

Integrating ICT Into School and College Design

Can advances in ICT play
a part in reducing costs?



The Challenge

Where are we now?

There can be no doubt the last six years has seen significant downward pressure on spending associated with replacing and modernising the education buildings estate. The school sector saw the cancellation of the Building Schools for the Future (BSF) programme and Further Education colleges suffered a similar set of cancellations.

The good news is that infrastructure investment in terms of the public finances is returning, though at much reduced levels. Work across all sectors of education spend combined, grew by 39% in 2013¹. This period has seen the introduction of the Priority Schools Building Programme (PSBP), and significant 'Basic Need' investment to meet the challenge of increasing pupil numbers (particularly in primary). The Enhanced Renewal Grant Programme (RGP) and FE College Capital Investment Strategy (CCIS) has also seen significant funding begin to appear in the system, signalling an increase in construction activity.

The funding for school programmes is small compared with BSF and the majority of the spend is in London/the South East where growth in pupil numbers is highest. Government only covers up to a third of a RG/CCIS project's cost, and some colleges will struggle to find the other two-thirds, as many have already borrowed or used reserves to upgrade estates prior to 2013 when little money was available.

Adding all these targeted sources of funding together means more than £10 billion is available. That said, in many cases education projects now have to rely on higher levels of refurbishment/remodelling, with little new build involved. This adds complexity in all aspects - design, build, ICT integration and decant.

¹ Figures from economic analyst Barbour ABI

'The reality of planning for a capital project presents education leadership with a very different challenge today; particularly in respect of IT Integration.'

Changing Times

At the same time things are changing across the spectrum of education design & build. Changes in:

- The very nature of the spaces needed - mixed mode/blended learning, distance learning etc.
- Financial constraints have seen BREEAM requirements downgraded from 'Excellent' under BSF to 'Very Good' under PSBP and other current funding regimes. In the future, as public finances improve, we may see a return to the need for every element of the solution to meet increasingly stringent environmental and sustainability conditions.
- Construction materials and methods - to reduce cost and time on site.
- Pedagogy - to meet young people's expectation of a modern learning experience (such as the flipped classroom, remote learning, on-line collaboration etc.)
- Structure - the rise of the Multi Academy Trusts and UTCs etc. has meant different models of collaboration and shared services and resourcing.
- Technology - driven by the revolution in consumer computing, the cloud and mobility, personal devices including wearables, the explosion in apps etc.
- Staffing - the tight financial climate means staff are teaching more and/or to larger groups of students
- Project governance - increasing levels of engagement and accountability are demanded from leadership teams who may not be able to call on the necessary expertise internally ... and so on.

As a result, the reality of planning for a capital project presents education leadership teams with a very different challenge today; particularly in respect of IT integration. Appointing a team capable of bringing together the elements of design, M&E and IT is an important consideration; a team with the experience and expertise to ensure the spaces are sufficiently flexible to accommodate changes in their use. This includes ensuring that the M&E is fit for purpose and that the IT is fully integrated into the learning spaces. Moreover, the same set of challenges apply to both education clients and the constructor and contractors.

Key Design Considerations

The scope of the FE Curriculum makes the design of the learning spaces of critical importance. A single room designed for 20 people must accommodate a wide range of learners - including those on full-time or part-time courses, those following academic or vocational programmes, those on adult education programmes, apprentices and increasingly, undergraduates. Moreover, the learning spaces are valuable assets and need to work as hard as possible, with significant extended use the norm. This means flexibility is an essential component of the design, as is its ability to support the technology.

Whilst some schools have similar extended use profiles, the range of course and learner groups supported is typically narrower, but in both schools and colleges there is a need for an appropriate mix of 'cellular' rooms, small group 'tutorial' rooms, 'breakout' spaces and open, ICT rich areas. In all contexts spaces that are capable of being adapted to uses not yet envisaged is a key consideration. To achieve this requires real design creativity in times of significant financial constraint, and leadership teams should seek to work with those with a proven track record in this regard - as the ability to move a wall in the future without disrupting services must be planned in to the design from day one.

In many circumstances, particularly when working with existing buildings and estates, design options may be limited. This may be due to funding constraints, planning, technological or logistical restrictions. In these cases where simple replacement is not possible compromises will be required; so, if the most effective solutions are to be identified, it is important to understand what existing buildings do well and what they do not. By focussing efforts and investment on the latter, the value inherent in the existing estate can be maximised; and this 'management of the assets' is a

key component overall, and of particular significance in respect of the integration of new/existing IT infrastructures in remodelling scenarios.

