21ST CENTURY SCHOOLS

LEARNING ENVIRONMENTS OF THE FUTURE

FUTURES BUILDING

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21ST CENTURY SCHOOLS

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FUTURES BUILDING

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FOREWORD

Investment in new school buildings has been erratic since the great Victorian school building campaign and about every thirty or forty years we have looked at the existing stock and decided that it needed substantial investment to meet current needs. We are at present in the early stages of a new campaign that will see the majority of secondary school buildings replaced or substantially improved over the next 10-15 years. In particular the DfES Building Schools for the Future programme will direct funds towards this area where the most substantial problems within the education sector are seen to lie.

Schools represent some of the most important of our civic buildings. Whilst there has been (and continues to be) much discussion around the issue of the Private Finance Initiative as a method of procurement, there are some complex issues about fitness for purpose of new school buildings that have potentially even wider implications.

The collaboration between CABE and RIBA in the Building Futures group offered an opportunity to commission a project to consider the requirements that we might place on these buildings during their lifetime. It was decided that this work should focus on the secondary sector, as this was the area where greatest change could be foreseen.

No doubt many of us have pet versions of the way that we would like to see schools deliver future educational strategies, but the reality seems likely to be complex and possibly varied with a range of different approaches many of which will be specific to their locality.

It seems to me that this study has captured the emerging complexity of interlocking issues in a way that is original and illuminating. We cannot yet know what future scenarios will emerge, but the diversity is likely to be much greater than the almost formulaic approach to school organisation and buildings that has been prevalent during the early stages of the reconstruction campaign.

This report voices some strong opinions and recommendations. Not everyone will agree with these, and some may find them challenging. Time will tell how many of them prove to be prescient, but in the meantime it is hoped this report will demonstrate that it may be hard to predict how our schools will be delivering teaching and learning even in ten years time. At the very least we need to be designing the school buildings of the future to be permissive rather than prescriptive - otherwise we could find ourselves having to embark on the next campaign of school building sooner than we would like.

RICHARD FEILDEN OBE, BUILDING FUTURES

INTRODUCTION

Building Futures was established in April 2002 as a joint venture between CABE and RIBA, to create space for discussion about the needs of society from our built environment, and consequently the built environment professions, in 20 years and beyond.

Whilst the education sector (and the built infrastructure that houses it) is in the process of gradual change, it is widely accepted that the built environment contributes to teaching and learning outcomes. In this sense, it is important that future learning environments support emerging approaches to teaching and learning, and avoid 'designing in' obsolescence.

Drawn from work specially commissioned from Ultralab, *21st Century Schools* seeks to provoke debate about the future of school provision, using provocative scenarios to illustrate issues. It explores the changes occurring within education for the 11-18 age range, and the impact that these may have on the built environment, including existing school buildings within the community as well as the design of new learning environments.

Within the Ultralab project, a literature review was undertaken to explore the changing nature of learning and society, spanning academic material alongside popular culture. A key aspect of the project approach was one of collaboration and involvement. The views of many stakeholders were gathered through web networks, focus groups and workshops, in order to assemble and explore the diversity of views for the future within learning and learning environments. Amongst those involved at this stage of the project were teachers, head teachers, children, educationalists, architects, LEAs, developers and futurologists. Throughout the project, feedback was also gathered from an online 'project community', in addition to the project steering group. Examples of international innovation in schooling and educational policy were also identified in order to inform the project.

21st Century Schools is aimed at those commissioning, designing and working within school environments. It sets the context for the sector, and goes on to explore the relationship between the physical school environment and the teaching that it contains. It draws together the arguments around the need for change within the sector and identifies some of the issues driving such change. Building upon this material, the report illustrates four provocative scenarios for learning environments in 2024, seeking to flush out key issues, questions and conflicts, which will serve to inform ongoing debate. The concluding section presents an agenda for schools of the future: issues, recommendations and questions for further exploration. In this way it is anticipated that the work will ultimately impact upon the significant rolling programme of school building and refurbishment currently underway.

For further details see www.buildingfutures.org.uk

THE FULL REPORT WRITTEN BY ULTRALAB, ENTITLED *BUILDING LEARNING FUTURES,*
IS ALSO AVAILABLE TO DOWNLOAD WWW.BUILDINGFUTURES.ORG.UK

21ST CENTURY SCHOOLS

LEARNING ENVIRONMENTS OF THE FUTURE

1 SUMMARY

The increasing investment in renewal and replacement of school buildings over the coming decades presents a significant opportunity to ensure that our learning environments are equipped for the future. The impact of school design has been widely recognised as being significant in the effective delivery of teaching and learning. Considerable change can be foreseen in future models of education and there is an increasing risk that school buildings will stand in the way of evolving models of delivery.

The traditional design of a school is beginning to transform, as specialised teaching spaces and classrooms, with a set school day and curriculum, accommodated at a school site shift towards multi-purpose spaces, with flexible timetables and individual learning plans accommodated at multiple locations across the neighbourhood.

Whilst diversity of provision seems to be certain, common themes emerging from this study suggest that learning environments of the future should be:

- **Flexible** at different scales and timescales, allowing for variation in use, occupancy and layout
- **Inspiring** to those working, learning and visiting, and embodying organisational aims
- **Supportive** of effective teaching and learning, accommodating a wide range of experiences and activities
- **Involving** of the users and the wider community, and linking with other learning places

AN AGENDA FOR THE FUTURE

Whilst we need to recognise that in the future there will be a great variety of ways that learning may be delivered within the community, there is a clear agenda emerging:

Increase investment in research and development: Increased investment is required at both central and local levels to ensure that ongoing capital programmes foster innovation and enhance quality. The sector would benefit from the patronage of an independent organisation to champion the issues, fund and promote research and innovation. In addition, the formation of an independent school buildings design think-tank, funded from across the sector, would help to coordinate and drive forward innovation in design.

Learn through innovation, coupled with evaluation and feedback: Commitment within each learning organisation and design team is required. Current knowledge, experience and good practice should inform the process, both before and during design. Investment in evaluating innovative designs in use will help to refine best practice.

