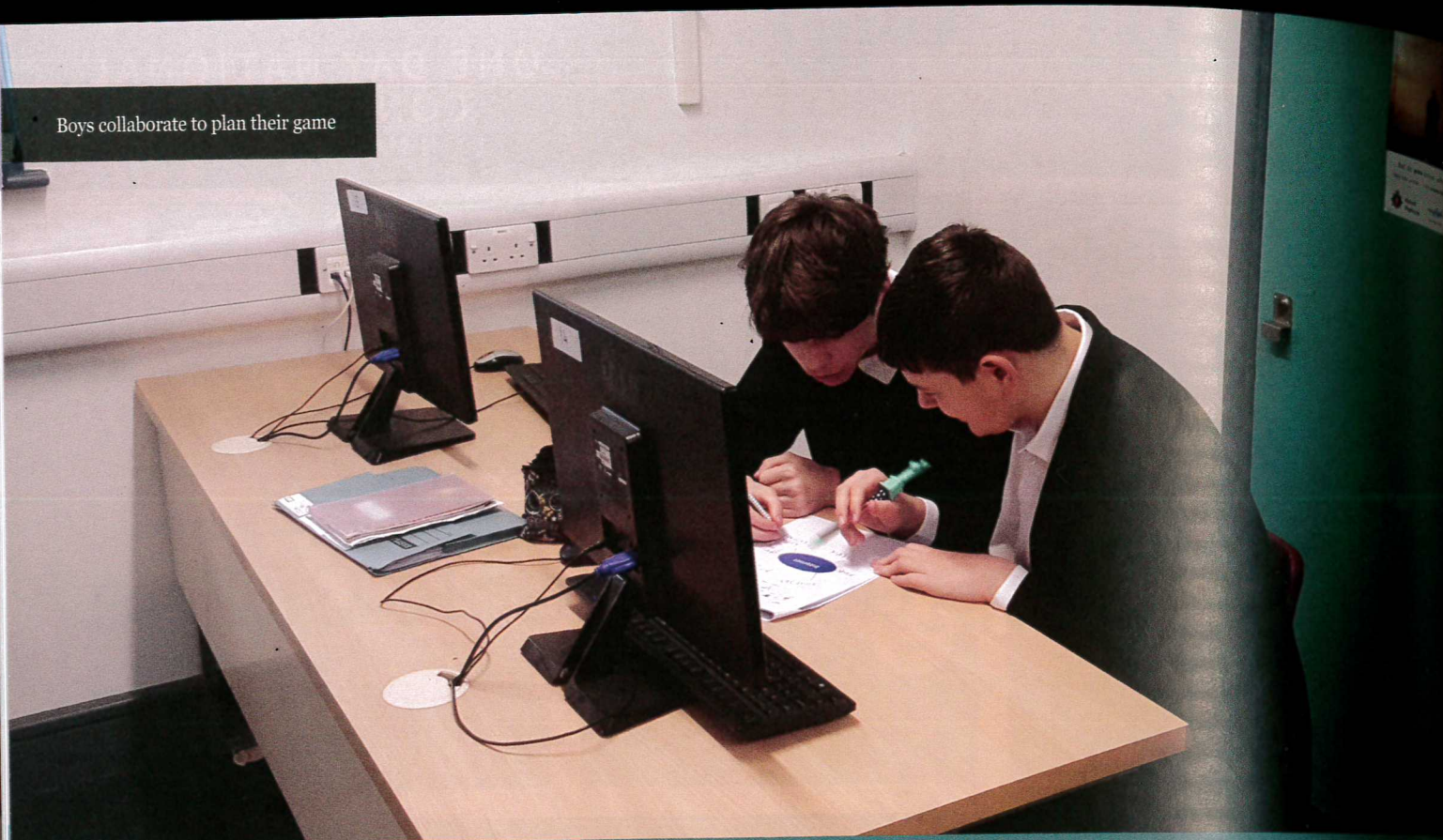


Boys collaborate to plan their game



The benefits of a game-maker culture

Sophie Chalmers finds out how creating games is developing important life skills in students with SEN

Every week students in three Year 8 classes at Stony Dean School, Amersham, arrive abuzz with anticipation for their respective ICT lessons with Thomas Boardman. They can't wait to settle down in their groups and get going with coding their games.

