Technology Teaching for the 21st Century – The ScanTEK Approach

Abstract

The LJ Group, based in Norwich, provides computer-based resources for technology education. It is internationally respected for its vocational training systems, particularly in the field of electronics, which are used by organisations such as The Ford Motor Company, British Airways, Electrolux and all branches of the armed forces.

Following the success of its ScanTEK 2000 modular teaching program in the USA, the company has recently launched the system to the UK primary and secondary educational sector. ScanTEK is receiving an enthusiastic response from teachers and pupils alike and it is currently used in more than 60 school technology laboratories.

Over 26 technology themes are available, each with interactive software and specially designed computer-linked hardware, which build into an exciting technology laboratory. The laboratory is managed by the ClassAct™ software which supports the teacher; creating lesson plans, tracking, analysing student performance and creating competence reports.

Each ScanTEK module, representing 10 hours of study, integrates the basic academic 'core skills' of maths, science, English and computer literacy into a cross curricula technology programme that meets the requirements of the National Curriculum at Key Stages 3 and 4. The Modules include:

- Robotics and Automation
- Electronics
- Space Technology
- Computer Aided Design
- Graphics and Animation
- Construction
- Aerodynamics
- Health Management
- Biomedical Technology
- Pneumatics/hydraulics

This article looks at the implementation of ScanTEK in two schools and the impact it has made.

CURRICULUM

Introducing High Technology at St Birinus School

Mark Squire
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Background

St Birinus school is a boys' comprehensive school with 900 pupils and a sixth form of over 200 pupils shared with the local girls' school. The school has made excellent progress in recent years, and was notably recognised as the most improved school in Oxfordshire last year following a rise in GCSE grades A* to C from 29% in 1997 to 45% in 1998. The development of the school as a technology college has led to some of the following recent initiatives in the technology department:

- Industry links with Rover Oxford and National Power Didcot for the GNVQ Part One Engineering at Intermediate Level in 1997
- School network of RM machines installed, including 112 stations in the technology department
- Formula School 2000 event
- Boxford CNC machine tools
- ScanTEK laboratory of 11 workstations.

All of these changes have helped the department develop and improve on existing practice with a great deal of hard work and effort from all the staff involved. The department believes that their vision and effort, linked to the opportunities provided from the sponsorships, partnerships and funding from technology college status and other initiatives, has enabled us to make continued improvements to the teaching and learning of all our pupils in the area of technology education and the skills suitable for their future working lives.

New equipment at St Birinus

The school recently purchased the ScanTEK system as part of the technology college development. The equipment has rapidly become a key resource for some of the initiatives in the school. One area that it has made a significant impact upon is the Part One GNVQ Engineering course. However, the department's aim for the kit is to integrate it within the whole range of activities in the department and not to make it elitist, and this includes the Key Stage 3 curriculum as well as supporting A' Level work. The school is also looking to extend its use in the forthcoming Advanced GNVQ Engineering course due to start this year.

The success of this system in the school has been due to the planning and vision of the department, the high level of training provided and the support of both LJ Group (the supplier) and the school's network manager.

The arrival of ScanTEK at St Birinus brought about an immediate change in the way technology was taught in several modules of work and has now started to make major changes to many other areas.

Staff INSET was seen as a vital area to ensure the smooth integration of the equipment into the curriculum. Initial training ensured that all

staff had a basic understanding of the system's use and methodology, and was soon followed up by a more advanced course for those who would be using the system on a regular basis.

Planning was a key area in the development of the system and the department had a clear vision as to how the system would be used. Following detailed research into the system, which included a visit to a school that already had the equipment, the department had the insight required to enable us to begin preparing our own modules almost as soon as the system was installed.

One of the reasons for this immediate development of our own modules was the need to make full use of the system across the department's work. Our newly equipped classroom was seen as one of the central areas of the department's development as a technology college, and therefore the need to integrate the benefits to the wider teaching and learning of pupils was always a key requirement.

The selection of which modules the school would purchase was seen as vital if the equipment was going to be successful in our aims. The department took the position of building on current strengths as well as developing on weaknesses in the existing curriculum, and the final aim was to introduce the kind of high technology equipment that most schools can only dream of. These 'Hi-Tech' modules had the advantage of offering the kind of technology that makes the equipment a key motivator for all pupils, as well as helping the department launch the school as a cutting edge centre of excellence to local industry and fellow schools.

Once the system had been installed and the staff had been trained, we had an even clearer picture of the system's capabilities and potential for future development. The initial step was to introduce the ScanTEK modules as well as customising some of our own existing modules into the ScanTEK style. This had two key advantages:

1. the ScanTEK modules are fully equipped and can be run from day one with little additional work from the staff
2. by introducing our existing work to the new style and method it enabled staff to see the advantages of the management system and to see how it might be used to develop and build on our existing good practice.

