Unprecedented investment in new and refurbished schools across the country has focused debate on how we teach and learn in the 21st Century. The usual way of designing a new school is from the ‘outside in’. Led by an architect, a school must be designed to a certain size and number of floors and must meet stringent regulatory, technical, cost and planning requirements to be approved. Understandably, hopes for the new school will be high. The head teacher and the leadership team will be expected to transform the education it provides to meet the aspirations of programmes like BSF.

As demanding as this is, the process of designing, procuring and then building does not allow the teachers to see early enough how their school will work from the ‘inside out’. They will be asked to approve or ‘sign off’ at stages through the design process so the contracting teams can achieve design and cost freeze as required by the DCSF and only later on will they consider how to use the building.

Lawrence Brenchley describes some of the thinking that must take place to design a school that meets its educational aspirations and government regulations.
As FF&E consultants working with teams on the BSF programmes, the challenge we are often given is how can we help transform a school. This, of course, needs an ‘inside out’ approach that is addressed early in the process and involves early engagement with the school, educationalists and the architect-led design team. This approach has two main drivers:

- size, interconnectivity and flexibility of teaching and learning space.
- selection of actual furniture and equipment that will go in the space to deliver the current and future curriculum.

Government funding limits and Building Bulletin Guidelines for new schools require groups of up 30 children to be taught in a general classroom of around 60m², and the accommodation schedules (from which funding limits are determined) necessitate a given size of school will require a certain number of science laboratories and design technology workshops in order to meet the curriculum requirements. How is it possible to meet these requirements, deliver the curriculum and give enough flexibility to allow different approaches to teaching and learning?

Increasingly, we see schools adopt different teaching and learning styles. These include project-based learning in plazas, adopting new ways to teach science as shown by Project Faraday and open access and Break Out areas. Such styles are intended to engage pupils who would otherwise fail to respond to traditional teaching methods and the challenge is how to design and incorporate these areas in ways that are practical, affordable and will work alongside the traditional classrooms.

With Alsop Architects we designed a project-based learning plaza called New Line Learning in Oldborough Manor School, in Maidstone, Kent. An existing old sports hall of around 150m² was converted to a learning plaza incorporating whole class seating units, teachers’ resource bays, storage units, island and perimeter tables with full ICT accessibility. Designed for 90 pupils, the concept is similar to a primary school where pupils will spend the majority of their time in the plaza with associated lockers and an indoor shoe policy. Pupils go to other areas of the school if they need practical science or resistant materials, but otherwise would have all lessons in the plaza. All the furniture and equipment in the space is loose and moveable which allows the school to configure the space to suit the teaching and learning needs of the group. There is some bespoke furniture including four tier 120 degree seating units which hold up to 30 pupils. These are constructed using a steel frame, lined with mdf, covered in fabric or leather and, despite a weight of 750kg, are mounted on wheels so they can be moved around the plaza. All three seating units can be combined to create an ‘in the round’ lecture theatre for all the pupils.

The plaza can deliver a range of activities including lightweight DT, theoretical science and ICT. This means that if it is included as part of a new school, a reduced number of DT and science rooms is required compared to the standard accommodation schedule. This allows the learning plaza to include high quality and durable FF&E. New Line Learning is a prototype project that has been built and is intended to inform the development of new schools in Kent.

Another example of a different approach to teaching is Project Faraday. This involved developing practical and innovative designs for secondary school science facilities which support more interactive and exciting ways of teaching and learning.

The DCSF commissioned three teams of designers, educationalists and practitioners to develop exemplar design ideas for science accommodation. The aim of the project is to support the drive to improve attainment levels in science, encourage more young people to take science at higher levels and help to reverse the recent decline in numbers taking science at A-level and at universities.

FFE Consulting were commissioned to develop science laboratories for schools in Bideford and York, which reflect the need for more flexible teaching spaces where practical and theoretical work can be carried out within one large area. The limitations of practical laboratories still apply where gas, water, electricity and ICT services are still required in serviced bollards. We designed hexagonal shaped serviced bollards based on a DNA structure that could ‘grow’ by the additional of additional bollards or loose tables depending on the group size required.

