Classroom culture: student and teacher roles

In every classroom, there is a set of mutual expectations of what each will do. The *Classroom Challenges* involve a classroom culture that is somewhat different from most teaching, with a different set of roles and expectations for students and the teacher.

Many classrooms follow a typical format. The teacher is expected to manage the classroom, explain new concepts and procedures, demonstrate these through worked examples, assign exercise problems that are similar, and ask questions to check students' answers. Students will follow the explanations, work on the problems in the way they have been shown, and answer a question as well as they can – usually in a few words. The teacher will know the (single) correct answer, and tell students if theirs is correct. If students are not "getting it", the teacher will explain again.

In the *Classroom Challenges*, the roles are different. Students are expected to take more responsibility for their own learning. The teacher, while managing the classroom and setting tasks, works mainly through questions designed to help students to clarify and improve their own reasoning. In discussion with others, students compare approaches and strategies and check their own and each others' solutions. The teacher focuses discussion on reasoning rather than just answers – questions of *why?* not just *what or how?,* expecting responses in complete sentences, featuring the word *because*.

It is helpful to think of this changed classroom culture holistically, as *moving students into teacher roles*. In the *Classroom Challenges*, students take on some of the traditional *directive roles*: managing their own learning, explaining, creating tasks. Teachers move into less directive, more *facilitative roles* in the learning process: challenging students about their thinking (*what?* and *why?*); listening and observing; discussing a student's reasoning as a fellow student might, rather than as "the expert"; providing information (not answers), but only when asked.

The Lesson Guides for the *Classroom Challenges* reflect these changes in the context of that lesson. Research shows that this formative assessment approach is more effective in promoting learning – not so much at the end of the lesson or a unit but in the long term, months and years later. If you are interested in knowing more about this, go to the project website: http://map.mathshell.org.uk/lessons.php. .

THE STUDENT'S ROLE

Students are expected to:

- Make sense of problems and persevere in solving them, look for and plan solution paths (MP1)
- Understand the approaches of others (MP1)
- Make sense of quantities and their relationships in problem situations (MP2)
- Attend to the meaning of quantities, not just how to compute them (MP2)
- Understand the approaches of others, communicate to others, and respond to the arguments of others (MP3)
- Try to communicate precisely to others (MP6)
- Justify their conclusions (MP3)
- Continually ask themselves, "Does this make sense?" (MP1)

THE TEACHER'S ROLE

The teacher is asked to create the opportunity for students to dig in and make sense of some mathematics, to facilitate student learning and support students by:

- Giving students time for "productive struggle" with each task
- Questioning, rather than explaining the math (explaining what you want them to do but not how to approach it)
- Asking for explanations, not answers. *(Tell us how you got that. Why does that make sense?* and, asking again, *Can you say more about that?*)
- Working to implement the *Classroom Challenge* as written

…and avoiding:

- "Scaffolding" – breaking up a task into steps (any scaffolding in the CCs has been carefully designed and developed)
- "Clearing up misunderstandings" during a CC – this is assessment
- Letting an activity run long past the suggested time (unless you see the students are playing the roles listed above in a particularly productive way).

CRITICAL POINTS

In teaching a *Classroom Challenge*, it is good to be aware of places where common teaching moves will undermine the challenge. For example:

- When you ask a question of a small group, don't look for a quick response but leave it with them. It takes thinking time to create a worthwhile response to a good question.
- Don't do "mini-lessons" that try to "fix" students' misconceptions and wrong moves so that they get a "right answer". Instead, ask questions that help students think more about their work and assumptions. This helps *them* make progress with the task, and more importantly with the content.
- Don't *evaluate* student responses, in words or looks; keep *them* responsible for that. Instead, ask a further question like: *Why do you think so?* or ask another student.

In a concept development CC:

- Note the structure, timing and suggested focus of the introduction. Its goal is to foreground the misunderstandings, *not resolve them* – that is for the discussions that follow in the collaborative work time and the last whole class discussion.
- Group students such that all students will have an opportunity to engage in the activity and share their thinking.
- The whole group discussion at the end of the lesson is the most important part of the lesson and critical for student learning.

In a problem solving CC:

- It is important for the students to engage with the task holistically – if you need to clarify it, perhaps for students with reading difficulties, make sure you don't break it into steps or smaller tasks.
- Avoid problem specific suggestions or questions. Keep to strategic questions: *What have you done so far (and why)? What have you tried?*
- If necessary after a while, ask questions related to problem solving strategies: *Have you looked at some simple examples? Have you organized what you know, and what else you need to find out? How might you represent this with mathematics? Do you see any patterns?*
- Group students who may have different approaches to solving problems.
- The whole class discussion at the end is important for student learning.

These things, if new to your teaching style, will gradually become natural as you and your students change the classroom culture and build new and different habits of mind and dispositions for doing mathematics.