Identify underpinning principles for design: Further investigation is required to establish underpinning principles; some of these may be universal, whilst others may be highly context specific:

- Understanding the local learning culture
- Understanding what makes a 'good' learning environment
- Understanding relationships between (and impact of) policy, pedagogy and the environment

Involve users in the design process through interactive and iterative briefing: Embedding local insight into the design process will become increasingly important as models evolve for the design and management of learning. It can also foster greater community links, and more effective use of the learning environment.

Embrace innovation and challenge assumptions in design: Creating opportunities for innovation and experiment, and sharing good practice are required, alongside removing the barriers to innovation.

Integrate management, pedagogy and technology with design: Design of the learning environment should be considered in tandem with the management framework, pedagogy and technology.

Achieve flexible and agile design solutions: The design solution should integrate the underlying elements of infrastructure (management, pedagogy and technology), whilst allowing for flexibility, both in the short-term and the long-term. In this sense, 'loose-fit' building shells are one way of allowing for a variety of settings, and a diversity of teaching approaches.

2 THE CURRENT SITUATION: 2004

As a nation we are currently building a substantial number of new schools. This is welcome news if we are building the right schools, but an accelerating crisis if we are not. In addition, much of the existing school building stock seems to be inadequate: unsuited to the shifting pedagogy, curriculum and learner expectations that can already be anticipated, and lacking the agility to cope with anticipated changes that we do not yet know in detail.

Within this context, Government expenditure on capital works in schools is also set to increase sharply over the next few years giving LEAs and schools greater opportunities to improve their school buildings. This is reflected in a jump from £683 million in 1996-7 to £3 billion in 2002-3 and will further rise to an annual rate of over £5 billion by 2005-06[1]. At the beginning of the 21st century, schools are finding themselves having to respond to rapid technological, economic and social change as nations compete with each other through the ability of their education systems to deliver creative and productive economies and societies.

The way we live, work and learn is changing. The skills and knowledge that business and society demand stand in contrast to the priorities on which the education system was originally designed. Our learning systems, our curriculum and assessment models, our teaching methods, and the whole culture of education and learning demand radical change if Britain is going to be adequately equipped for the emerging knowledge-based economy.

Rachel Jupp, 'Creating a learning society', Education Review vol 15 no 2, 2002

PROGRAMMES AND INITIATIVES: FUTURE SCHOOLS

Maps, models and memories by Peter Millson, © Groundwork

There have been a number of initiatives and projects established to explore the nature of future schools. Some of the most recent include Classrooms of the Future and Exemplar Designs for Schools, all DfES funded projects. The Classrooms of the Future initiative comprised a series of 30 pilot projects within 12 local education authorities, and sought to develop and test innovative learning environments, ranging from technological innovations to new school buildings, mobile classrooms and 'pods', technology-rich laboratories and themed learning centres.
The Exemplar Designs project comprised a drawing-board exercise culminating in the development of 11 innovative designs for hypothetical future schools, each taking a different approach. These initiatives are informing the Building Schools for the Future programme, a coordinated national strategy driven by the DfES, that over the next fifteen years will result in the rebuilding or refurbishing of every secondary school, at a cost of £2.2 billion per year.

WWW.TEACHERNET.GOV.UK

THE TRANSITION FROM PRIMARY TO SECONDARY

Currently within the UK, the transition from primary to secondary school is abrupt. The contrast between the 'caring' environment of the primary school and the large, anonymous secondary school can have a huge social impact. The secondary school experience can be a daunting one, and large unfamiliar environments (alongside peer pressure) can have a major influence on the life choices young people make. The key challenge for designers, teachers and educationalists is to make secondary schools more stimulating and rewarding, and to switch the perception of school as a place that one is obliged to attend, to one which is more welcoming, attractive and integrated into the community that it serves.

[1] DfES, (2003), 'Classrooms of the future: innovative designs for schools' (p3)

THE EVOLUTION OF EDUCATION

Globally, new pedagogies are emerging. This can be seen around the country (and more so internationally) as moves towards:

- Increasing use of ICT (a catalyst for change, as well as a key tool to deliver change)
- Virtual classrooms and communities of learners
- Tailoring education towards the individual child's needs
- Different means of grouping within schools
- Opening up schools to the wider community
- Dispersing learning environments within the community and off-site schools
- Greater integration of special needs within mainstream schools

Within the UK there are an increasing number of examples of these types of trends, and this is further reinforced by: the Government's ambitious plans for ICT development in schools; the 2001 Government White Paper 'Schools Achieving Success'; and the 1999 DfEE paper 'Schools Plus: Building Learning Communities'. It seems likely that in the future the boundaries between school and the outside world will be less clearly defined and educational environments will increasingly enable boundaries to be spanned: physically, socially and economically.

However, learning is bursting through the confines of the school building. City Learning Centres provide better facilities for digital technology and are developing individualised learning programmes. Cyber cafés provide convenient and accessible internet links. Learning environments other than schools are reviewing and extending their educational roles. Libraries, museums, galleries and heritage sites are embracing family learning and developing new education programmes as well as providing for scholarly study. Encouraged by schemes such as Artsmark (an award administered by the Arts Council) schools are making better use of these specialised resources. There is further potential in science centres, architecture centres and urban studies centres, but long-term funding strategies have not yet been developed.

Although a new building is almost always a transformational experience for those within it, the limits on that transformation may be set by other factors: the organisational detail of the school day, the administrative structure of the school, the formality of external assessment modes and the tyranny of expectations built on past behaviour. All these impact on education and conspire to limit its ambition for the learners within it.

Stephen Heppell, Ultralab

ENABLING SUCCESSFUL LEARNING

In the face of such change in environments, there will potentially be a significant impact upon teaching and learning. There have been a number of studies undertaken internationally trying to establish a link between the nature and quality of the physical environment in which students learn, and the learning outcomes associated with these environments. Whilst it is difficult to achieve explicit links, some convincing evidence linking the physical school environment with teaching and learning has emerged.

