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On-the-fly feedback Dialogue UK

Example 1. Creating opportunities to develop an understanding of the nature of science inquiry.

The following example comes from a transcript of a lesson carried out by one of the project primary teachers with a class of 30 children aged 9-10 years. The class are presented with some samples of bread that has mould growing on it. In groups, the children use observation, questioning and discussion to describe what they see and develop some inferences and explanations for their observations. They are then asked to investigate what conditions will keep bread 'mould-free' for the longest amount of time.

This inquiry opened up with a whole class discussion where the success criteria, a vehicle for communicating what effective learning in science inquiry looks like, are shared with the class. The inquiry was set within an engaging context, authenticated through an email read out by the teacher from someone requesting information about mouldy bread. The class were then sent off to interrogate, in groups of 5, a range of data sources. Here, learners have an opportunity to apply and develop a range of practical inquiry and collaborative skills. These key characteristics of practical, collaborative, group inquiry set within meaningful, engaging and authentic contexts were a strong, common feature of all the primary inquiry ASSISTME lessons and helped to set up assessment conversations.

The exerpt is taken from a whole class feedback scenario partway through the inquiry.

Teacher: Lovely and then Amara's team?
Amara: We found out that [inaudible 0:34:51] funghi actually grown [inaudible 0:34:54] and that when it starts off, it actually grows from the mould but you can't really see them [inaudible 0:35:01].
Teacher: Oh right, okay then and it works its way outwards, that's why it looks like wave effects, doesn't it?
Teacher: Do you think it's the same funghi or mould on the bread?
Amara: No.
Teacher: How can you tell me that's true or not true, [inaudible 0:35:19], what clues have you picked up that tells me that maybe what's on there is different?
Amara: Because some of them are different colours.
Teacher: Okay, so colour would be an observation that you've made, you might want to put that down in your notes.

Here we see the teacher confirming the observations that Amara's team made. The teacher then challenges Amara's group by asking whether they thought it was the same mould on the bread. Amara is able to answer the question and give a valid reason for her answer. The teacher then affirms that the Amara gave an accepted answer. So both the teacher and the rest of the class are getting feedback here as well as Amara's group. It also highlights for the class that making observations and inferences is an important part of science learning.

Example 2. Walking on the tight rope between opening up discussions and closing them down, leading students into the teacher's paths of thought

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The following example comes from a transcript of a lesson carried out by one of the project secondary science teachers with a class of 18 students aged 16-17 years. This 90 min lesson focused on an inquiry into electromagnetism (factors influencing the strength of an electromagnet), and took place in February 2015, half-way through the ASSISTME professional development programme. One of the learning aims of the lesson was to get students to derive a mathematical relationship from the data they had collected and use it to support the formulation of evidence-based conclusions.

In this scenario, the teacher reads students' written conclusions and notices that students make a claim of a direct proportionality relationship between the number of coils of a cooper wire around an iron rod and the number of paper clips picked by the electromagnet. The discussion evolves as the teacher probes their understanding on the concept of direct proportionality, and guides the discussion using a combination of open- and close- ended questions, as well as exposition of information.

Teacher: …These results show that the independent variables are directly proportional [teacher reads students written conclusions]. Does it?
Sally: Yeah… because as this increases this increases and as this increases this increases [says the student pointing to values on a table].
Teacher: Yeah? What does directly proportional mean?
Sally: That they increase together.
Teacher: Is that all it means?
Sally: Is that something to do with equal.
Teacher: Right, if something is proportional it means that as one increases the other one increase in a straight line. Ok? If it is directly proportional it means that as one increases the other one increase in a straight line that passes through the origin.
Maria: Oh!
Teacher: Oh! Do you know that this is a straight line?
Sally: Yeah.
Teacher: How do you know that?
Sally: Because as this increases this increases and… .
Maria: No, it won't be an exact straight line…because of this, look!
Sally: Oh!
Teacher: that curve shows as this increases this increases, yeah? [teacher draws different examples on a sheet of paper]and that curve shows that as that increases that increases, yeah? neither of those are proportional or directly proportional.

Here we see how the teacher skilfully gets students to look back at and reflect on the evidence they have collected and what it means. The teacher leads the students through this reflective scenario and points out to them where their ideas go astray and provides input to challenge their thinking. The teacher does not say they are wrong but rather provides a more detailed look at how they have formulated their ideas and asked the students to reconsider their ideas. This guided approach allows students to rethink their ideas rather than feel they have got things wrong and so more pro-actively helps with future learning.

Example 3: Using on-the-fly feedback to develop a student's understanding of inquiry
The following example comes from a transcript of a lesson carried out by one of the project primary teachers with a class of 30 children aged 9-10 years. In groups, children are given

some yeast, water and sugar and 3 measuring cylinders. They are set with the task to investigate what is the best way to make yeast work. Before carrying out their inquiry, they are asked to write down their prediction.

Teacher: Ok, if you are just finishing off your predictions, then feel free to keep writing, then finish your sentence. Everybody else though, look this way. Now, I'd like a few people who have done some really good predictions to share. Now, what I mean by a good prediction is (teacher refers to success criteria on Interactive White Board) to make a guess, someone who has linked it with their reasons, someone who has used what they already know and has used their scientific knowledge to make their prediction. Who has done that? Hopefully everyone's hands should go up because they know what they should be doing. Ummm, Jaad, you have really impressed me today. Can you read your out please? Let's see if you have done all the bits.
Jaad: I predict that the yeast will rise up in the warm water because the warm water will heat the yeast and the yeast will release carbon dioxide.
Teacher: That's great, well done Jaad!
T: So Jaad said his prediction. He made his guess, didn't he. He said 'because' and said why, he said 'because heat will release the carbon dioxide'. But he didn't say why the heat will help. So the last thing you need to do is to say why you think the heat will help the yeast to release the carbon dioxide. Does anyone know or think why that heat will help? Anyone written the why the heat would help? Louise what have you written?
Louise: I predict that the warm water will be the right temperature because when you put bread in the oven, the oven needs to be warm.
Teacher: Well done, so Louise, made her guess. She said why and her reasons are to do with her prior knowledge. When you put yeast in the bread dough in the oven, you never put it on warm or cold, you put it on hot so she is using that to say why, what would be the best temperature. So, well done. These ideas are all good. Think about living organisms as well. What temperature do they work best in? Saadia, tell me yours.

In this episode, the teacher helps the class to share ideas and explore their understanding through using the success criteria. This focuses the learners on considering the reasons that students are providing as part of their hypothesis and, as such, allows the teacher to go beyond accepting answers as correct to exploring how well the ideas are expressed. At the same time, doing this in a whole class feedback session, enables the learners to reflect on and reconsider their hypotheses in comparison to the two presented and so begin to interpret what is meant by a good prediction.