As always, school and college leaders need to consider "what part of the learner experience can I deliver in this kind of space?" When engaging with design teams, education professionals must describe the learning outcomes required in a language that designers will understand if they are to be able to deliver the spaces capable of meeting the vision. What is different is that the changes in technology mentioned earlier can generate cost savings in design and M&E. These are covered in the sections below.

Finally in respect of the design process, leaders need to look at the Governance arrangements. It is important to have a curriculum group working alongside the build project group to make sure teaching staff are involved in considering the impact of each decision both at the outset and to sign off changes. Failure to do so can lead to compromises and missed opportunities for innovation.

Integrating The Different Elements Of The Programme

Recent (and future) changes in technology have implications for the design of the learning spaces too: smaller server rooms are needed as virtualisation and the move to the cloud reduce the number of physical servers to be housed; more mobility and less fixed IT means less need for mechanical heat extraction; BYOD (Bring Your Own Device) means more flexible spaces and fewer dedicated IT spaces; the list goes on.

That said, Media/IT suites may still have a significant part to play in some school/college settings, particularly in vocational and 'training room' contexts. Their design needs to move

on from the perimeter 'horseshoe' style with dado trunking if the learner experience in these spaces is to be modernised and relevant to today's young people.

Media/IT suites and Server/Hub rooms generate significant amounts of heat too. This can be recycled in some solutions, but for the most part mitigation strategies like server virtualisation and low power PCs are needed to help to reduce their impact. Mobile devices also mean any space can become an IT rich environment in seconds, and implementing Bring Your Own Device (BYOD) means adapting designs to this new reality - and accommodating BYOD means designs have to be markedly different to those of the past.

The relative timescales relating to the different elements of the project also introduces challenges. Architects are planning for a building with a life expectancy of 60 years or more, whereas the Mechanical and Electrical (M&E) team expect their services to last for maybe half this time; and even though the Furniture Fittings and Equipment lifecycles are shorter, they are still measured in decades. The technology infrastructure is different. Whilst it will contain some elements which mirror the M&E in longevity (the structured data cabling for example); the active components (the switches) are the next most long-term of the investments - probably lasting for seven years or so. The Wireless Network could last this long too, but speeds and protocols change rapidly, and with the demand for mobility increasing exponentially some elements like the wireless access points may be better if refresh is planned for a shorter time period.

Leaders can no longer plan for a big-bang refresh of user access devices every five years either. Changes in the last decade give a clear indication of the current pace of technology development, and it is likely the end user device estate in a school/college will be completely unrecognisable in ten years time.



Technology Priorities

The changes in technology over recent years have been enormous and go far beyond those hinted at in the Changing Times section. Wireless can now support the mobile agenda, devices can last a full day on one full battery charge, printing can be easily managed, making centralised solutions with a few Multi Function Devices a better alternative to dozens of local devices. Virtualisation and cloud/hybrid cloud solutions mean fewer physical servers are needed on-site; IWBs are giving way to other solutions raising the question as to whether teacher walls are relevant now and so on. With IWBs being mainstream for 15 years or more, Leaders should question the wisdom of simply upgrading to an Interactive TV display. Will the change from a whiteboard to screen really be the shift needed to embed the technology in teaching? With wireless mirroring solutions costing less than an IWB whilst supporting all the major tablets, would it make more sense to turn the traditional teaching wall into a 87" tablet that can be presented to from anywhere within the room?

So, in designing the technology solution schools and colleges need to focus hard on the infrastructure. First, the wide area network. Bandwidth is key, the connection should be as fast as is affordable to cope with future growth, and there should be a second connection in case the first should fail; essential when services, storage and apps are in the cloud. The connectivity needs other characteristics too, which the right IT partner can help with.