This process of integration has enabled the staff involved to question and review their current methods of teaching and delivery and seek new and more advanced methods to be used in the classroom. The introduction of this new system has helped the department take forward their work in new areas, and has brought about a greater level of sharing ideas and resources. This is vital if those involved are going to react to the challenge of teaching an ever changing subject and continually evolve to include the best and most suitable of the new technology available today.

Developing a new module (or adapting existing work)

It was essential to complete an audit of current practice and existing resources before we started the detailed process of adapting our existing modules to fit the new equipment. We needed to be clear as to our aims for the future, including the wider teaching in the department.

The importance of maintaining varied teaching methods and styles used by different staff was seen as a vital area to be continued and extended upon. The need for a range of methods to be used to introduce and teach the ScanTEK modules to ensure variety for both staff and pupils was also seen as an area for continued monitoring.

Staff specialism was an important area as the department started to develop more cutting edge materials. It was clear that staff needed ownership of their areas to ensure that they could develop and strengthen their own teaching. It was therefore clear that some staff would specialise in the new system and feedback their developments to the rest of the department as they learnt and developed their new skills. This is linked to the fact that it is clear that for the pupils to achieve their best they need a member of staff who can teach their specialism to the full and avoid the difficulties of staff trying to teach areas where they may have limited knowledge. This led to a natural selection within the department for those who had a clear need for this style of work and those who could develop the ScanTEK system.

Throughout this work access to ScanTEK is as open as possible to ensure maximum use by pupils throughout the week, especially at lunch time and after school. This has helped to maintain the enthusiasm of pupils and has frequently helped pupils to reach new levels of understanding.

Pupil training took place almost immediately after the installation of the equipment and clearly illustrated to staff the benefit of the high quality training they had received. It would have been easy for the staff to feel overawed by the amount of equipment, knowledge and management required to run the modules. This was overcome by launching

the system as quickly as possible and therefore allowing staff to see how the system could be managed. Pupils were introduced to the system via an ICT style module teaching basic computing skills such as word processing, importing graphics and researching from a CD source. This training also included questions linked to the central management machine and enabled staff to monitor the work of pupils both during and after lessons, and had the added benefit of targeting those either in need of help and support or extension tasks to challenge the more able. Once this training module was completed the pupils had the dual benefit of increased ICT skills as well as the working knowledge required of how to use the ScanTEK system.

Building a working module

The department had a clear idea as to the additional modules to add to the extensive range that had been purchased. The most important consideration in the early days was to make sure we built on our strengths across the department and linked to the existing areas of good practice.

This had two advantages:

1. We were building on firm foundations, a well as on teachers' familiarities. Therefore the new equipment would be seen as a useful tool to deliver existing work in a new and imaginative way. Also, the fact that the strengths of the management system would enable teachers to use the marking, assessment and monitoring features of the system to help record the work of each pupil.
2. Pupils could see how the new technology was enhancing their work and adding a new dimension to their lessons. This has helped to bring an even greater level of motivation to many classes and has made the modules even more popular.

Well planned implementation was vital to ensure that our modules could match the detail and level of professionalism that the ScanTEK system offers. Staff worked extremely hard to adapt and develop existing schemes of work to fit the new style. One of the advantages we had was the fact that most of our work was already produced on computer as this limited the time consuming job of reproducing work in a new format. It was just a case of cutting and pasting additional sections in to ensure a smooth progression by pupils. Additional benefits of being a technology college had brought us a school network with Internet, digital cameras, scanners and shared work areas to enable us to integrate and share the wide and varied sources of information with staff and pupils.

A clear perspective of our aims was vital during this development work as the new technology could easily have made this task a never ending chase for more detailed and advanced material. We knew what we needed to teach our curriculum successfully and more importantly, we knew what appealed to our students and how to get the best from them. This enabled us to focus on the end need of this development which was a working module that covered the required topics in a clear and logical way and enhanced both the teaching and learning of the subject.

Future developments

The importance of a ScanTEK laboratory to a department can vary widely depending on the other resources and facilities available in the school. However, at St Birinus we were determined to make sure that the ScanTEK laboratory would become a key area for the teaching, learning and delivery of technology throughout the education of our pupils.

To ensure that this vision was possible we had to have a clear plan from day one as to the way the system would develop for us. This has been carried through since the installation and integration of the system, and has enabled us to look to the future with an ever increasing range of ideas and possibilities.

Below is a list of just a few ideas the department has for future development:

- computer based workbooks are seen as an ideal way to integrate the ICT skills our pupils will require for their future, as well as ensuring the full use of the skills the pupils learn during their training on the system
- the technology department at St Birinus has been keen to link with other departments and show the system's capability to others as well as offering them the opportunity to learn about the system's unique facilities for recording, assessing and monitoring pupils' work
- the department is looking into Key Stage 4 developments and possible GCSE and GNVQ work that can be linked to the existing modules
- links between ScanTEK modules is an area that can enable pupils to produce unique projects, as well as providing more able pupils with the opportunity to extend their work beyond the normal tasks and to launch their imagination with the help of some of the most high tech equipment currently available.