MAKING THE CONNECTION: PHYSICAL ENVIRONMENTS AND LEARNING OUTCOMES

Warwickshire County Cricket Club café by Joe D Miles

- Capital investment in school buildings has the strongest influence on staff morale, pupil motivation and effective learning time (UK)
- Improving the physical school environment leads to a marked improvement in students' performance (USA)
- New school environments with integrated ICT can improve the students' rate of progression through the grades (France)
- Pupil performance, achievement and behaviour is better in well-designed schools than in poorly designed schools (USA)
- Students with the most natural daylighting in their classrooms progress quicker on school tests in one year than those with the least natural light (USA)
- Improved test scores and child behaviour are experienced in schools with more than 100 square feet of area per child; a result more noticeable in children with special learning needs (USA)

FOR FURTHER DETAILS AND FULL REFERENCES SEE CABE, 2002, 'THE VALUE OF GOOD DESIGN'; WWW.CABE.ORG.UK

However, the school buildings themselves do not exist in a vacuum. The way that teachers are developed professionally, the school curriculum, management, assessment and testing systems, parental engagement, expectations and entitlements all intermesh with the design of schools to create the learning environment. It is also clear that the design of the school is only one of the limits on the ability of a learning organisation to respond to future changes. Whilst teachers will often discuss design issues when questioned about bad learning experiences, children often highlight organisational barriers within schools.

None of this is helped by a lack of agreement about what 'learning' is. Whilst it is easy to calculate and minimise heat loss from a building, the target of minimising a loss of potential learning through good design is considerably more elusive. Different schools, children, cultures and contexts at different times will create a variety of conditions for potential learning and this needs to be given voice, challenged and defended. We can be certain that there is much still to learn about what makes effective learning, and that new pedagogic knowledge must be capable of being incorporated into our schools.

I sat down and then found I had to stay in that seat all year.

A secondary school student

INSPIRATIONAL SPACES

Learning spaces should be inspirational. They will never compete with the other engaging spaces in which young people spend their time – retail, leisure and other public environments – if they continue to look, feel and smell like institutions. We need therefore to rethink not just the buildings in which learning is housed but every element that makes up the learning environment – internal spaces, furniture, technology, school dinners, lighting, storage systems, communication (even down to whatever it is that makes schools smell like they do) and ensure that we continue to provide innovative solutions designed to improve the experience of learning. The future of learning environments demands that architects, designers and manufacturers work together with students, teaching staff and educationalists to translate both emerging educational trends and day to day interactions into spaces, products and systems that truly support learning.

In the future, the boundaries between formal and informal learning will blur and the school as an institution will dematerialise. The focus will shift from creating the right buildings to creating the right environments, interactions and conditions for learning, and these may appear in a variety of physical and non-physical spaces. The quality of learning environments will appear on educational league tables and assessment structures will have been redesigned to encourage collaborative and creative work.

JENNIE WINHALL,
DESIGN STRATEGIST,
DESIGN COUNCIL

Hayes School by School of Architecture, Planning and Landscape, University of Newcastle

3 THE NEED FOR CHANGE

Just as the industrial revolution transformed the home and created the school in order to provide a disciplined workforce for the new factories and offices, the digital and communications revolution seems likely to transform the learning environment for today's young people. In tandem with this, rapidly accelerating change in other areas – in economics, in demographics, in our social and cultural life, in government policy, in the management of education and in developments in pedagogy – will also play a key role in the shape of future learning.

WHAT IS LEARNING FOR?

It has become clear that there is on the one hand a clear and rapid velocity of change in some areas: technology, children's capabilities, the economic context. But against that a very slow development in some key "gating" areas: assessment and examinations, the professional development of teachers, the individual's internalised models of what a school might be like.

Stephen Heppell, Ultralab

The current period of rapid change in our learning environments requires us to develop a coherent view of the future by reconsidering the nature and purposes of learning. Some may view it as a vehicle for economic development, creating a trained and disciplined workforce. Others see learning as a means for cultural development, or individual empowerment. However, the challenge for education is not only to provide access to information, but to help people learn to think, and to enable them to operate effectively within this rapidly changing and increasingly complex world. More than ever, education will need to enable people to become effective learners, to be able to encounter new experiences, unfamiliar ideas and changing conditions confidently and creatively. In the wider sense it should also develop collaboration, a sense of community and shared responsibility.

INFLUENCES ON CHANGE

There are many factors that are driving change within education, and consequently the physical settings that education 'inhabits'. Influences on change within these learning environments are a complex interplay of government policy, economic imperatives and social trends, alongside the impact of technology, sustainability issues and changing pedagogy.

Government policy

Education policy, social policy and even urban and housing policy have an impact upon the school. Workforce reform, Creative Partnerships and New Opportunities Funding have emphasised the importance of education and expanded the need for better schools, in tandem with establishing new roles for educators and non-teachers both within and outside the classroom. Access and inclusion have been mainstays of Government policy and as a result provision for vocational training and life-long learning within secondary schools is expanding, whilst much work has been done to accommodate young people with disabilities and special educational needs in mainstream schools.

Current initiatives forging new links between education and social services will result in a greater number of functions to be accommodated within the school site in addition to a longer school day. The decreasing power of the local authorities has also led to greater self-sufficiency, with schools developing as individual businesses and establishing new alliances. These are based on geographical proximity, on a shared site or within a neighbourhood, on cross-phase links between secondary schools and their feeder primary schools, or on communities of interest such as Beacon Schools or Specialist Colleges. Other policy issues having an indirect impact upon the school environment include that of linking head teachers' salary scales to the size of school, which subsequently leads to a presumption in favour of large-scale establishments.

Pedagogy

Teachers are increasingly no longer the only educators in schools, whilst learning increasingly takes place in other settings, and links with external agencies and study outside school for both visits and work experience are expanding. Classroom assistants, learning mentors, students, parents, governors, inspectors, supervisory and administrative staff, and artists in residence are all part of the scene. More attention is given to individual learning needs and teaching is geared to accommodate a variety of learning styles and situations, with individuals, small and large groups and mixed-age teaching. Flexibility is increasing, with the use of specialist resources, digital equipment and computers, home-based study and part-time schooling contributing greater flexibility (and complexity) in the management of learning.

In the future students will need to take more responsibility for their own learning, and educators will need to monitor and support individual learning programmes, whilst at the same time ensuring motivation, stability and continuity. Increased space needs for administration, health and safety requirements, disabled access, storage, special facilities and specialist equipment are also impacting upon the learning environment. For example, with the demise of traditional sports and games, alongside an increased need for health and fitness, schools are investing in training equipment for individual use.