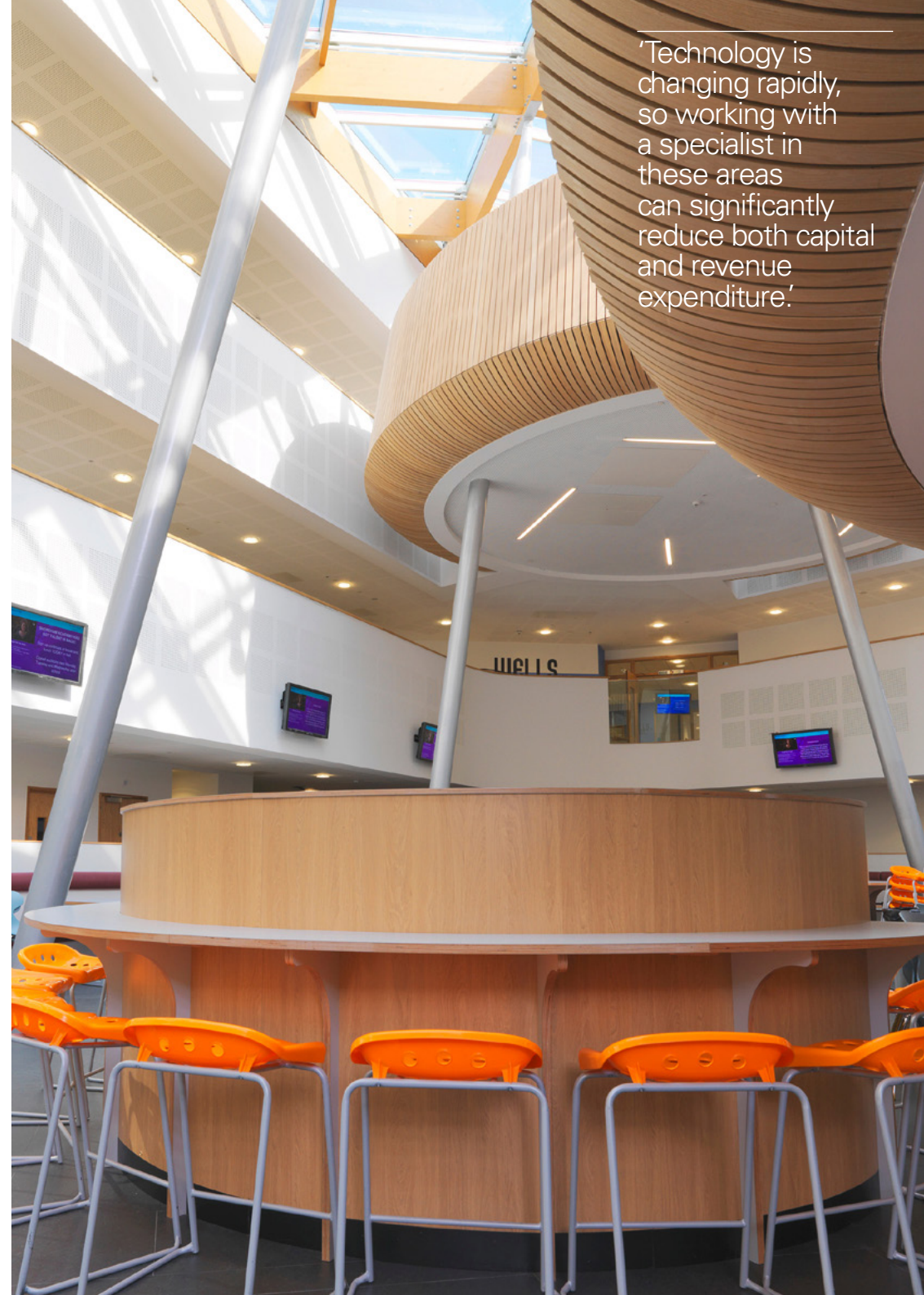
Second, the internal network infrastructure needs to be right. The fastest possible connection to devices through both the wired and wireless networks is essential. Pressure may come to 'value engineer' these elements of the solution by, for example, reducing the number of fibre

cores in the cables to each hub room, and/or settling for an inferior server or switch, and/or reducing the number of data ports or wireless access points etc. These 'economies' should be resisted until the consequence of each decision is fully understood. Leaders should ask the question "how will the learner experience suffer if I reduce this?" Indeed, future proofing demands the best possible infrastructure is in place, as economies in these areas may quickly prove to be counterproductive; sometimes very early on in a building's life.