Westlands High School

Marc Morris, Head Teacher and Roger Tyrie, Head of Manufacturing and Electronics Technology

Westlands High School, Congleton in Cheshire installed a new technology laboratory over a year ago. Here they comment on their experiences and their reasons for adopting the ScanTEK approach to technology teaching.

> 'Technology is a crucial part of a pupil's education and one that every child should experience.'

Comments Marc Morris:

> 'I believe that we are now entering the third industrial age – where the first was coal based, and the second gas, electricity and oil based, and the third is the silicon age. Technology is having a profound effect on people's lives and we in schools have a crucial role in preparing pupils for the third industrial age and its social consequences.'

Westlands was a girls' grammar school until the 1970s. The school is now a mixed 11 to 18 high school with 690 pupils on roll. In 1997, the school gained technology college status and has invested in a range of developments, each with an information technology focus. The ScanTEK 2000 technology laboratory is one of these.

The school's mission has been to invest in projects that add the highest value to the quality of the children's learning. Over a year ago the school invested in a technology laboratory and it is an outstanding example of how technology, as a taught discipline, can raise its own profile in education. The staff are now working at the leading edge of what can be done in this subject, and education needs pioneers to develop what is possible with the limited resources that are available.

The school plays a vital role in preparing pupils for employment in modern manufacturing and industrial settings and equipping them with appropriate expectations of what employers want. By giving every child access to this technology the school is giving them the best possible start.

As part of Westlands' Technology College Development Programme it was important to make links with industry a part of the day-to-day curriculum. A local award scheme has been initiated with Siemens to reward students in technology who apply the greatest initiative in practical work. Airbags International has presented a real work-place product development problem and their staff use Westlands' IT facilities for their own human resource development programme.

Westlands has installed ScanTEK 2000 which provides a computer-supported environment for teaching technology. It incorporates versions of real-world equipment that have been specially designed for school use. This offers pupils the unique opportunity to experiment with wind tunnels, rockets, magnetic levitation tracks, synthesised speech, computer controlled robots, hydraulics and pneumatic systems. Compute simulations, video and other resources are also included to provide an exciting, self contained learning experience.

Roger Tyrie, came late into teaching after a career in industry. He comments on the rationale for developing a technology laboratory:

> 'Our aim is to create an exciting learning environment in which students can develop their full potential. I believe we have done that by installing the ScanTEK room. Our experience is that children across the entire ability range can succeed. Student response and motivation has been excellent, we have children coming into the laboratory after lesson time to complete assignments, and we have achieved respect for the environment and equipment. We did a stock check before the summer holidays, and over the whole year only one module component went missing!'

> 'We have now notched up 2,000 hours of system use and have managed system expansion through local industry sponsorship. Zeneca Pharmaceuticals have been instrumental in providing funding for primary/secondary school partnership projects. As a result we were able to purchase the CNC technology module. This is an important issue for a technology college, as we actively seek links with industry.

> An awareness of technology as a subject has been raised within the school. My role has changed from being an information giver to a roving consultant, getting directly involved with pupils and sharing their learning experiences. Other colleagues can see that the focus of technology has shifted away from the more traditional wood and metalwork to a high tech environment that exposes children to aspects of modern manufacturing methods.

> We now also get many visits from other schools, which is amazing considering where we were just two years ago. It's a real boost, other people consuming in and seeing your pupils working. The interaction with other teachers has been a major plus as it creates opportunities to exchange ideas.

Figure 1: ScanTEK 2000 Living with Technology computer based activities help motivate students as they follow the activities presented on screen.

> I do have some advice for other technology teachers considering setting up a ScanTEK technology laboratory. Have one person responsible for the area, this is essential given the range and number of resource items. There is nothing worse than finding at the beginning of a lesson that you don't have all the module components. I do a stock check every day and a back-up of the database every week. Team teaching is important, it provides essential staff development, we also learn from each other that is vital in the event of staff absence.

Get to know the ClassAct™ management system, especially the reports section which can save an enormous amount of time. ClassAct™ also provides information that is very useful at parents' evening. The depth of information presented is extremely comprehensive and impressive and future targets are easy to identify.

Encourage access to the area. For example, use it for INSET training. We start all Year 7 pupils on the module 'writing and research' as it provides a useful introduction to basic IT skills.'

Conclusion

Such is Roger's enthusiasm that he is the secretary of the ScanTEK user group and he is excited by the future. 'ScanTEK has offered us the opportunity for radically altering the way technology is taught in the UK.'

For further information: http://www.lj-tech.com