Puzzle-based Learning in STEM Subjects

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Last year Chris Sangwin and Matthew Badger in Mathematics, Colin Thomas in Chemical Engineering and a colleague from the University of Manchester wrote a "Guide to Puzzle-based Learning in STEM Subjects". This was published by the University of Birmingham and made freely available through the **Higher Education Academy (HEA) website (http://www.heacademy.ac.uk/)** . The Guide shows how puzzles might be a useful tool in the teaching of mathematics in physical sciences, engineering and mathematics, and possibly in other disciplines. It was based on practical experiences of the authors with input from colleagues all over the UK who attended a HEA funded workshop on this topic. There are forty-eight selected puzzles, from the very simple to the frankly difficult, with solutions, variants and commentary. An interesting and fairly typical example is:

Diagonals of two faces of a cube meet at a vertex of the cube. What is the angle between the diagonals?

This can be solved using geometry or vectors (useful mathematics) but there is also a very nice lateral thinking solution (that can found in the printed Guide and on the HEA website mentioned above). That many of the puzzles have two or more solution methods was a key point in their selection; the purpose of Puzzle-based Learning is to encourage students to think rather than rely on rote learning.

Thanks to the generosity of the Circles of Influence Alumni Impact Fund, it has been possible to distribute printed copies of the Guide to all teaching staff in EPS. It is hoped and expected this will influence teaching in EPS, possibly in a minor but potentially very enjoyable way for both staff and students. Also funded was printing of booklets of the puzzles only (no guidance, no solutions) that will be given to all first year students in the College in September. There are also enough copies for students in Years 2 and 3, or these may be given to first year students in future years. A puzzle-based activity for first year students during Welcome Week is under discussion. A workshop on Puzzle-based Learning specifically for EPS staff will be arranged in the Autumn Term and a University-wide activity is planned for February 2014, under the auspices of the Centre for Learning and Academic Development. The intention is to turn this into a self-sustaining activity that will make EPS a leader in Puzzle-based Learning in STEM. This exploitation of the initial work that went into the Guide would not have been possible without funding from the Circles of Influence Campaign and our generous alumni donors.