Contextualisation caged?

Despite a contextual approach to the learning of science being advocated across the world, implementation has been patchy and often trivialised. MARK ASH questions why is it so hard and what can be done to help science break out of its contextual cage?

A contextualised approach asks students to look at their world and identify the science within it to develop a deep and transferable understanding of the key concepts and ideas. Contexts must be central to student learning and an integral part of the learning process. Despite strong advocacy for contextualisation, implementation in the sense advocated by research has not been widespread.

Over the last decade, various iterations of a contextual approach to science curriculum have been developed across the world. In the UK, the context-based approach pioneered by the Salters Project of the 1990s gained a reputation as both rigorous and successful in attracting a large proportion of students to study 'A' level sciences. In Australia, contextualisation has found its way into the VCE, HSC and Queensland courses to varying extents. However, implementation, in the sense advocated by educational research, has been patchy and little headway has been made in the middle years. Why is it so hard and what can be done to help it?

Why contextualise?

The in-priniciple case for contextualisation comes from perspectives of learning and student engagement. If learning occurs only when students process new information or knowledge in such a way that it makes sense to them within their frame of reference, then a unit aimed at building an answer to the question 'What makes a healthy body and a healthy lifestyle?' is likely to be a more appropriate frame of reference than one as inert as 'Structure and function in living things'.

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The latter is typical of discipline-based curricula that views science in terms of abstract and generalisable concepts, processes and skills. Such approaches have been extensively challenged as inappropriate based on the view that thinking and learning are dependent upon, and embedded in, the contexts and activity in which it takes place.

With respect to student engagement, Goodrum, Hackling and Rennie (2001) summarised the benefits of a contextual approach by stating that students respond positively to tasks that they perceive to be purposeful and interesting to them. Therefore they argued that science activities and investigations should be conducted within a context that has relevance to the students.

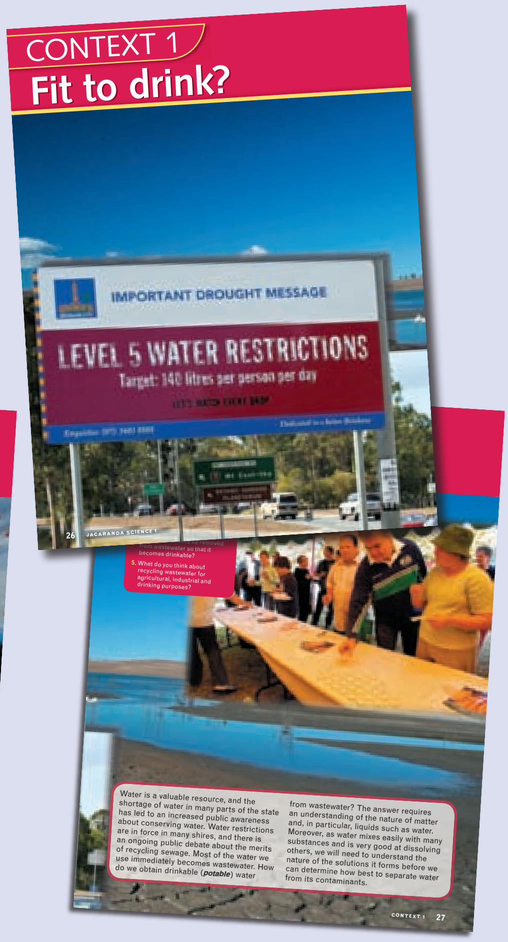
In senior courses, such as HSC chemistry, contexts are little more than labels under which traditional knowledge is delivered. The 'Acidic Environment' may sound like an accessible context, but is often little more than a vehicle for understanding acid-base indicators and the acid-base nature of oxides. Perhaps students can be forgiven for a cynicism towards units with catchy titles such as 'Armageddon' and 'What's Cooking?' but that deliver nothing different in terms of day-to-day classroom experiences than was observable 25 years ago.

Why is it so hard?

I have watched and listened as teachers have struggled to develop and/or implement contextualised units across years 8–12 in my own school over the last four years. The staff are very well qualified and all are experienced in their fields, and there have been many successes, but implementation hasn't always delivered the changes envisioned for the students. Why is it so hard? I can identify four of the bars on the cage that constrains contextualisation.

Firstly, contextualisation requires that we have a deep understanding of the contexts as well as the scientific concepts and their interrelationships. Unless we personally operate within a context familiar to us in one of our life roles, we must acquire a new domain of knowledge: the knowledge of the context itself—the issue, problem, or focus question. Once we have acquired this, we must integrate it with our existing conceptual knowledge. Such learning takes capacity, desire, time and effort that needs to come from some other priority—bar one of the cage.

Also, beyond the understanding of contexts, contextual approaches require a deep understanding of related scientific concepts. Many studies have found that primary teachers do not feel that they have



adequate background in science, let alone the expertise and time to construct a contextually based curriculum. In secondary schooling, the shortage of trained specialists presents similar problems—bar two.

Related to these two issues is a third. Usually, contextualisation requires that we radically reconstruct our conceptual knowledge in terms of its sequencing and packaging. Qualified and experienced teachers possess their own personal, robust and intricate conceptual knowledge base that provides them with the foundation for the design and development of the school course. As a result, moving away from a familiar discipline-based approach demands that they dismantle, re-assemble and integrate these concepts, processes and skills to form a new cohesive whole: one whose structure is very different from that previously held. Such a task requires a significant level of intrinsic drive, doesn't often come off the first time they try it, and competes with the other demands on teachers and department heads—bar three.

Finally, I'd suggest that there is a fourth bar on the cage for the science faculty leaders within a school: a whole-school contextual approach to science requires high levels of coordination and planning across many year levels to ensure that the development of key concepts, processes and skills occurs in an appropriately sequenced way. If this coordination is piecemeal or breaks down, the resulting holes and redundancies can lead staff to be discouraged and perhaps feel that their students are experiencing a program that is not delivering what it once did. Politically, such perceptions can lead to retreating to previous curriculum models and before we know it, units on 'Mechanics' and 'Geology' have reappeared.

A way out of the cage?

Overall, the case for adopting a contextual approach is strong, but doing so is much more complex and demanding on teachers' knowledge and expertise than it may seem. Given that the backgrounds of students and staff, as well as local factors, make the needs of each school quite different, a single roadmap for implementing contextualisation is unlikely to exist. Nonetheless, significant support is needed. Commonwealth and State authorities (with publishers) will need to follow the lead of successful projects such as Salters Science and the local *Primary Connections* initiatives in generating full contextualised courses of study with unit and lesson plans for the stages of learning through years P–9. Through using such materials, teachers have the opportunity to develop their conceptual knowledge as well as experiencing contextualisation, without being expected to invent the wheel themselves. Once familiarity and confidence is built, they will be well placed to tailor and tweak the materials, in order to generate their own curricula to suit the needs of their students and break from the cage that constrains the contextual approach.

References

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