



Denbighshire Education Authority chooses Autodesk Inventor® in a drive for higher Design Technology standards.

Exciting things are happening. Did you know that schoolchildren as young as eleven are now using exactly the same 3D CAD technology that is used by the most advanced of industrial organisations? All over the UK, exciting things such as this are happening in education. This is especially true at Ysgol Dinas Brân in Llangollen, the first school to use Autodesk Inventor as part of Denbighshire Education Authority's strategy for the teaching of Design Technology. In fact, Inventor is now being installed in all secondary schools in Denbighshire that teach Design Technology at Key Stage 4. According to Julian Molloy, ICT advisor at Denbighshire Education Authority, "Our pupils need first-hand experience of current industrial processes. These days, that means 3D design and manufacture, and that means using software like Autodesk Inventor."

Winning awards.

A high-achieving co-educational high school, Ysgol Dinas Brân is proud of the number of students it sends to the UK's top universities. The school and its staff have won many awards. The headteacher, Mrs Raine, is a previous winner of the School Management Leadership award from the Teaching Awards Trust in Wales. Rhys Evans, ICT Co-ordinator and Head of Design and Technology at the school, became ICT Teacher of the Year in Wales for 2001. In 2002, he was granted a Design and Technology Association Award for Subject Leadership in Design and Technology and was a finalist in the BECTa ICT in Practice awards scheme for his innovative use of ICT. Judging by the schools use of Autodesk Inventor to increase standards in Design Technology, more awards will follow.

Doing something right.

Julian Molloy says, "In Wales, it is compulsory for all pupils to be taught Design Technology up to Key Stage 3. At Dinas Brân, they undertake a nine week block of 36 periods, which includes CAD/CAM and computer

control. We have to do a really good job because Design Technology is optional at Key Stage 4. If pupils don't enjoy the subject at Key Stage 3 they won't opt for the subject at Key Stage 4. We must be doing something right, because over half of the pupils opt for GCSE in Design Technology Product Design and most students study one or more of the Design and Technology courses on offer." Pupils can then opt for Manufacturing at the GNVQ Intermediate level as well as Design and Technology at AS and A2 levels.

Piloting CAD/CAM in schools.

Denbighshire's first venture into CAD/CAM came in 1995-6. Designs created in schools using special educational 2D CAD software were sent to the LEA's Technology Centre in Denbigh. Pupils used video conferencing to watch their designs being manufactured. The project was successful and provided the impetus for schools to invest in their own CNC machines. Then, in 1996, Dinas Brân successfully bid for investment from the Technology in Schools Initiative from Welsh Office to install Control and CAD/CAM

resources. As the school was a pilot in the CBI's CAD/CAM in Schools Initiative, staff and pupils at Dinas Brân soon became familiar with the way that 3D could be used to produce what were, in effect, virtual prototypes of their designs.

Fully functional software.

Why move to Inventor? The trigger was the need to find a fast and effective rendering solution, since the software being used to add a realistic finish to pupils' designs was proving to be a bottleneck. Rhys Evans comments, "Overall, we were actually quite satisfied with what we had. But whilst we were looking for a faster rendering solution at the Design Technology Exhibition, we saw Inventor. We were stunned." What happened next? Rhys Evans set up an in-service training day (INSET) and showed Inventor to representatives of each school. The feedback was very positive. He adds, "It was schools led. At the end of the event we asked attendees if they wanted Inventor in their schools. The answer was a resounding 'Yes!'" Matched funding for Inventor education licences was provided from sources such as Education Learning in Wales (ELWa). Inventor was initially installed at Dinas Brân, where the curriculum processes and material were developed. 20 copies of Inventor were installed at each of the other seven schools offering Design Technology at Key Stage 4. It is important to note that educational versions of Inventor at education prices are just the same as commercial versions: fully functional software with no features removed.

Eyes light up.

In practice, what have been the most impressive aspects of Inventor? According to Julian Molloy, "Ease-of-use, it is easy for pupils to create designs; animation of mechanisms; the ability to visualise designs realistically in the finishes that the finished product will have. Inventor can produce stunning 3D animated visualisations, too." It is beneficial in other areas, not only for designing and manufacturing but for teaching mechanical systems as well. Rhys Evans adds, "We can now create stand-alone movies that show how machines work. That is one of the big 'wow' factors for pupils. Even something as simple as a helical spring, something they know they could not draw themselves without a lot of difficulty, when they see it done in an instant in Inventor, their eyes just light up, it's that moment of comprehension." By using Inventor, pupils can produce a product quickly, whereas with traditional methods we would lose some students at various stages. Now everyone stays with it right to the conclusion: they can actually produce something.

Really significant moment.

In addition, Inventor has been helpful to those pupils who find it difficult to get the proportions right when drawing in 3D. They can now draw in 3D and manipulate the design on screen to view it from all directions to get a far better understanding of their finished design. Rhys Evans quotes the example of a special needs pupil, "For the first few weeks it was a challenge to keep that particular pupil in the lesson. There were a thousand and one excuses to try and get out of the classroom. Once the pupil saw, that by using Inventor, you could not get it wrong, you could just change things until you got it right, she was transformed and started to come back during breaks and lunchtimes to do more. She actually saw the design machined out, one that she had created herself. She saw that it was just as good as everyone else's. That was a really significant moment."

Inventor an industry standard.

Pupils in Denbighshire learn about CAD using 2D Design Tools at Key Stages 2 and 3. Also at Key Stage 3, Design Technology pupils learn the basics of 3D design using Pro/Desktop. At Key Stage 4 they retain the option to continue with Pro/Desktop, or since the 3D skills are transferable, they can move up to Inventor. Julian Molloy explains, "The beauty of Inventor is that, even as a fully featured professional tool, it is very easy to use. The evidence already is that pupils will extend their use of CAD much further, the features make it exciting and pupils will be able to produce very high quality work. They will grow with the software as they go on to A-level." Julian Molloy now intends to identify the local companies that use Inventor, so that through work placements, pupils can see the very same software in use in industrial situations. Julian Molloy concludes, "As the momentum gathers, I believe pupils will favour Inventor. It has more features and is easier to use. After all, Inventor is an industry standard."

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Julian Molloy, ICT Advisor,
Denbighshire Education
Authority.

"We expose our students to a range of 3D CAD, solid modelling and surface modelling packages and given an open choice the majority choose Inventor".

Rhys Evans, ICT Co-ordinator and
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Autodesk Ltd
1 Meadow Gate Avenue Farnborough Business Park
Farnborough GU14 6FG
Tel: +44 (0)1252 456600 Email gb-info@autodesk.com

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