

# THE ORIGINS AND CONTINUED LIFE OF SMILE MATHEMATICS

Hilary Povey documents her involvement with the embryonic development of the Smile resources

This is a personal “take” on the beginnings of Smile. I began teaching mathematics in 1970 in an inner city comprehensive in Hackney, part of the Inner London Education Authority (ILEA). The students were put into two bands on entry: 120 in the top band and 120 in the lower band. Within each band, four sets were created for mathematics. I had recently emerged from training college and, as part of my studies there, had been required to read and analyse some texts that were to become classics: examples included John Holt’s *How Children Fail*, Paul Goodman’s *Compulsory Miseducation* and Robin Pedley’s *The Comprehensive School*. One such text that had a profound influence on me was Brian Jackson’s *Streaming: an Education System in Miniature*. Research clearly showed, and has continued to show, that the division of school students into bands, sets and streams has little effect on the attainment of academically successful students, but it does produce a long tail of poor achievement and it impacts negatively on the social and personal welfare of those deemed unsuitable for the “higher” classes.

I was concerned about this issue. Much educational rhetoric at the time was advocating mixed attainment teaching for English, history, art and so on, but arguing that mathematics and modern foreign languages were deeply hierarchical subjects and so could not be taught to groups composed of students with varied levels of prior competence and understanding of mathematics. I was not prepared to accept this model for grouping students in mathematics classrooms, so when my Head of Department asked me to attend a week-long course focusing on this issue I grabbed the chance with both hands. As it turned out, I was privileged to be present at the birth of *Smile*.

Following the course, many of us established a working collective, supported by the ILEA and our schools, to create materials, which would enable us to move to all attainment teaching in mathematics. We generated independent learning resources for use in our own classrooms, and then met to trial each other’s material, to thrash out which items provoked mathematical thinking, to work together to edit and adapt the resources until we were happy with them, and then to publish and distribute them amongst ourselves. We organised the materials in a matrix showing both content and levels of

mathematical difficulty, provided answers for students to use and, and created tests for students to self-administer. These tests would be marked by the teacher, to enable diagnostic assessment and planning.

In these initial stages I was still buying into some of the conventional wisdom with respect to the teaching and learning of mathematics that, through *Smile*, I was gradually able to question. In retrospect, my earliest attempts at producing material for the young people to use independently make me blush. My only mental model of a successful work card was one which a student was able to work through without needing to question me, their peers, or most especially themselves about anything, and which allowed them to get right some questions that they had not been able to get right before they started. Of course, there may be, rare, times when this is exactly what is needed, “*I get the point of factorising and can see it’s really interesting the way it connects to the graphs but it always takes me ages – are there some quick ways to do it and can I have some practice?*” but it now seems to me that almost all worthwhile mathematical activity requires us to struggle with problems which are difficult for us, that stop us in our tracks, and that need thinking and arguing about, perhaps just with ourselves but, for most of us most of the time, also with others. The students in my *Smile* classes taught me this, but I certainly would not have been able to come to this view of learning if I had not had regular, committed, even impassioned, involvement with colleagues trying their best to do the same job as me. So, in general, in step with my *Smile* colleagues, I moved away from a ‘bite-sized’ piecemeal approach to the curriculum and moved towards more investigative and problem solving based ways of working.

After some time, the ILEA provided additional resources so that a designer, Charles Snape, could be employed. Charles worked closely with the groups of mathematics teachers, so he was able to create high quality designs which embodied the key approaches to mathematics we were striving for. The resources that began from humble beginnings were becoming world-leading.

*Smile* classroom practice also made it possible for me to work more democratically with my students. I learned that this new way of working opened up opportunities for students to be more in control of

their own learning. Students reflected for themselves about what they did and did not understand, what their mathematical mood was on a given day, who it would be good to chat with about some problematic mathematics, how they would record their work or present it to others, and so on.

Intimately interwoven with this, the *Smile* project contributed significantly to the professional development of the teachers fortunate enough to be involved. There were Heads of Department, colleagues near to retirement, through to young novice teachers like myself, and everyone in between all working together, sharing their expertise, their hopes and fears, their problems and solutions, and developing wisdom. The structure of the project instilled a deep democracy, with decision-making resting with a consensus of those who participated. Any, and all, were welcome and could contribute. Fairly early on, the then ILEA Chief Inspector for Mathematics, Laurie Buxton, argued with the assembly that a more conventional democratic structure consisting of elected hierarchies with committee members and such like should be set up. To his credit, even though he remained unconvinced by those of us taking an alternative stance, he allowed our will to prevail, while predicting an imminent descent into chaos! *Smile* survived and flourished with this *open* structure.

This example illustrates the considerable respect that ILEA offered its teachers. It was willing to pump-prime projects and to support the energy and initiative of its teaching staff. ILEA expected its teachers to be intelligent, creative, and professional and so we were able to match this expectation. I gained from working alongside a committed and mixed group of teachers, all of whom were eagerly and regularly examining their own practice, sharing anecdotes and reflections about the thought-provoking things happening in their classrooms. Throughout most of the time I worked in ILEA schools teaching mathematics, in common with a significant number of other teachers, I was seconded one day a week to work with colleagues at the teachers' centre to make *Smile* happen. This seems almost unthinkable now, that an Authority and the Headteachers of its schools believed sufficiently that their teachers' active involvement in curriculum development and design was a power for good that they were prepared to find the funds, and the timetabling solutions in school to permit this to happen. But, possible it was, and it still would be if we had the collective will.

The *Smile* materials endure, and they remain some of the best available resources to support mathematical thinking in young learners working at all levels of attainment in our secondary schools.