There is a clear tension between the rhetoric of the 'learning society'… and the reality of the 'performance' culture which is being promoted by current policy making.

Marilyn Osborne and Elizabeth McNess, 'Teachers, creativity and the curriculum, a cross-cultural perspective', Education Review vol 15 no 2, 2002

Economic imperatives

The move from a production-based economy to one that was service-based, then to one that is knowledge-based, has implications for the value of education both to the individual and to society. Businesses will require people with skills of inventiveness and the workforce will need to be flexible, able to adapt to new situations and conditions and able to learn new skills. In addition, the move from productivity to creativity will encourage a different view of the learning environment. The design of new office environments with inter-connected work, social and recreational spaces will impact on learning environments, with students using digital and telephone technologies to access information and services, hot-desking, and meeting in the café or at the gym or fitness centre for recreation and relaxation.

Freelance and home-working will also influence the nature of learning environments. New ways of working will demand qualities of self-motivation, independence, self-reliance, flexibility and adaptability as well as organisational, entrepreneurial and practical skills to make the situation and technology work. Multi-purpose environments that can accommodate work, family life and educational activities will be required, where it will be possible to share costs and responsibilities. This might result in small communes with their own private living space, sharing technology and facilities for both work and education.

The language of 20 years ago was of capability and quantifiable standards; to accompany this, the design of schools spoke largely of efficiency in moving pupils or in heating and lighting, whilst decor was judged by its impact on concentration levels and behaviours. There is now a clear economic imperative driving the need for agility, creativity, ingenuity and collaboration and this is being reflected in education policy around the world.

Stephen Heppell, Ultralab

SERIOUS PLAY: THE WORKPLACE AS A LEARNING ENVIRONMENT

JOHN WORTHINGTON,
FOUNDER DEGW,
CHAIR BUILDING FUTURES

The workplace as a learning environment, © DEGW

Today with the mobility afforded by miniaturised ICT, office work is no longer tied to a single location. Like school, much office work is potentially nomadic, choosing the most appropriate setting and the most convenient time. As work shifts from the service economy (dominated by the processing of information) to the knowledge economy (with a focus on adding value through creativity and innovation), so the workplace becomes a learning environment; a distributed collection of locations and settings, selected and designed to express company values, generate collaboration and stimulate learning. Experience of the new office suggests five pointers for future school planning, design and management:

1. *Planning is reflective of both space and time. Information and communications technology (ICT) allows organisations to work in many locations, over a wider period of time in an increased range of settings.*
2. *Buildings become the flexible long-term shell with a robust services infrastructure that will support a variety of short-term settings.*
3. *Imaginative design can express the aspirations of the organisation, transmit values and act as a communicator. The building shell is a long-term asset for the community.*
4. *Intelligent design and an investment in the process of change can help to integrate innovative educational thinking with changes in the physical environment.*
5. *At the heart of long-term success lies change and a willingness to continuously innovate, coupled with recognition of the risks involved.*

The school will have to open itself in new ways to families and the local community, it will have to come to be seen as an active agent in the creation of change rather than a passive transmitter of information or values.

David Uzzell, 'Children as Catalysts of Environmental Change', Summary Report, University of Surrey, 1994.

Social trends

With increasing pressures on parents to work, and rising numbers of lone parents, schools are increasingly taking on responsibilities for pre-school and after-school childcare. In an age dominated by the car, the television and the computer, and because of adult fears that children may be harmed or abducted, children in western societies are being increasingly denied access to the outdoors. This reduction in contact with other adults and children can result in a loss of informal experience and learning. Parents increasingly look to schools to be safe and secure environments that can protect their children from what they see as an increasingly threatening world. A strong sense of community and society is at the heart of all good learning environments, although this may be difficult to achieve in many urban settings where communities are dynamic (with changes in population and employment opportunities), and social networks are reduced. In addition, the age groupings within schools may need to adapt to provide greater social interaction.

Impact of technology

New technologies provide both a catalyst for change and a means of changing. Home-based study using computers will probably result in part-time attendance at school, so that the school timetable and the school year as we know them may disappear. As young people spend more and more time surfing the net, accessing virtual libraries, conferencing with their teachers via the web and publishing their work electronically, the traditional classroom as a setting for learning is quickly becoming redundant. Some subjects might be taught more effectively through the use of computers, while others require inter-personal contact. New learning environments in the community are emerging in libraries, learning centres and cyber cafés. Interactivity is a characteristic of the use of digital media and authorship and provenance are increasingly difficult

to define. We might find ourselves moving away from the idea of the creative individual to the concept of the creative society, more dependent upon interactivity and collaborative effort. This has implications for the design and management of learning environments.

Sustainability

Sustainability as an issue covers both the view that development should not harm or hinder future generations (in terms of environmental effects and resource consumption), whilst at the same time not harming existing groups in society (through excluding them in some way). Concern for sustainability can focus on costs: for design, materials, construction, energy, maintenance, renewal and development. However, it also focuses on the quality of the learning environment, the learners' wellbeing within it, environmental protection and the environment's ability to adapt to changing needs. Sustainability also implies shared responsibility and decision-making, through participation in the design process and shared responsibility in governance and management.

Two development approaches are generally taken: that materials and construction should promote a long-life for the development, with high quality and ecologically sound materials; or that structures should be temporary, easily replaced in response to changing needs, and constructed from biodegradable materials. A 'whole life' assessment should be undertaken, that evaluates maintenance and running costs in the long-term, and should also consider manpower provision for security, catering, waste disposal and maintenance. The traditional role of the school as a centre of the community, providing stability and permanence, needs to be explored in this regard: is this still the case and if so how will the buildings contribute to this? In addition, new learning environments do not have to be new-build; they can be adapted from existing buildings.

