

## IMPROVING STUDENT COLLABORATION

### PROFESSIONAL DEVELOPMENT GUIDE

#### Introduction

If students are to assess their scientific and mathematical concepts formatively, they will have to elicit evidence on their own, and their peers', understanding and receive feedback on how to move their learning forward. This can be achieved by giving them opportunities to share, discuss and work together. Research has shown that cooperative small group work has positive effects on learning, but that this is dependent on the existence of shared goals for the group and individual accountability for the attainment of these goals. It has also been seen to have a positive effect on social skills and self-esteem (Askew & Wiliam, 1995)<sup>1</sup>.

This module is designed to help teachers to:

- consider the characteristics of student-student discussion that benefit learning;
- recognise and face their own worries about introducing and using collaborative discussion;
- explore techniques for promoting effective student-student discussion;
- consider their own role in managing student-student discussion;
- plan discussion-based lessons.

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#### Time

Approximately 2½ hours

#### Acknowledgement:

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1 Askew, M., & Wiliam, D. (1995). *Recent Research in Mathematics Education 5 -16*. London: HMSO.

## Activity A: Experiencing a discussion

This activity will give teachers a taste of the experience of a discussion before offering them an opportunity to reflect on the pedagogical implications for the classroom. You might choose one of the problems shown on **Handout 1: Experiencing a Discussion** for this activity or substitute a similar problem of your own.

Ask teachers get into pairs or small groups and choose one of the problems to work on. First they should work individually on one of the problems. Then they can compare their responses with the others in their group and try to refine their answers until they feel that they have reached a consensus. Teachers may not complete the problem in the time you have allowed, but do not worry too much about this. What is important is that they have had time to discuss and explore their ideas about one problem. Suggest that they record their discussion if they have a suitable device such as a mobile phone.

Ask teachers to take a few moments to reflect on the experience they have just had. On the back of Handout 1 there are some prompts to help them with their reflection and you could use the questions below to get them started.

Consider the following questions:

- In which ways was it helpful to have a chance to think about the question yourself before it was discussed in your group?
- How far did you really think together, or did you tend to follow independent lines of thought?
- Did you build on one another's ideas to construct chains of coherent reasoning?
- Did your discussion stay 'on task' or were you 'wandering'?
- Did someone 'take over'? Was someone a 'passenger'?
- Did you listen to, share ideas with, and consider the alternative views of everyone in the group?
- Did you feel able to share your ideas without fear of embarrassment of being wrong? Did anyone feel uncomfortable or threatened? If so, why?

Then, as a group, consider the implications of using this type of group activity in the teachers' own classrooms. Use the teachers' experiences as a starting point to decide how students may or may not respond to issues that may arise, such as someone taking over.

Consider the following questions:

- Did you feel you wanted to find your own solution before sharing as a group?
- Did you gain any further understanding of the problem from working together?
- Were you satisfied with the group's solution?

Remind teachers that the initial time for individual work is important. When students are put straight into groups before they have had time to think for themselves, the 'quick thinking',

confident students are more likely to take over and dominate the group. When students prepare something to share, and then take it in turns to make a contribution, more thoughtful and engaging discussions will usually result.

The questions asked in this activity reflect the characteristics of powerful discussions that emerge from research literature (Alexander, 2006, 2008; Mercer, 1995, 2000)<sup>2</sup>. This is discussed more explicitly in the next activity.

An optional follow-up activity could be to ask teachers to listen to the recordings they made of their own group discussions, if these were recorded. They should think about the kinds of discussion that took place, and how much and in what ways, these influenced their own learning.

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2 Alexander, R. (2006). *Towards Dialogic Teaching: Rethinking Classroom Talk* (3 Ed.). Thirsk: Dialogos.  
Alexander, R. (2008). *How can we be sure that the classroom encourages talk for learning? Here is what research shows*. Cambridge: Dialogos.  
Mercer, N. (1995). *The guided construction of knowledge*. Clevedon, Philadelphia, Adelaide.  
Mercer, N. (2000). *Words and Minds*. London: Routledge.