Other project Faraday initiatives include a move away from traditional laboratories into new classrooms such as ‘robot labs’, with open source equipment, where students can create their own experiments and tests of prototypes. Other experiences include ‘drop zones’ which are tall vertical enclosures within the building allowing objects to be dropped, and their motion observed and measured using sensors.
or cameras. These concepts were developed by the students of East Barnet School, an exemplar school in Hertfordshire, where Faraday principles are to be adopted as part of the new school redevelopment and where we have been engaged as the FF&E consultant.

Break Out areas are another example of where schools are using space more flexibly. We recently designed a school where the Head requested a layout which will enable the school to move to a smaller cohort of 20 pupils, an idea he hopes to implement in the future. This was certainly a challenging request as, at present, the Building Bulletin Guidelines and accommodation schedules simply do not allow enough space or budget to do this. However, this can be addressed for facilities such as science or design technology where, in certain cases, data logging or design work on computers can be carried out in areas adjacent to the main practical rooms.

The numbers and locations of Break Out spaces are, of course, limited to areas that are not noisy or busy – which precludes most of the main circulations routes. In this case we designed loose furniture for ICT use in a widened corridor on the top floor of a school to allow Break Out adjacent to a sixth form science laboratories. Open areas are by their very nature flexible and can be used by all year groups. However, their success is ultimately determined by the effectiveness of the school management.

Design and Technology areas are also changing. We are finding there is less demand for traditional resistant material workshops and machines, although ‘lighter’ DT subjects such as 3D art, graphics and textiles remain popular.

Increasingly, modern and expensive equipment is needed to teach manufacturing which is relevant to the current industry methods, and this includes CAD/CAM, plastics machines, rapid prototyping and 3D printing. This has increased pressure on FF&E budgets and has meant that, for some projects, we have procured a reduced number of modern machines which can be shared between two or three spaces. Most ICT spaces, for DT areas, need to be segregated as dust and noise prevents their effective use, and we now design segregated CAD/CAM bays which allow vision and line of sight to a number of workshops, but which are located centrally in the DT area. Perhaps the biggest challenge in DT is the shortage of teachers. We have worked on a number of schools which, after opening, have decided to close their DT workshops and make them into other teaching spaces. Exceptions to this rule include exemplar schools, such as the Dyson School of Engineering and the JCB Academy where advanced DT is to be taught to reverse the decline in take up.

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We have found there is insufficient early consideration of how the school can function from the inside out and how the FF&E will work in these spaces. In our view this should be carried out first and then the services and ICT can be designed so that they can support this. In many cases the services and ICT strategy are already set and this limits good design and flexibility of teaching spaces.

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FF&E budgets for academies generally allow a good standard of FF&E provision. However these are lower for the BSF schools, especially in the case of refurbishment or refreshed areas. A lot of FF&E is still provided by traditional educational suppliers who do not have design and coordination skills to make the school work as an integrated building. Many products being put into schools are not appropriate because they are not sufficiently robust and do not comply with the relevant British Standards governing the specification of furniture and equipment. This is an important issue for BSF where Contractors are required to operate and maintain the FF&E for 15 or 20 years.

FF&E budgets are also particularly vulnerable to cuts late in the programme to fund overspends on the building. This is because loose FF&E, which is not physically connected to the building, is procured much later in a building programme.

I am always surprised at how much attention is given to ICT compared to FF&E, as the internal teaching environment is arguably the most important area of a school, and the capital spend is often lower than for the FF&E when licensing, software and training costs are deducted from the budget.

In our experience we have moved a long way from the attitude displayed in the earliest BSF projects. Having said this, the bar has been raised, as many Local Authorities in the later BSF waves are demanding transformational schools with adaptable learning spaces and design teams are responding with more flexible and innovative designs which better meet the needs for the future.

Lawrence Brenchley is a Director of FFE Consulting which is working on a number of school programmes in the UK.