DRIVERS FOR CHANGE IN THE SCHOOL ESTATE

SCHOOLS BUILDING AND DESIGN UNIT – DFES

Blyth School 1
by Joe D Miles

Funding directly to schools for capital projects and building repair has increased significantly in recent years, and the Building Schools for the Future funding is available over the next ten years or so for secondary schools, so many schools are (or should be) thinking more strategically about their overall estate. It is now more important than ever that any building work is planned with an overall strategic masterplan, to ensure early minor works projects enable future major building work rather than hinder them.
The main drivers of change are:

- *The impact of ICT and how it is used (specialised suites vs. mobile, wireless ICT)*
- *Inclusion at classroom level (the need for space for wheelchairs and assistants)*
- *Inclusion at school level (rooms for withdrawal, therapy and counselling)*
- *Inclusion at site/strategic level (co-location, reorganisation)*
- *Community use of shared (or extended) facilities and funding complexities*
- *Workforce reforms, leading to additional space requirements for staff*
- *14-19 curriculum: flexibility may reflect the curriculum and therefore space needed*
- *Sustainability and environmental issues*

In practice, the changes that many schools are currently making are addressing more subtle or immediate concerns, such as:

- *Staff shortages, prompting the question "are bigger group sizes here to stay?"*
- *Safety and security concerns of parents and staff, in contrast with community use*
- *Health and safety concerns limiting the curriculum (e.g. within science experiments)*
- *Availability of dedicated space for examinations to reduce facilities management*
- *Introducing new technologies in the classroom, such as interactive whiteboards*
- *Introducing new timetables, with longer periods and more teaching before lunch.*

All of these issues are drivers for change. Many have different possible approaches, each of which has pros and cons; there is room for useful debate. Major changes are often LEA reorganisations mainly due to inclusion (linking co-located special schools, for instance) and age range (removing middle schools and moving to a split at 11). Other issues may take time to filter through.

4 DESIGN OF THE LEARNING ENVIRONMENT

In the light of significant change in the education sector, we should correspondingly challenge our preconceptions of the nature and form that the 'school' should take in the future. Currently, school environments are not very different from what they were a hundred years ago, whilst the design of homes, the workplace, retail spaces, hospitals, transport and communications have changed dramatically. Schools cling to models derived from the church, asylum, prison and factory as well as domestic settings such as the nursery and kindergarten.

LEARNING ENVIRONMENTS: AN EVOLVING MODEL?

At the end of the twentieth century, we have increasingly adopted a business model for education, with schools as point-of-delivery providers in the giant education service industry. Commercial ethics and business management practices currently influence the way schools are organised and how education is managed, leading to particular physical solutions for school buildings. The models we have used for education in the past have tended to be hierarchical, with schools acting as a gatekeeper to higher education and job opportunities, sorting out the population to play different economic and social roles. We need to question whether this should continue to be the case.

If we accept that schools are not the only places where learning takes place, and teachers not the only people who can support learning, then the emerging models of learning environments will need to embrace innovation, creativity and a flexible approach to the management, form and location of school settings. The need is to think of a school less as a building and more as a community of individuals sharing learning experiences and activities. As a result of this, schools may need to become more diffuse in their operation, providing a wider range of educational experiences for a more varied group of learners over a longer time period.

VECTORS OF CHANGE IN THE DESIGN OF LEARNING ENVIRONMENTS

School buildings are important assets for communities. They are currently expensive to build and to maintain. In recent years, many local authorities have attempted to capitalise on the increasing value of building land and release the value of their assets by selling off school grounds for development. Many local authorities try to make more effective use of their assets by extending the school day and increasing income with classes, clubs and cultural, sporting and social activities for a range of users, including children, young people and adults. The notion of part-time schooling might extend into that of long-term schooling.

Within the different models of learning (from the traditional to the innovative and experimental), there are a number of component attributes that define the nature of teaching and learning, and how it is accommodated and managed. In general terms there has been a vector of change from the attributes reflecting more traditional models to those reflecting emerging models of learning. It is likely that in the future new learning environments will continue to evolve, whilst variation and diversity are also likely to increase.

	TRADITIONAL MODELS?		EMERGING MODELS?
SPACE	Dedicated teaching space	>	Non-dedicated space (shared with other uses)
	Specialised teaching space	>	Multi-purpose teaching space
	Centralised accommodation	>	Dispersed accommodation
	'Within' school (under school control)	>	'Beyond' school (outside of school control)
	Fixed infrastructure (equipment and facilities)	>	Flexible infrastructure (adaptable, portable, individual – e.g. ICT)
CULTURE	Process-focused (management and measurement)	>	Student-focused (individual development)
	Student-centric (11-18)	>	Community-centric (lifelong learning)
	Defined subjects (traditional curriculum)	>	Flexible subjects (broad suite of subjects and vocational studies)
	Inward-looking (school boundary and remit defined)	>	Outward-looking (involvement, links and partnerships beyond the school)
LEARNING	Social interface (educator-student relationship)	>	Technological interface (access to learning via ICT)
	Pupil-teacher relationship	>	Learner-mentor relationship (other adult, specialist, peer mentor)
	Place-centric (specific learning is located at specific venues)	>	Student-centric (flexible access to learning is not location-specific)
	Generic mode of teaching and learning	>	Customised modes of teaching and learning
	Didactic ('delivery' of knowledge from educator)	>	Interactive (2-way learning transaction)
TIME	Permanent (design life)	>	Temporary (design life – short-term residency)
	Traditional school day (fixed hours of attendance)	>	24/7 (flexibility in hours of attendance; 'shifts')
	Generic timetable	>	Modular and customised timetable (individualised learning programmes)
	Fixed lessons	>	Flexible lessons

The 2004 DfES publication, 'Schools for the Future: Exemplar Designs', identifies certain emerging themes for schools of the future. These include: flexibility, adaptability, linear cloisters (extendable linear forms), learning clusters (clusters of classes), indoor courtyards, outdoor classrooms, comfort and sustainability.

DESIGN QUALITY IN THE EDUCATION SECTOR

Existing, new and proposed schools need a greater agility to be able to cope with the uncertainty of future pedagogies. Innovation and quality should be embraced, both in design and management of education and teaching. Design may seem a highly subjective topic, however design quality can be broken down into many constituent parts, enabling a reasonably objective evaluation to be made. One method of evaluating and understanding design quality is the Design Quality Indicators tool (DQI). It breaks down the elements of design quality into the categories of build quality, functionality and impact in order to allow detailed evaluation of a design or completed building through an online ranking system. These three groupings comprise detailed criteria, which can be used to inform a project design brief and evaluate both proposals and the completed development.