## Activity B: Analysing a discussion

There is a clear difference between working in a group and working as a group. It is quite common to see students working independently, even when they are sitting together. *Disputational* talk, in which students simply disagree and go on to make individual decisions, is not beneficial. Neither is *cumulative* talk in which students build uncritically on what others say. For true collaborative work, students need to develop *exploratory* talk consisting of critical and constructive exchanges, where challenges are justified and alternative ideas are offered (Mercer, 1995, 2000)<sup>3</sup>. It is not enough for students to simply give each other right answers, as this does not produce enhanced understanding (Reynolds and Muijs, 2001)<sup>4</sup>. Exploratory talk enables reasoning to become audible, 'publicly' accountable and, thus, assessable.

In this activity, transcripts from classroom discussions will be used to help teachers think about how the discussions in these examples either help or hinder learning.

Give out **Handout 2: Characteristics of helpful and unhelpful talk** and ask teachers to read the characteristics of helpful and unhelpful talk.

Then issue **Handout 3: Analysing a discussion**. Ask teachers to volunteer to read out the transcripts, with different teachers taking the parts of specific students. Then ask them to discuss the questions below in pairs and to write a response in the spaces provided on the back of the **Handout 2**.

Consider the following questions:

- Which of the characteristics in **Handout 2** do you recognise in the transcripts in **Handout 3**?
- Would you describe the discussions as **disputational, cumulative or exploratory**?
- What strategies could you use to help students to discuss more profitably?

Hold a group discussion and ask the teachers about how they responded to the questions.

The *Find the elephant* discussion is *disputational*. The two boys are treating the computer software as a competitive game, making random guesses. They laugh or make derisory comments when their partner makes an incorrect guess. There is little evidence of collaborative thinking.

The *Rail prices* discussion is more *exploratory*. These students are clearly listening to, and engaging with, one another's reasoning. Dan and Harriet are working together to convince Andy and are backing up their argument with an example. This discussion shows evidence of learning.

The *Always, sometimes, or never true* discussion is more *cumulative*. The students are trying to get through the task as quickly as possible. They do not disagree or challenge each other; they simply reinforce each other's unqualified assertions.

Very much classroom discussion is *disputational* or *cumulative*; there is usually much less *exploratory* discussion. One suggestion to help students discuss more profitably is for students themselves to role play different ways of working together and discuss how learning takes place. Alternatively, one group of students may hold the discussion whilst others observe before discussing the experience together.

<sup>3</sup> Mercer, N. (1995). *The guided construction of knowledge*. Clevedon, Philadelphia, Adelaide.  
Mercer, N. (2000). *Words and Minds*. Routledge, London.

<sup>4</sup> Reynolds, D., Muijs, D. (2001). *Effective Teaching*. Sage. ISBN-10: 1412901650

## Activity C: Recognising the concerns of teachers

This activity is designed to help teachers recognise and articulate their own concerns relating to collaborative work. It is important to address these explicitly, because these concerns often prevent teachers from even attempting to use group work in their classrooms.

Ask the teachers to work in pairs or small groups, and to discuss what worries them about discussion lessons in which students work in small groups. Once they have had some time to discuss, give them **Handout 4: Common obstacles to classroom discussions** and ask them to list their concerns.

The other side of the handout lists a number of concerns and opinions commonly expressed by teachers. Ask the teachers to think about the list in their small groups and respond to the questions below.

What further concerns would you add, and which would you remove?

What strategies or approaches could be used to minimise the anticipated problems

In a whole group discussion, emphasise the opportunities that small group discussions provide in terms of formative assessment.

The teacher's role is explicitly addressed in Activity E but it may be worth having a very short discussion about the teacher's role during small group discussions at this stage. Point out, for example, the importance of standing back and listening to what the students are saying.

It is also important to recognise that group work may not always be appropriate. When the purpose of the lesson is to develop fluency in a particular skill, then individual practice may be more suitable. Collaborative group work is necessary when the purpose of the session is to develop conceptual understanding or strategies for solving more challenging problems. In these cases, students need to share alternative views, interpretations or approaches.

