At the end of another long academic year, when one might expect academics to be thinking only of summer vacation, research and perhaps even holidays, a group of mathematicians assembled in Birmingham to spend a weekend discussing ideas for innovation in mathematics teaching. The brief was to exchange new ideas for teaching mathematics in higher education, with a view to identifying projects which might be pursued collaboratively and proposals which might be submitted to the National HE STEM Programme Mathematics Curriculum Innovation Fund for possible support.

The mix was interesting, in that there was representation from different kinds of institution and delegates were varied in terms of experience and area of expertise. Universities represented were Aston, Greenwich, Keele, Manchester Metropolitan, Nottingham, Salford, and Sheffield Hallam. The format of each session required three of us to make five-minute pitches, after which we were then sent to a break out room where other delegates could come to discuss our ideas. This worked well in stimulating discussion, which tended to range widely, and the coffee and meal breaks provided further opportunities for animated conversations.

In accordance with our brief, the ideas put forward for discussion ranged from innovations we had successfully used with students, through plausible extensions of existing practice or projects people had not yet had the opportunity to develop, to wild and unlikely speculation which might be refined by feedback from like-minded colleagues into something workable.

I opened with a pitch about using jokes to communicate mathematical thinking. My presentation of the old proof that Alexander the Great had infinitely many arms perhaps failed to persuade the audience, but discussion afterwards focused on the idea that suitable mathematical jokes (or magic tricks and illusions, the subject of my subsequent pitch) can be an effective way to dispel students’ misconceptions. As a result we concluded that a joint project to assemble a library of jokes and demonstrations to address common student misunderstandings might be worthwhile.

David Bedford and Mike Peters made a presentation demonstrating the value of video conferencing as a means of conducting tutorials. We learned from Neil Challis how computer software could support problem-based learning in geometry – a long way from Euclid! Those of us not already using GeoGebra realised that this is something we need to investigate.

Killian O’Brien demonstrated the use of tablet computers to create short video clips of worked mathematical examples – a particularly easy way to capture mathematical
thinking, and a reminder of how technology can enhance mathematics teaching and learning in ways that are not immediately obvious.

The vexed question of groupwork, and how to allocate students to groups without tears, was addressed by Noel-Ann Bradshaw: this led to discussion on Twitter with contributions from some who were unable to attend the event. Noel-Ann also talked about the ‘Maths Arcade’ she set up at Greenwich and is developing with HE STEM funding (see page 26). This has helped student engagement and seems to have improved retention: as a result of this weekend, the National HE STEM programme has agreed to help other universities implement this initiative.

The Saturday finished with ‘entertainment’ – demonstrations of tricks and puzzles that are useful as refreshers to break up a long class or as cliff-hangers to keep students engaged over a short break. Peter Rowlett talked about the 14-15 puzzles, Killian O’Brien demonstrated a topological rope trick, David Bedford posed a counter-intuitive problem about an ant on an elastic band, and I did some mind-reading.

The Sunday morning began with a special guest, claiming to be Gottfried Leibniz but bearing some resemblance to Noel-Ann Bradshaw, arguing that the occasional use of period costume might be effective in engaging students and creating memorable learning experiences – this is effective in outreach activities, so why not in regular teaching? Could ‘applied drama’ enhance student learning?

There was discussion as to whether departments might be able to share the potentially expensive costumes.

Killian O’Brien asked us to think about how to deal with student ‘howlers’ in exams – do we discount them as purely the outcome of stress or do we read them as signs of deep lack of understanding and try to address them? This connected with Peter Rowlett’s reflections on how we present mathematics to students – too often we only show the finished product and not the false starts and mistakes that are inevitable when mathematics is created.

In the final session Sally Barton talked about the use of puzzles in transition and mathematics support – once again all about promoting engagement, and Edmund Chadwick complemented this in telling us about his use of puzzles like Rubik’s Cube to convey mathematical ideas.

This was a fascinating and productive weekend. It is always worthwhile to talk to colleagues about teaching maths, and this differed from other valuable events such as the CETL-MSOR Conference in that we were encouraged to put forward half-formed (and indeed perhaps half-baked) ideas that might just work. The discussion helped share, clarify and develop these ideas. The emergence of common themes, such as the use of games and puzzles in different learning contexts – was thought-provoking and encouraging. The best thing about the weekend was that new collaborations were emerging, and ideas were going to be taken back to be discussed with colleagues at our own institutions. These are exciting times for mathematics in HE.

Fig 1 – Gottfried Leibniz attended the Ideas Exchange to talk about the use of drama to enhance student learning.