This is a valuable legacy. An even more important legacy is the example of a very different educational world from the educational world of 2014. Telling the history of *Smile*, and thus keeping alive the knowledge that other ways of working, knowing, and being are possible is a vital bequest. I remember at a meeting about *Smile* for non-*Smilers*, some twenty-five years ago, a mathematics education colleague asked '*If you were starting again, would you create Smile just the same all over again?*' I thought this was an interesting question and, I guess for me, the answer is '*No, not quite*'. I would probably emphasise more whole class activities than I had envisaged being possible in 1972, more opportunities for more extended work than I achieved in my *Smile* classroom, more frequent use of structured group work than I employed. But, this is as it should be. A major strength of *Smile* was its ability to adapt, and adopt new insights generated both within the project and outside it. However, I return often to the materials for use in my mathematics teaching at the university; I cannot forget the excitement of young people working together co-operatively and independently in *Smile* classrooms, and I feel enormously privileged to know that this can happen; and that I, and hundreds of other mathematics teachers, have been indelibly touched by a vision and a range of possibilities that are needed more now than ever. This is a vision of co-operation, mathematical excitement, mutuality and real learning.




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#### References

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- Harlem, W. & Malcolm, H. (2007) *Setting and Streaming: a Research Review*, The Scottish Council for Research in Education
- Cassen, R., & Kingdon, G. (2007) *Tackling low educational achievement*, Joseph Rowntree Foundation, <http://www.jrf.org.uk/publications/tackling-low-educational-achievement>.

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#### Note

**The National STEM Centre mathematics team explain how to access the *Smile* materials**

Some people, like Hilary, held on to their precious *Smile* materials and I know some maths departments will still have their favourite activities.

Many of the *Smile* materials have also found new life in other resources and publications, as we discovered at the National STEM Centre when we set about packaging the materials for the eLibrary. For all the reasons that *Smile* was a great resource when it was first developed I think in particular with a new National Curriculum on the way it is well worth re-visiting. Spoken Language and non-routine problems are specifically mentioned in the new curriculum and the *Smile* materials provide an excellent resource to enable students to tackle both.

At the *National STEM Centre* our eLibrary aims to give teachers access to materials that are no longer *in*, as well as contemporary resources. *Smile* is one of these out of print collection that we have brought back to life and is one of the most viewed. Originally the *Smile* collection stood as a series of files containing the cards referenced by number, great if you knew what you were looking for. However one of the original supporting documents, the Network, gave teachers a progressive route through the mathematical areas using the *Smile* cards. At the *National STEM Centre* we have re-packaged

the materials so they are in the mathematical areas, which is when we started coming across what looked like familiar resources that had been touted as 'new' in other publications. The truth is mathematics and in particular a good mathematics resource is still as good today as it was yesterday and we should not be re-inventing the wheel. With a new National Curriculum departments and teachers will be re-visiting their schemes of learning and sourcing resources to use, I would highly recommend not starting from scratch but building on the excellent work that teachers did in designing *Smile*.

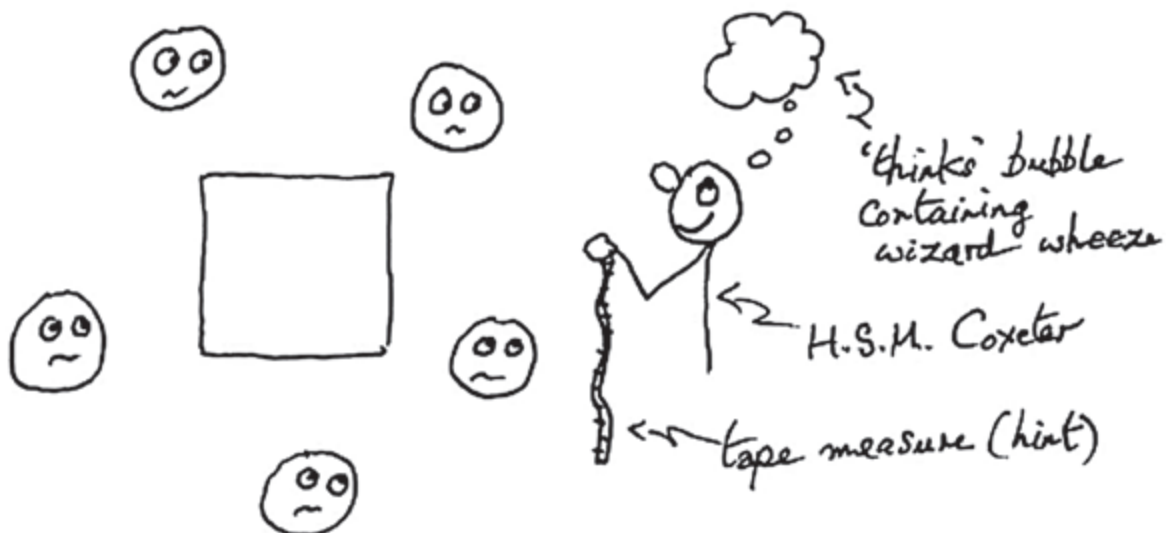
You can now find the *Smile* cards (<http://stem.org.uk/cx3e>) at [www.nationalstemcentre.org.uk](http://www.nationalstemcentre.org.uk) in the themes originally set out in the Networks.

The *National STEM Centre* Secondary Mathematics Resource group also features extra *Smile* activities and even more activities can be found in the *Smile* mathematics books collection (<http://stem.org.uk/cx3hr>).

## Coxeter's Cake

by Paul Stephenson

How do you cut a square cake so that 5 children each get the same amount of cake and the same amount of icing?



Paul Stephenson is operations director of The Magic Mathworks Travelling Circus.

For the solution go to [www.magicmathworks.org/coxeterscake](http://www.magicmathworks.org/coxeterscake)

**Source:** Coxeter, H.S.M. (1961) *Introduction to Geometry* (Wiley), p. 38.



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