The Design Quality Indicators tool (DQI) was developed by the Construction Industry Council (CIC) with support from CABE. In addition, the DQI has also been adapted by CABE Education and CITB-ConstructionSkills as an educational resource (Creative Spaces: improving school design).

www.dqi.org.uk and www.cabe-education.org.uk/creativespaces

CHANGE AND THE SCHOOL ESTATE

RICHARD FEILDEN, SENIOR PARTNER, FEILDEN CLEGG BRADLEY ARCHITECTS

An accelerating rethink on the way that we deliver education is developing, and all too often the school estate will be found to stand in the way of new methods of teaching and learning. It is increasingly difficult to predict what we will require from schools and in this context it is essential that the large numbers of new buildings that are beginning to emerge are planned for future adaptability. The secondary school environment in 20 years will be a place where teachers and pupils of all ages collaborate in the learning experience. The school will be open for extended hours and will fulfil a range of other functions bringing the local community into the building. On the face of it growing use of ICT is one of the biggest issues and the implications of this are already profound in some schools. Used properly ICT allows far greater individualisation of learning and this will also be the trend arising from the Tomlinson report. Increasingly the cellular classroom will need to be supported by other kinds of space whether these are for larger or smaller groups and we can probably also expect class sizes to vary more than they have in the past. Growing use of teaching assistants will also have an impact.

Shrewsbury School Auditorium and Music School by School of Architecture, Planning and Landscape, University of Newcastle

Hayes School – by School of Architecture, Planning and Landscape, University of Newcastle

INNOVATION AND AGILITY

Some of the simplest design issues can be barriers to innovation and good practice in the classroom, and these will continue to be a hindrance in the future unless designs conform to some simple minimum standards.

For instance day-to-day flexibility can be affected by:

- *area or width of room too small to allow a variety of layouts and activities*
- *awkward shapes reducing flexibility*
- *inappropriate or fixed furniture and equipment*

Good teaching practice and the opportunity to develop teaching styles can be hindered by:

- *poor ventilation and lighting*
- *bad acoustics (speech intelligibility is vital in any teaching environment)*
- *inappropriate servicing*
- *insufficient or badly located support spaces for small groups or staff*

The ability of the design to respond to new educational or organisational ideas can be inhibited by:

- *rigid or inflexible structures that reduce the chance to adapt space*
- *design which does not allow for expanding or varying departments and year groups*
- *the location and relationship of facilities*

SCHOOL BUILDINGS AND DESIGN UNIT, DFES

Common themes emerging from this Building Futures project reinforce and extend the principles of design quality. The design of learning environments of the future should be:

Flexible: at different scales, and timescales. Individual spaces and the configuration of buildings should be adaptable to flexible use in the short-term, as well as over the long-term as models of learning evolve. This should allow for variation in use, number of occupants and layout. The balance between flexibility and specificity (with regard to particular subjects) should be carefully managed. Infrastructure (such as ICT) should accommodate such flexibility.

Inspiring: to those learning, working and visiting. The design of the environment should embody the aims and principles of the organisation. Spaces should be inspirational, fostering creativity and a culture of learning. The learning environment should provide a platform for wider learning on a range of issues from citizenship to sustainability; for example environmental issues can be expressed through location, choice of materials and form of construction.

Supportive: of effective teaching and learning. The environment should not constrain or inhibit learning, from interior and detailed design to space configuration. It should accommodate a wide range of experiences and activities, including all types of learning: intellectual, physical, practical, social, emotional, spiritual and cultural. In addition, it should support a diversity of learners. Management and technology should be seamlessly integrated and accommodated.

Involving: of the users, the wider community, and other educational and cultural establishments. The learning environment should 'belong' to the community, involving teachers, students and community members in the design process. As educational establishments (of all kinds) will increasingly have greater local significance, the physical design should positively connect with the local urban context. Better use of local resources should be made through creating, organising and linking places for learning across the community.

The publication 'Being Involved in School Design: A Guide for Funders, Local Authorities, School Communities and Design Teams' (CABE, July 2004) identifies the different phases of the development process for school buildings (preparation, design, construction and use) and presents a project timeline that highlights different methods of user participation relevant to each project phase.

ACHIEVING DESIGN QUALITY IN PUBLIC BUILDINGS

Discovery1 Primary, Christchurch, New Zealand ©Ultralab

There are ten ways to help achieve design quality in the development of public buildings:

1. Provide strong client leadership
2. Give enough time at the right time
3. Learn from your own and other successful projects
4. Develop and communicate a clear brief
5. Make a realistic financial commitment from the outset
6. Adopt integrated processes
7. Find the right people for the job
8. Respond and contribute to the context
9. Commit to sustainability
10. Sign off all key stages

TAKEN FROM THE 2003 CABE PUBLICATION:
CREATING EXCELLENT BUILDINGS - A GUIDE FOR CLIENTS: WWW.CABE.ORG.UK

Everyone involved in the building of new schools, from civil servants to civil engineers, from architects to head teachers, from children to politicians, brings to this area a wealth of creativity, of genuine involvement and of a passion to make UK schools the best in the world. Knocking down the barriers that allow them to do so is a relatively simple task compared to the struggle that would be faced if they were less creative, less talented or less committed.

Stephen Heppell, Ultralab

THE PROCESS: ACHIEVING DESIGN QUALITY

Achieving quality in design within major building projects such as education environments requires time and commitment, alongside well-structured project management. In addition, a key part of the process is the involvement of users, at optimal points in the process. There are many barriers to the creation of innovative learning environments and the emergence of new and experimental models of learning. These range from underlying attitudes and perceptions driving a culture of conservatism and tradition, through to more 'structural' barriers embedded within funding and regulation protocols, and the design and development process.

Overcoming barriers is a complex task, involving commitment and investment on many fronts. The primary barriers to innovative learning environments include:

Conservatism and tradition:

- A fixed perception of what schools are, what they do and what their role should be
- A presumption towards traditional models of schools by parents and planning committees
- An assumption that teachers are transmitters of cultural heritage, not agents of change

Funding and regulation:

- Provision needs to be seen to be fair and procedures need to be transparent
- Apparent inflexibility of some current regulations, inhibiting experiment, diversity and adaptation
- Excessive regulation in tandem with increasing litigation
- Tension between central and local control (including involvement of the local community)

The design process:

- Management issues considered separately from design
- Lack of exchange between educators and designers
- Lack of time during the process to involve user groups

Designing for an uncertain future is a tough challenge, but not one that is necessarily out of reach. The pace of change however does signal an urgent need for a clear acceleration in the way that we iteratively design and use our schools. The scenarios within the next section illustrate a diverse range of alternative futures, and seek to prompt debate about how the design of the learning environment may best respond to such requirements.