The school specialises in communication and interaction for students aged 11-19 who have a wide range of needs, including MLD, ADHD, ASD, sensory needs and physical impairments. The three classes comprise students with very different needs. One has students with high functioning autism; another has students with physical impairments and difficulties with fine motor skills; in the third are students with ADHD, moderate learning difficulties and sensory difficulties. Despite these disparities, students in all three classes have made huge progress in the last academic year thanks to researched-based practice that encourages them to evolve from game players to game makers.

Initially, the three classes were the focus of a pilot project to investigate

and develop the use of digital games as a pedagogical tool in the classroom. Mentored by Dr Maria Kambouri from the UCL Institute of Education, Mr Boardman hoped to find out how games might be used in education to improve attainment (see box on page 14).

The project came about as a result of a successful application to Erasmus+ for KA2 strategic partnership funding, and is a partnership between Buckinghamshire County Council and the Gothenburg Region Association of Local Authorities in Sweden. The project was run in both Stony Dean School and Lexby, a mainstream school in Gothenburg, which was used as a control group.

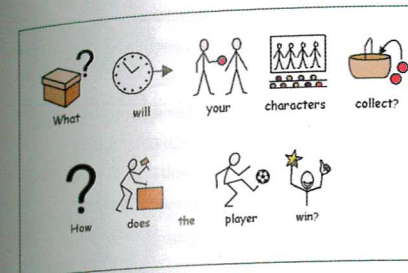
Teaching students to code

When he started out, Mr Boardman was open-minded about the nature of the benefits he was hoping to see. However, he discovered that games creation is a perfect vehicle for improving key life skills such as teamwork, communication for receptive and expressive language, patience and problem solving, all of which had a direct impact on students'

behaviour and attainment in school. Importantly, the whole project sat neatly within the computing National Curriculum, which means it can be adapted to many school settings.

As preparation for the project, he spent 12 weeks teaching the students to use two coding programs: Scratch and Kodu. These are very different. Scratch is a text-based 2D programming application that allows students to create stories, games and animations, whereas Kodu is a 3D programming tool that uses images, rather than text, for the coding process, making it more accessible for those with literacy difficulties. Although Mr Boardman had only used Kodu a little, he discovered many online resources to guide him and, learning alongside his students, supported them in the creation of a game of Pong and a racing game.

At the same time, he produced a journal/record book supported with symbols for each pupil, which outlined the project aims and the steps involved in game creation, and provided space for pupils to record their ideas along the way. For example:



Having equipped students with the basic skills to code, Mr Boardman divided them into several groups to create their own games using either of the programs. He predicted that more would use Kodu because of its visual nature and the clear sequences involved (24/26 students did so). Of the two that used Scratch, one wanted to challenge himself to read more, and the other had a visual impairment and could not see the 3D objects as presented in Kodu.

First, however, the groups spent seven weeks designing their games. During this time, they had long discussions about what their game would do and how, and evaluated each other's designs. They talked about who their main character would be, what this person would do and how players would win the game. In the process, they gave each other advice and help, and lots of positive feedback. This preliminary stage was vital to enable the students to visualise what the game would look like, identify its aims and simulate the working life of a computer programmer.

At the end of each session, Mr Boardman would summarise the skills, including life skills, the students had learned during the lesson and encourage them to use these in the rest of their classes.

A positive impact

The project outcomes surpassed all Mr Boardman's expectations. Here are some individual examples.

Becoming team oriented

One student with severe expressive communication difficulties used to rely entirely on a learning support assistant (LSA) to read for him, complete his work and prompt him to join group discussions.