There may be value engineering compromises possible elsewhere, but each must be considered on merit. For example, reducing the quantity of small power (as mobile devices increasingly replace fixed PCs and battery life improves), and/or in on-site storage as this is replaced by cloud based alternatives may be sensible. The security solution needs to be considered at this point, too. This will be different for primary and secondary schools and different again for FE colleges. Depending on the requirements, a range of 'belt and braces' technologies can be implemented to ensure users and data are safe; and whilst education institutions cannot compromise on e-safety/security, financial constraints can make it a challenge to stay within affordability limits. Again, as services move off-site the nature of these solutions is changing, so 'traditional' (expensive?) approaches may not be necessary, or even appropriate.

The same applies to the teacher wall and the class/lecture room toolkit (presentation technologies etc.), printing solutions, digital display and so on. All of these are changing rapidly, so working with a specialist in these areas can significantly reduce both capital and revenue expenditure. It will also mean creating more exciting learning spaces, better suited to the expectations of today's young people. Finally, if everything else is properly designed and successfully in place, almost any user access device mix can be connected to the new infrastructure, and any form of application or content delivered to learner on it. This is real integration.

'Technology is changing rapidly, so working with a specialist in these areas can significantly reduce both capital and revenue expenditure.'



Whose Responsibility?

The final area of complexity is provided by significant changes in responsibility in building programmes - particularly in schools. Typically the allocation of tasks is described in a 'responsibility matrix' covering the relationship between the construction company, the ICT Contractor and the school/college. The reduction in the level of funding for construction programmes has produced a commensurate reduction in the money to fund specialist consultants to manage these interface issues. This has meant more responsibility being devolved to both client leadership teams and supplier bid teams, members of which may lack both experience and expertise in complex areas. For example, PSBP's Services Output Specification says:

'The Contractor and the School should work together to deliver a best practice resource efficient procurement and operation of ICT, seeking innovative approaches to reduce energy consumption of servers, server rooms, and other equipment, and sustainable disposal of equipment, saving costs and reducing resource consumption.'

The Matrix referred to in the guidance sets out the responsibilities for the following ICT systems:

- Server Room & Distribution Rooms
- Network infrastructure - passive and active
- Local Technology - Core
- Local Technology - AV Automated Systems
- Building Control and Energy Management Systems
- Fire Alarm/Detection
- Telephony, Internet and TV signal'

But it is acknowledged that the success of the management of interface issues is dependent on effective communication between construction and educational staff. As a consequence we believe it is clear that leadership teams should consider carefully their capacity to handle this workload, in time and skills terms.

How can we help?

ArchitecturePLB, Moxton Education and Circle IT are three organisations with staff who have extensive experience and tremendous expertise in working together to ensure school/college build programmes are delivered to highest levels of quality in terms of the integration of technology into the design.

We are passionate about education and committed to delivering the best possible outcomes for the learners and professionals who work in our schools and colleges ... something to which the case studies and examples referenced in this whitepaper will attest.

So, if you are going to be involved in a building project, be it a new build or a more complex mix of refurbishment, remodelling and new build, or you are already in one and finding it challenging, please get in contact with a member of our team. We would love to help and can provide outstanding value for money in respect of our services.

Casestudy: Shoreham Academy, West Sussex



ArchitecturePLB

ArchitecturePLB is a design-led practice with offices in Winchester and London. They have a diverse portfolio including projects of all sizes and types. Over the last 25 years ArchitecturePLB have developed an outstanding reputation for their work in education, having delivered over 100 successful school buildings, including nurseries, primary, secondary and Special Needs settings. ArchitecturePLB's designs benefit from a detailed understanding of learning trends and of the relationship between pedagogy and space.

ArchitecturePLB's approach is to listen to their clients in order to develop richer, more meaningful briefs as the basis for innovative design solutions and buildings that enrich the lives of the people who use them.

"I very much appreciated the way in which I was able to engage with final designs. Congratulations on the way in which you have interpreted the concept. It will be an outstanding school and one which will give effective pleasure for many generations."

Sir Ewan Harper, Chief Executive
United Church Schools Trust

Nick Mirchandani - Director
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At Shoreham Academy we invested time during the briefing stage to explore in detail the school's vision and their aspirations for the new building. Our resulting understanding combined with a collaborative exploration of alternative options allowed us to develop a creative design solution that delivered aspects of the vision, which had initially appeared unaffordable within the available budget.