Blyth School 2, by Joe D Miles

DESIGN OF THE SCHOOL ENVIRONMENT

GARY FOSKETT, HEAD TEACHER, EVELINE LOWE SCHOOL, SOUTHWARK

School environments, perhaps more than any other sort of environment, need to offer maximum flexibility and adaptability of internal space. The best teaching employs a mixture of group work, whole-class and individual learning. Space needs to be quickly configured and reconfigured according to the type of session required, and according to the subject that is being offered. Sliding (soundproof) dividers, for example, can allow for teachers and support staff to work together with a large group, or allow for a number of different groups to work in close proximity to one another without interfering with each other's ability to stay focused on the task in hand. The reconfiguration of sight lines can be even more important than managing sound levels when we are addressing learners' ability to work individually or in groups without undue interference with one another.

Collaborative learning, learning with partners and in groups, is and will continue to be a key issue. The degree to which a building can facilitate all of this will determine how successful the building is - how fit for purpose. The best learning is active and not passive - what sorts of design take account of this basic principle?

5 SCENARIOS FOR LEARNING

Scenario-building is a way of drawing together and making sense of the diversity and complexity of factors that may shape the future. The intention of scenario-building is not to develop an accurate prediction of the future; rather it is to engender discussion, and inform forward planning. Within the UK (and internationally) there has been a number of scenarios developed that explore possible futures for the management of education. The scenarios presented within *21st Century Schools* seek to build upon this existing work, and focus upon the physical environments that may result from such change in the culture and management of learning in the future.

OECD SCENARIOS: WHAT SCHOOLS FOR THE FUTURE?

The Organisation for Economic Co-operation and Development published 'What Schools for the Future' in 2001. The report, building upon seminars, events and conferences, outlines six scenarios for school systems 10 to 20 years in the future, in order to sharpen the understanding of the shape of future schooling, and the role of policy. These are grouped into three distinct categories: 'status quo', representing the continuation of existing models; 're-schooling', representing the strengthening of purpose and position of the school; and 'de-schooling', representing a decline in the position of schools. The scenarios have been used in a number of contexts, as a focus for discussion around the issues.

WWW.OECD.ORG

Mowbray Park, Sunderland by Andrew Hendry

LEARNING FROM THE FUTURE: POST-16 LEARNING SCENARIOS

The Tomorrow Project in conjunction with the Learning and Skills Research Centre published 'Learning from the Future' in 2003. The aim of the project was to take a long-term view of the form and structures of the post-16 learning sector. The project developed scenarios on the basis of different levels of investment and regulation, and focused on four themes: skills, priorities, integration and participation. The report concludes by drawing out policy questions pertinent to each scenario around these themes.

WWW.TOMORROWPROJECT.NET

Discovery1 Primary, Christchurch, New Zealand ©Ultralab

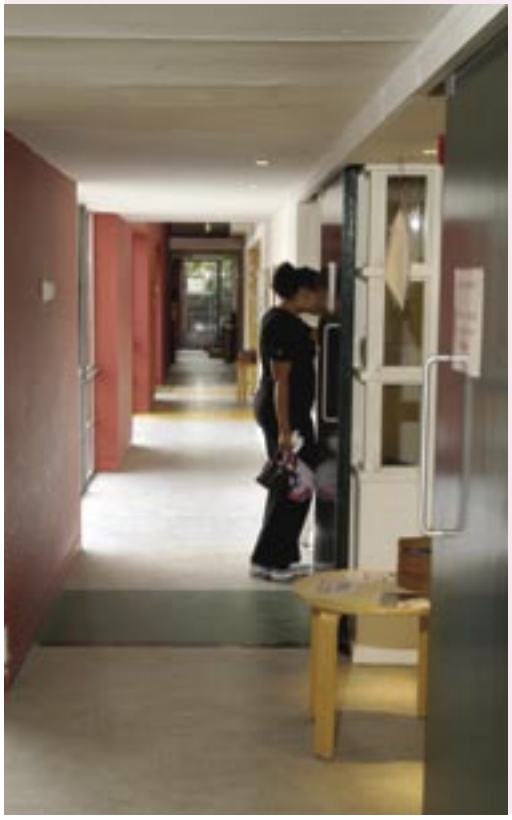
THE CONTINUUM FROM FORMAL TO INFORMAL LEARNING

The following scenarios explore alternatives at extreme ends of a continuum, from a formal view of learning, to a more informal one. The first scenario represents a breakdown of the idea of 'school', with an absence of formal physical settings, and an emphasis on diversity and the individual (a form of absolute 'de-schooling'). The second scenario represents a reinforcement of the principles and culture of security, with tiers of protection, resulting in a cocooning 'fortress' (a form of 're-schooling'). The second pair of scenarios explores the relationship with the wider community. The first of these represents a dissolved school, its component parts dispersed into the community, and synonymous with the community. The second of these scenarios represents an extended school, drawing in the major community functions within its grounds so that it begins to embody the community.

DIVERSITY AND CHOICE

It is clear from the different trends currently gathering pace that the future for learning environments is one of diversity, where the national landscape of different learning environments may reflect and include many distinct scenarios and approaches. The hypothetical settings that have been developed within this project represent extremes; however they are also plausible, albeit to different extents. Indeed the genesis of some of these scenarios can be observed in some examples of current provision (see below). However whether or not each scenario would be part of the future of choice, is a question for debate.

Kids Unlimited,
Summerfields by Joe D Miles



THE SCHOOL OF THE FUTURE

Where schools are tied into PFI and other contracts for at least 25 years it is difficult to know quite how they will have been able to adapt to the changes of time. Flexibility will be strictly limited unless changes are made to PFI legislation. In the future schools should be places where there is effective teaching and learning and where the curriculum suits the needs of the children at the school and in that community. Buildings need to reflect the needs of the community and the people who use them.