It turned out that he had an aptitude for designing games and his confidence soared. As a result of taking part in the project, he became very team oriented and took it upon himself to start helping other students, without assistance and without being prompted. He even became a willing participant in the ICT discussions.

The most important thing he learned was that it was all right to get things wrong in front of his peers, and not to feel embarrassed or anxious about this.

He is now a key member of his form group and is confident enough to stand up in front of everyone to explain what work he has done.

Learning to take criticism

Another boy has severe learning and language difficulties, which led him to become agitated, confused and upset when he had to work in a team. Before the project started, members of staff said that he regularly had negative interactions with two students in his class that often resulted in him being sent to the behaviour unit.

Coding games provides an opportunity to develop students' social skills

As the project progressed, he began to see that he could interact more positively with others and he realised that not everything people said to him was negative. Once he had taken this on board, he was more able to take positive criticism from his peers. In the process, he discovered that he could work



Mr Boardman guides and supports students with language structure, reinforcing what they do through words, and helps them understand actions as well as timing

alongside his fellow learners in the ICT sessions in a calm, collected manner.

Before the project, the school recorded an average of seven behaviour incidents a week for him. Afterwards, this dropped to an average of three.

Problem solving

A third student has ADHD and Asperger syndrome, and had low self-esteem due to his poor social skills and language difficulties. With a reading age of three and a half, his confidence plummeted whenever teachers put anything written in front of him. In addition, as soon as he was given something challenging or had to make decisions independently, anxiety would kick in and he would remove himself from lessons and go to the nurture unit.

The project allowed him to blossom. He overcame his fear of being challenged and was soon revelling in being part of a team developing games.

Rechannelling energy

The final example concerns a boy with severe ADHD and some autistic traits. This made it hard for him to concentrate and remain patient, which meant he tended to go off task easily.

He was also forever getting into trouble; before the project, the school recorded an average of 12 behaviour incidents a week. After the project, this figure went down to no more than two a week – he had learned that he could channel his need to be active into helping other students. At first, he asked permission to do this, but by the end of the project he was taking the initiative and behaving almost like an LSA.

Intriguingly, he was not one of the students who showed a natural aptitude for coding and he never became one of the high achievers. However, he now gets a deep sense of gratification when he is helping others. Meanwhile, working on games has improved his ability to stay on task generally.

Creating better communicators

All pupils managed to create a game and completed their project evaluations. When they were compiling these, Mr Boardman was surprised – and delighted – when they listed that some of their new skills were social as well as academic. Here are some examples of student feedback.

- I learned to work as part of a team on a task.
- I improved my communication skills by helping my friends out.

Up-skilling teachers

Dr Maria Kambouri, who is researching how to make schools more inclusive through the use of technology, was Thomas Boardman's mentor during this project.

She is a senior lecturer in the department of psychology and human development at UCL Institute of Education. Her research style is participatory, with a teacher at the centre of a project developing their skills. Together they discuss what the individual wants to achieve, identify the software that might help, and often negotiate a licence from the developers. Dr Kambouri then observes the teacher using the software as a teaching tool over six weeks. In some cases, an intervention may only be a few minutes long, but on each visit, she will discuss progress with the teacher and sometimes uses her own assessment tools to establish what difference an intervention is making. In this way, they become co-creators of knowledge.

There are two phases to the projects she runs with teachers: the first is exploring technologies and experimenting; the second is passing on information and insights to colleagues, with the teacher mentoring them in turn. Meanwhile, her MA students go in and learn by observation while

collecting the information they need to write their dissertations.

'Teachers have to be able to initiate and conduct a given intervention on their own,' she says, 'although we might work on sharpening their observation skills, and propose and explore with them different ways the tool could be used. We also condense research for them – few teachers have the time to search for academic papers on the internet, and even then, few of these contain the detail required to run an intervention. For example, when does a teacher decide that a child might fail a game for a short time? In this situation, the teacher might get the child to work at a level slightly higher than they are comfortable with, and then have to deal with the behavioural issues that arise.'

