Tackle those anxieties

James Akerman looks at how technology can be utilised to maximise the potential of students with SEND affected by maths anxiety

Arbour Vale School is an all-ages special needs school. Our pupils have a wide range of abilities: some have profound and multiple disabilities, while others face challenges with emotions and behaviour.

As in many other schools, our students vary in terms of their needs, skills and knowledge. Some in the secondary phase struggle to add up numbers, while others possess a good grasp of number concepts.

Research from the University of Oxford recently confirmed that studying maths produces a chemical in the brain that supports many crucial skills beyond mathematics, including reasoning, problem solving, memory and learning (bit.ly/ti8-send1). Such connections demonstrate the importance of nurturing a good relationship with maths, particularly at secondary – a time when young people will be preparing to take their next steps and set themselves up for a successful future.

Unique circumstances

Ongoing lockdowns, school closures and uncertainties forced us to adjust our teaching tactics, so that we could support all of our students and effectively tackle maths anxiety. As was the case in schools across the country, this was particularly difficult to do while we transitioned to remote learning and tried to prioritise the wellbeing of our students, especially those with SEND.

Arbour Vale hasn't been alone in having to navigate this terrain. According to the National SENCO Workforce Survey 2020 carried by Bath Spa University and nasen (see bit.ly/ti8-send3), three quarters of SENCos state that their school experienced challenges with providing virtual support for their students during the first lockdown. To overcome these unique circumstances ourselves, we needed to track our learners' progress, monitor their achievements and identify where they were struggling in tasks remotely.

To achieve this, we worked with Mangahigh, alongside other SEND schools, to make their gamification content accessible to our students. The games we used were able to inspire a greater interest in maths for them, which will in turn deliver myriad benefits to our students that extend far beyond their time at school.

Maths anxiety can be crippling for many students, and even cause physical and mental distress. It can lead to students underperforming in standardised testing and school exams, due to them acting in accordance with their low expectations.

Research published earlier this year by the American Psychological Association (see bit.ly/ti8-send4) shows that maths anxiety can impact a student's ability to learn new mathematical concepts and procedures well into the future, since they're likely to assume that they'll fail before they even begin the process of learning.

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Boosting confidence

Our students love computers and technology. Students on the autism spectrum and with ADHD respond particularly well to gamification because it draws them in, holds their attention and keeps them engaged. In a world where so much is constantly changing, and at a time when students are studying at home while surrounded by distractions, getting students to focus is crucial to their learning.

Games can nurture positive engagement with maths at home in a more effective way than may be possible in the classroom. Students can be concerned about the social consequences of answering questions incorrectly in class, and may be reluctant to put their hand up and engage in lessons. In contrast, engaging privately in maths games allows students to explore and develop their maths skills without fear of social consequences or making mistakes.

Many students feel anxious about maths due to this fear of being viewed as a 'failure'. Well-designed educational maths games can reframe the narrative of failing. If a level is too difficult, the game can automatically adjust to better suit the student's level of understanding, so they never feel left behind. The idea of 'failing' is therefore replaced by a sense of trying, which is central to the process of succeeding, thus boosting the confidence of students

and their subsequent ability to learn.

Maths games will tend to progress slowly, in order to consolidate learning and ensure students never feel out of their depth, while still being challenged. Before the students know it, they'll have grappled with various mathematical concepts without feeling frustrated or embarrassed, irrespective of their additional needs. Through this measured progression, the students' abilities can be constantly expanding.

Finally, many games also feature positive reinforcement features, such as rewards and achievement boards. These will validate a student's progress, boost their confidence and encourage them to learn more. We've found that find this works particularly well among our secondary students at Arbour Vale, who are typically more competitive than their younger peers.

Problem solving and reasoning

The team carrying out the aforementioned Oxford research was able to distinguish between adolescents who were studying maths and those who weren't, based entirely on how certain brain chemicals support various skills, including decision making, problem solving and reasoning. Of course, adolescence also coincides with a period where secondary students will be going through a series of natural, yet important cognitive changes.

The pandemic has lent a certain urgency and importance to the task of making maths fun. Professor Roi Cohen Kadosh, who led the Oxford study, has expressed concern over "The reduced access to education in general, and maths in particular, [and how this will] impact the brain and cognitive development of adolescents."

Games help to harness the power of maths, and in particular, these overarching skills. They often require students to use their maths knowledge in solving problems that take the form of puzzles, mazes and more besides. In the process, students will develop skills of planning and prediction, forced as they are to consider what will happen when they make certain moves. This will help students feel more comfortable in predicting the consequences that may arise from their actions, and in turn, support their ability to reason.

TIME-SAVING TRACKING

Games aren't just helpful for students – they can also save teachers considerable time. Data collected from the games students play can be utilised in numerous ways, such as tracking student progress over time.

Teachers can quickly gain insights into how many students have played the games they've been assigned; how often they were played; the points at which students may have stopped engaging; areas where they might have struggled, and those areas and topics they've found easiest.

Tracking progress in this way can help to identify knowledge gaps amongst students, as well as the types of support individual students might need, and any notable classroom successes that could be celebrated. Using this information to inform future lesson planning and individualise students' learning could help to reduce maths anxiety.

We know that an interest and aptitude in maths can benefit students in many different areas, from problem solving to decision making. Online games can inspire secondary students and boost their maths confidence, while also saving teachers time and ensuring that maths remains an important part of every student's future – irrespective of their individual needs or ability.

ABOUT THE AUTHOR
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