## Activity D: Creating and establishing 'ground rules'

Students (and adults) do not always discuss in helpful ways. Some are reluctant to talk at all, while others take over and dominate. Students therefore need to be taught *how* to discuss. Some teachers have found it helpful to introduce a list of 'ground rules for discussion' into their classes. These ground rules should, in appropriate language, give explicit guidance to students on how to talk together profitably.

Ask the teachers to imagine that they are starting with a new class and want them to begin to work collaboratively. What classroom 'rules' would teachers seek to establish?

Provide the participants with **Handout 5: Ground rules for students** which lists ground rules developed for use with one class. Ask the teachers to compare their own ideas with those offered on the handout.

Consider the following questions:

- How would you change this list for your class? What would you add or remove? What would you re-phrase?
- What would be the benefit to you, and your students, of involving students in developing a list such as this?

## Activity E: Managing discussion

In Activity A there was some reference to the importance of allowing students some ‘thinking time’ before asking them to work in groups. A well-organised discussion lesson usually has a *three* distinct phases:

- **Individual ‘thinking time’**  
Students think about the problem before the discussion begins. Without this opportunity, the discussion is likely to be dominated by more confident and assertive students.
- **Small group discussion**  
Students share and refine their ideas in small groups.
- **Whole class discussion**  
Students ‘report back’ to the class, and share their ideas with a wider audience.

In this activity, participants consider these phases and in particular the teacher's role in each one.

Before discussing the three phases in detail, allow the teachers some thinking time of their own. Give them **Handout 6: Phases of a discussion lesson**. Ask them to make some notes in the spaces provided on their own thoughts about how they would manage a discussion lesson.

- What is the purpose of ‘thinking time’? What is your role?
- What is the purpose of the small group discussion? What is your role?
- What is the purpose of the final whole class discussion? What is your role?

Now issue the teachers with **Handout 7: The teachers’ role during small group discussions** and **Handout 8: Final whole class discussions and the teachers’ role**.

Many teachers appear unsure of their role during discussion lessons. It is important to remind teachers to view discussions as a formative assessment strategy. Discussions can help them in eliciting information about their students’ understanding and provide students with feedback that moves learning forward. Nevertheless, when students are struggling, some teachers will quickly intervene and try to ‘ease the path’ by giving strong hints and explanations. Others withdraw and offer little help, as though they expect students to discover everything by themselves. The most effective teachers take neither of these positions. They use the formative assessment strategies below in order to challenge students to think more deeply, explain and justify.

- Elicit evidence of students’ thinking.
- Keep reinforcing the ‘ground rules’.
- Listen before intervening.
- Join in, don’t judge.
- Make students do the thinking.
- Give feedback that moves learners forward.
- Don’t be afraid of leaving discussions unresolved.

Later in the lesson, a whole class discussion may be held in order to:

- present and report students’ discussions;
- recognise and value the important ideas that have emerged;
- generalise and link these ideas to other situations.

During this phase of the lesson, the teacher’s role is to chair the discussion and help students to clarify their own thinking. Many teachers find this phase of the lesson challenging: it is difficult to keep the students engaged once they perceive that they have finished the task.

## Activity F: Observing and analysing a discussion lesson

An 11 minute video clip<sup>5</sup> 'How many school teachers?' is provided for this activity. The video clip shows the three phases of a discussion lesson as described in Activity E.



*Video: How many school teachers?*

This shows one class of secondary students engaging in a discussion lesson with their teacher, Eve. The focus of the lesson is the problem:

**Estimate how many teachers there are in the UK.  
The UK has a population of 60 million people.**

After watching the video, ask teachers to identify the aspects of this lesson that relate to students working collaboratively and everything that they have learned in this professional development module. Spend some time discussing the issues that arise. **Handout 9: Analysing a discussion lesson** provides space for teachers to make notes about the discussion.

Consider the following questions:

- How does the teacher introduce the problem?
- Which 'ground rules' does she emphasise?
- What approaches do students use to solve the problem?
- How does the teacher help students to discuss productively?
- What types of talk are students using? (Refer again to **Handout 2**)

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<sup>5</sup> [http://map.mathshell.org/pd/modules/5\\_Collaborative\\_Work/html/videos\\_1.htm](http://map.mathshell.org/pd/modules/5_Collaborative_Work/html/videos_1.htm)