



Autodesk Inventor and Revit bring 3D thinking to Thomas Cowley High School

At Thomas Cowley High School in Lincolnshire the technology department uses Autodesk Inventor Professional to teach 3D design and modelling from Year 7 through to GCSE. Graphics teacher, James Hannam writes schemes of work that mix traditional and contemporary PC-based topics covering three key areas of technology – graphics, resistant materials and food technology. James is keen to introduce students to Inventor as early as possible: “It is good to get the kids thinking in 3D from the start so we give Year 7s demo pieces and small animations in Inventor and take them on from there.”

Designing in 3D for the first time is a challenge for anyone but James says that once students have grasped the concept, they are hooked: “When they are first shown Inventor they all groan and say ‘This is really difficult!’. As soon as they click, suddenly it’s ‘This is fantastic!’ and they want to sit and play every lunchtime and after school. Some of them even ask if they can take it home with them.”

James first came across Autodesk Inventor in 2000 when he was at university: “I had used Pro/DESKTOP and SolidWorks before but I picked up Inventor much faster than either of these as it is a lot more intuitive. Before I started teaching Inventor, I attended two Autodesk training courses - a three-day

introductory course followed by an advanced skills day. I am also about to start using the Autodesk Elements course book – everything’s there, which is great.”

The fact that Inventor is easy to use means that James doesn’t have to spend time teaching students the basics: “The kids can work through the Inventor tutorials at their own pace. I just show them where to find the Design Doctor tool and tell them ‘If you go wrong, look here.’”

More than just a 3D design tool

Autodesk Inventor Professional is a comprehensive package that combines Autodesk Inventor software for 2D and 3D design, AutoCAD Mechanical for 2D drawing and detailing, and Autodesk Vault for data management. It also comes with ANSYS Finite Element Analysis software and IDF import functionality as standard.

James describes how the different tools within the Professional package can be used: “We don’t need any other software for product design/engineering because Inventor does everything. We can design in 2D as well as 3D and, whereas with other software there is no transition between the two, Inventor lets you track the motion, so there isn’t anywhere for the kids to get lost.”

“Inventor is a quick, high quality piece of kit. The rendering is good, letting you model in materials straight away, and switching between views is useful. Also, you can export to virtually anything, and when we get our new 3D printer this will open up even more opportunities.”

“At Key Stage 3, the kids have to say how they can improve their designs. With the built-in FEA functionality, they can run a strength analysis and make modifications. We are also starting to take advantage of Autodesk Vault, not only for GCSE projects but also for school administration because you can use it to track Microsoft Office documents as well as Autodesk files.

Inspiring creativity

To help different year groups get to grips with Inventor, James comes up with a variety of design and modelling projects: "Year 9s do an automata project where they are presented with all the parts made in plastic and asked to model them in Inventor. We also give them a nine bend exercise to design a mobile phone holder. This is typically a 2D exercise and you would expect them to look at the side and front profiles and start by drawing these. But the kids find the spline tool in Inventor, create the shape they want, extrude it and start playing with it in 3D."



James is also struck by the speed at which his students can create 3D models in Inventor: "I teach a manufacturing course where I get 30 students to design a wall bracket. They design it, weigh it, get it modelled and print out all the working drawings in one lesson."

As a Primary School Liaison Officer, James uses Inventor to introduce younger children to 3D: "We are getting pupils in Years 5 and 6 to use the software for basic maths, looking at geometrical shapes in 3D and modelling cubes. It is simple stuff but starting them early means they will be ready for more advanced work in Year 7."

"I had a Year 6 class modelling a perfume bottle from a cube by pulling on the handles to create different 3D shapes. Inventor makes it easy but you wouldn't be able to do this type of exercise in other software that doesn't update automatically."

Software for budding architects

Two years ago James decided to trial Autodesk Revit, a state-of-the-art building information modelling system used for architectural design and documentation: "Students in Years 10 and 11 who are interested in architecture can use Revit to enhance their Graphics portfolio. Because Revit has the same feel as Inventor, they get to grips with the software with little input from me. The only things they need redirection with are specialist architectural terms that they may not have come across before."

Designed to mirror real-world architecture, Revit allows users to work on buildings holistically, rather than in terms of separate floor plans, sections and elevations. Like Inventor, students find the software very easy to use: "With Revit, students can quickly get 3D models on screen and they don't have to waste time thinking about wall thicknesses and window types as they can simply open standard architectural parts without panicking over industrial standards. They can also work in their preferred visual layout. For example, a lower ability student may work better in 2D and know how to use basic plans while a more able student can switch easily between 2D and 3D views."

One of James' Year 11 students is using Revit as part of a project to create an estate agent's welcome pack for new residents on a housing estate: "He is using Revit to create models to render, and to generate floor plans. He is also going to create a DVD of walk throughs to include in the pack."

A flexible licensing system

As well as teaching Graphics, James administers Thomas Cowley High School's 300 PCs and purchases the hardware and software. He bought Inventor and Revit from his local Autodesk reseller and installed them himself: "It was self explanatory - I used the Deployment Wizard which took me about 10 minutes to work through."

The school purchased a Secondary Schools Bundle and has a subscription for 20 Autodesk Inventor Professional licenses and two Autodesk Revit licenses: "It is a floating license system which means we can use the software on all of the PCs that will have it, so we are not restricted to just one classroom. I can even log on to the server, pull off a license and put it on a USB pen stick so a student can use it at home."



"As part of our subscription we receive upgrades to the latest version of the software. I will always take these as Inventor just keeps getting better. The last three versions in particular have been excellent."

Scope to share the Autodesk advantage

From using Inventor to make lower ability maths more fun to working with local commercial and industrial outlets on real-world projects, James would like to get even more out of the software and extend its benefits beyond the school gates: "We are going for Technology Status which would give us another classroom of PCs running Inventor. I would also like to have more Revit licenses and take it out to the local community - there are a few architects round here using very old software who would benefit greatly from switching to Revit."

The advantages of working with Inventor and Revit in the classroom are becoming increasingly apparent to James: "The ability to think in 3D gives our students a head start, particularly if they go on to do vocational courses such as architecture and engineering. I had a couple of students in my Graphics group last term who had been using Revit for three weeks when they took a work placement with a local firm of architects in Boston. By the end of the first day they had ploughed through all of the Revit work the firm had lined up for them to do over the entire two weeks! By the time I got there in the middle of the first week they were helping out on real projects."



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