In Mr Boardman's project, the use of gaming technology was not really about teaching students coding or literacy but about developing behavioural and life skills. The outcome was that they became more socially apt and, crucially, more patient, which enabled them to develop their ability to concentrate on a task even when they found it difficult.

'We know students like playing games,' Dr

Kambouri continues, 'but what they are really learning is how to interact with each other during the creation process to develop, and then to debug or improve their game using their newly acquired problem-solving skills. Turning students into game makers creates a lot of opportunities to work on their social, emotional and behavioural skills, while, at the same time, teaching them practical skills like coding.'

'For example, in one observation,' she concludes, 'there was a moment when a student organised a game to include his peers and gave them roles. This is exhibiting management and leadership skills – we do not see that very often. Usually we just see an improvement in literacy, maths and peer-to-peer collaboration. Here we were observing a much higher order of skills and Mr Boardman facilitated this through carefully structured and well-prepared lessons, which were similar to an intervention with a much longer preparation period.'

Developing such pedagogic skills combined with teachers' enthusiasm for exploring games and technology as tools for learning and teaching is the core of the E-mentors project that Dr Kambouri is leading.

- I learned how to talk with my mates, which I would normally find hard.
- I learned how to solve a problem that I did not think I could do.

These comments illustrate a major breakthrough because most of the students struggle in a social setting. The fact that they could independently and confidently help their peers, and use and improve their communication skills, was a direct result of participation in the project.

'All of them became better communicators,' adds Mr Boardman, 'and this has transferred into other areas of learning. You can see it when they are talking to each other outside the classroom and even in work experience.'



Trials in other classes

When Mr Boardman presented his insights to the rest of the staff, some were keen to try his ideas in their own classes, and that proved successful. In addition, the therapy team started to use game making in the school's speech and language programme, although they apply the principles using Lego® rather than computer games.

He also ran training sessions for his colleagues, and many of them came to observe his ICT lessons during the project, where he would demonstrate how different strategies worked for each group – for

example, when working with students who have high functioning autism, he would focus on sequencing and scheduling.

'My original aim was to encourage young people to take up coding,' he says. 'I felt that, while it is particularly hard for our students to explain a game, if they could plan, design and draw it, it would be easier for them to comprehend and so describe it to other people. I wanted them to become confident in themselves, feel they could achieve something, work with others and take skills from lessons into life.'

 ***By the end of the project he was behaving almost like an LSA*** 

'I used a lot of visual aids and sequencing, and not only showed students how to construct a game but allowed them time to play it. They were fully engaged because they felt empowered to plan and code, play and debug, play some more and then improve their game. They were constantly challenging each other and themselves. I have become a great advocate of teaching children to become game makers.'

Reflecting on the outcomes, he says: 'Next year, I hope to roll out the concept

of game creation across the school. There are many ways we might do this. For example, we used Minecraft for Education in a humanities project where students were learning about medieval castles. We are also introducing Minecraft into maths lessons.' (See *Using Minecraft to camouflage learning, Special Children* 227.)

Mr Boardman is convinced that digital games are a powerful way to raise academic achievement and improve life skills. To that end, he presented his insights from the project at this year's BETT Show, and is planning to speak to other schools in Buckinghamshire about the advantages of turning students into game makers.

FIND OUT MORE

- **Resources.** Thomas Boardman has loaded the resources he developed for the project onto his blog: <https://mrbgamesproject.wordpress.com>. He can also be contacted direct via Stony Dean School
- **E-mentors.** More information on the projects and the case studies in special needs classrooms will be disseminated this summer. Contact m.kambouri@ucl.ac.uk
- **Erasmus+** is an EU programme for education, training, youth and sport. It runs from 2014 to 2020, and each year organisations are invited to apply for funding to undertake creative and worthwhile activities. www.erasmusplus.org.uk