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## Don't test pupils, talk to them

Keith S. Taber

Teachers are well aware there can be a wide variation in the knowledge and understanding among pupils in a class. When interviewing students in one school, I was told by Y7 (11 year old) pupil Daniel that the three states of matter were “solid, liquid and gas”. He went on to explain that

“a solid's particles are close together and they vibrate because all particles move. A liquid's are able to move round more, but they're still attached, and the gas [particles] are like far away apart as possible, and they fly around really fast”.

I imagine that had the class teacher heard this response, she would have been satisfied with the boy's learning and her own teaching. Yet, of course, another learner in the same class could experience the same teaching with very different results.

So, when Jason was asked what he was studying in the class, he told me that “we done changing states and the three states of matter, and about if burning was irreversible, and if stuff was a state of matter”. What he had taken away from this was that “we found out that wood ain't a state of matter, I think, or fire, no fire's ain't a state”. When asked what the three states of matter were, he suggested “burning, freezing and melting”.

As a researcher I sometimes have the opportunity to talk to students at length about their understanding of science topics. This was something I started doing when I was a teacher in school and college. However, as a school teacher I certainly did not have the opportunity to explore the thinking of more than a small minority of my pupils in any depth – there was just not enough time.

However, I do strongly believe that the best way to find out what pupils know and understand is to talk to them. In research, interviews are often able to delve into detail that is not possible in written probes, and can avoid the challenge of writing effective questions that children with limited literacy can access. Talking also offers opportunities to clarify and follow-up, where written tasks only elicit the pupil's response to their initial interpretation of what is being asked for.

What is true for research is just as valid in teaching. Talking to pupils offers the best way of monitoring learning and informing teaching, and most teachers become highly skilled in using talk as an informal and on-going means of formative assessment. In some educational systems this process can form the basis of students' reports and grades. However in the UK there is a culture of giving priority to written forms of assessment.

Written tests obviously have advantages: all pupils can be tested at the same time on the same questions, and there is a permanent record of responses. Yet these strengths do not really relate to the best way for teachers to use assessment to inform teaching, but only to the needs of a system based on an obsession with standard testing, and - just as significantly – teacher accountability. From an educational point of view, the teacher needs to find out what students know and understand whilst teaching the material: information from the end-of-topic test comes too late.

Formal national science test papers for 14 years olds in England have now been abolished, and this seems an ideal time to allow teachers to use the time saved in test preparation to talk more to pupils about their learning. This will not provide comparable marks that support league tables, but will produce much better knowledge to inform teaching decisions. Teachers should be undertaking an on-going and flexible programme of informal assessment; recorded in the ways they consider best able to support their teaching. Head teachers, parents, governors and government should trust teachers' professional judgments – for when teachers are allowed to work in ways that best facilitate their teaching, they should not need to be held accountable by time-consuming paper-trails.

The approach I am championing is needed to do justice to the complexity of learning processes, and the nuances of student thinking. This was demonstrated by my talk with Jason - or Daniel as I also called him above: the quotes at the start of this article are based on a conversation with a single pupil. After offering the inadequate account of the three states of matter reported above, 'Jason' was then asked what 'changing state' meant. In answering, he then remembered what the three states were,

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“Changing state is like an ice cube into like water. No! I know what the three states of matter is [sic] - solid, liquid and gas, I think. Yeah. Solid, liquid and gases, three states of matter.”

The new question triggered something that changed this pupil’s recollection about the states of matter, along with my assessment of whether he understood the scientific model. It was then that he proceeded to describe the arrangement of particles in the different states. In this case, the extended conversation demonstrated a very different level of understanding from that suggested by the pupil’s original response. I am not confident that a written test question would have been so revealing.

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