The new Academy was briefed with a 'school within school' organisation comprising three distinct schools focused around a central hub. The vision was for this 'heart space' to accommodate the entire school population, however it quickly became evident that the briefed area allocations and funding would fall some way short of this aspiration. We therefore 'deconstructed' the original schedule of accommodation and developed in collaboration with the senior management team an alternative strategy.

By combining dining, learning resources, circulation and other allowances we were able to provide a multi purpose space over three floors that delivered each of these functions individually while also allowing their combined use for whole school gatherings. In this way we were able to provide a space that 'worked hard' to deliver different functions at different times of the day and year, thereby meeting our clients' vision and offering outstanding value for the capital investment.



Moxton Education

Moxton Education is a boutique consultancy specialising in ICT in the education sector. Each one of our team has over 20 years experience in the Education sector, many having been senior leaders in schools and businesses. Together we have been responsible for;

- the roll out of ICT to over 500 Education institutions in the UK in both the state and independent sector
- supported both the supply and client side in Federations, Free Schools, Academies and UTCs
- been responsible for the management of the design and ICT delivery in over 150 construction projects

and...been teachers in both state and independent schools.

Ludgrove school is located near Wokingham and is a fully boarding preparatory school for 180 boys. Ludgrove provides a high quality education for its boys and many go on to the country's leading independent schools.

Ludgrove school is a mixture of both old and very modern buildings. The ICT solution had grown up with the school's development so some elements were new and others older or re-purposed. Moxton Education was engaged to review all of the ICT and then work with the school to develop a plan and deliver it in partnership with the school.

The Moxton team worked with the schools teaching staff initially to absolutely understand their needs, issues, ideas and challenges. From this point the plan was drawn together keeping the teaching and learning needs at the heart of all development. Reviews and presentations were made to all staff during the planning process to ensure full engagement then during the summer of 2015 Moxton Education managed the implementation of a range of integrations and improvements in the ICT provision.

Staff can now teach using ICT with confidence and the school have a set of buildings in which ICT is both embedded and resilient.

"The Moxton Education Consultant understood the school very quickly having come from being a senior leader in a school himself - he both challenged our views and sensitively worked with our staff. We now have a clear plan in the knowledge that we can deliver our vision safely, securely and effectively."

Simon Barber - Headmaster.



Circle IT

Circle IT specialises in providing IT support and services to a range of business, from SMEs through to large multi-site organisations.

They are committed to providing the highest quality IT services and aim to deliver growth through the use of cutting edge technology, working in partnership with key vendors to bring customers the latest technology available to them.

Cardiff and Vale College put forward proposals to develop a brand new £45m campus supported with funding from the Welsh Government.

For stakeholders at the college, the IT infrastructure supporting the campus was crucial. Evan Davies, Director of Information Services and IT at Cardiff & Vale College explains: "E-learning is a key driver in education nowadays. You won't find a classroom without some element of IT. We really wanted an IT solution that prepared students well both for higher education and the changing world of work."

Circle IT initially worked with Cardiff and Vale College's Senior Leadership Team to develop a joint IT and ILT strategy, to help deliver an improved learner experience. Something which the college admitted had been neglected for a number of years. One of the fundamental problems with the architecture was that staff didn't have enough confidence that the technology would work and therefore avoided using it as part of their teaching.

The Solution

Over many months, Circle IT audited the IT supporting the old campus and drew up plans for a replacement infrastructure at the new facility.

The school wanted a system to encourage collaborative working in and outside the classroom, and an IT environment to support a bring your own device strategy. This would require the provision of good WiFi connectivity to support up to 3,000 users in every part of the building.

Working in partnership with the college a Dell solution was designed and implemented. The infrastructure had to support a Microsoft-based environment using a combination of on-premise and Office 365 cloud-based applications. Circa 1,000 devices were deployed including a mixture of Apple and tablet devices. In addition to standard teaching environments specialist music recording labs and film studios were required to support the college's vision to support its learners to thrive in the 21st century.

Following the successful completion of the project, Circle IT currently provides onsite IT managed services, with a team of five Circle IT staff now based at the college full-time.

"Clearly the technology was important, but we were also keen to establish a relationship with our IT provider. We wanted a trusted advisor, which could help with the strategy and through the design, deployment and support stages"

Evan Davies, Director of Information Services and IT at Cardiff & Vale College



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