and set up a research team (as the study has spanned several years, the make-up of the team has changed with time). A cycle of research lessons then followed.

We selected 'case pupils' to represent different sections of the class, then planned a lesson, or lessons, with these pupils in mind.

One member of the research team taught the lessons, whilst other member(s) made observations and recordings of the case pupils' behaviour and responses to the lessons.



To collect data we:

- used observation sheets;
- made audio recordings of pupil dialogue;
- made video recordings of pupils' group work;
- collected written work produced by pupils during the lesson; and
- collected written work produced by pupils after the lesson.

We sampled pupils' reactions to the interventions through questionnaires and/or interviews.

After each lesson the research team met to analyse the data they had collected. They then formulated recommendations and planned further research lessons to address any additional questions or issues resulting from the analysis. For example, we decided to develop 'ground rules for working in groups' after lesson 1 to see if this would increase collaborative working within groups.