Other possible changes could be:

- *interactive social areas, indoors as well as outdoors*
- *use of mentors continuing to expand*
- *use of non-teachers in more roles, especially pastoral*
- *implementation of workload legislation*
- *more effective pupil councils*
- *teachers given more time to teach*
- *greater involvement and responsibility of parents in schools*
- *extended schools commonplace*
- *legislation in place to sort out all the problems surrounding the movement of pupils around schools*
- *parents committed to their community's school*

It is an old statement but schools should:
Not be a community school
Nor a school in the community
But the community's school

NIGEL ASTLEY, HEAD TEACHER, AND SARAH WILKINSON, BUSINESS MANAGER, HENBURY SCHOOL, BRISTOL

THE SCENARIOS

THE SCENARIOS PRESENTED WITHIN THIS DOCUMENT EXPLORE DIFFERENT RELATIONSHIPS BETWEEN 'SCHOOL' AND THE COMMUNITY:

NO SCHOOL,

THE SCHOOL DISPERSED IN THE COMMUNITY,

THE SCHOOL EXTENDING INTO THE COMMUNITY,

AND

THE SCHOOL AS A SELF-CONTAINED COMMUNITY.

HOWEVER, THERE ARE UNDOUBTEDLY OTHER POSSIBILITIES.

SCENARIO 1 THE NETWORK OF LEARNERS

RESOURCES & INFRASTRUCTURE: No buildings other than an administrative suite; there is a network of experts online to support the students. The success of the approach is reliant upon equal access to substantial technology infrastructure in dedicated bandwidth and home computers. Low capital costs mean high levels of teaching input and good staff-student ratios.
LEARNING: Learning is entirely on-line: peer to peer, expert to learner, learner to expert. High levels of external expertise are accessible, alongside teachers to help with the process of learning. External organisations like museums also have a role in this learning community. Students build a digital portfolio of work, each following an individual learning path at their own speed.

Dipti had always enjoyed science and as she sat at her keyboard she thought how lucky she was to be learning entirely on-line with friends all round the country and in many cases the world. She particularly liked to have direct access to her friends at the Science Museum. Although she was only 13 she was digging deeply into Material Science in a way that astonished her mentors, but somehow she still needed a lot of support and encouragement with her language work and creativity. She already had something of an idea about her future path into and beyond university, after all, she was already familiar with a lot of the research staff at her chosen college and would be beginning study there a couple of years before finishing at the Institute.

As the long day stretched into late afternoon Dipti paused from contributing to an on-line seminar that had been running all week. She had a whole lot of details to organise before the weekend: she was mentoring three groups of younger learners and needed to set up their conferences, then there was the local Institute team playing in a (real!) badminton tournament, a field trip for her ecology project and the mid-term ball for the UK students (with no less than three Institute bands playing). Dipti needed to arrange where she and her on-line friend Lucy would stay for the ball or their parents certainly wouldn't let them go. "It will be nice to see Lucy properly again" she thought. As she pulled her blue sweatshirt on over her head she looked down at the Institute's name and badge with some pride.

"Cool place, this Institute" she thought, and then smiled to herself because of course the Institute wasn't any place at all.

The concept of 'de-schooling' is typically used as a term to cover all schemes which offer an alternative to traditional institutional education. Much current 'de-schooling' falls into the 'home schooling' movement, that of parents taking control of their children's education within the home. This type of learning has undergone a transformation with advances in information and communication technologies, which have the potential to bridge between individual learners and connect them to experts and other learning resources.

A serious challenge (in both design and management) would be to engender the social aspect of learning – something potentially lost within virtual networks. More emphasis upon the places where children meet (theatres, museums or sports arenas) would be needed. These community-wide learning facilities would need augmenting, in order to offer the depth of support required. Ensuring that the virtual network was accessible to all regardless of income or location would be a pre-requisite, in order to avoid the learning network becoming a tool for social exclusion.

The 'virtual school' would not replace the traditional school entirely, but may well replace some of it. The key question is to what extent?

NOTSCHOOL.NET
A NETWORK OF LEARNERS

A 'wired' but de-schooled future can offer a powerful sense of community without the inflexible capital intensive buildings of a formal institution. The DfES sponsored Notschool.net project is a fully 'virtual' school for those excluded from school for the long-term, and has achieved some good success within this group. The children (considered 'researchers' in Notschool vocabulary) are connected at home to a broadband network, with a multimedia home computer and a network of experts and peers to support their learning. The sense of community is very strong, yet there is no capital expenditure at all other than technology: no premises, no campus, no school.

SCENARIO

2 THE FORTRESS SCHOOL

RESOURCES & INFRASTRUCTURE: A single campus school with rigid security protocols and a clear barrier between school and community. Community facilities are neither included within the school nor welcome there. There are rigid requirements for security in design, and this may hamper flexibility in use.

LEARNING: The teachers teach, monitor, assess and lead, whilst the students learn, perform, attain and follow. Other adults stay outside the boundary of the school. The hardest thing for them to do is to "anchor" their learning in real life experiences beyond the school gates, from which they are effectively isolated. However, this isolation may also offer peace and tranquility, enabling learners to focus and engage.

It had been an early start. Jonny had met his class early for a working breakfast as they read through their parts for the drama assessment, now only three weeks away. The school canteen was bustling and although the whole school population wasn't in at 7.30 it seemed to him most were. Jonny had registered just by walking into the school canteen, but he needed to see his tutor and was glad for the ten minute briefing session before getting down to trying to hit this morning's targets in maths, science and citizenship. Three tests and three chances to compare his ranking with others around the country.

The hours seemed to flash by, with a rapid change of subject at each hour and Jonny's head was spinning at lunch although he was very conscious of how many things he had managed to cover that morning.

Afternoon saw a long session on the integrated learning systems before an end-of-school dash across to the seminar rooms for the board meeting of his mini-company. Jonny was sales manager, but the company rotated posts every month and he was delighted to find that he would be moving on to marketing next month.

It was dark as he found his younger brother Jaf from the study clubhouse and they both started for home munching the snacks he'd bought for tea in the school canteen, and he thought back with pride at how much he'd covered today.

Looking back at the school gates he could see the big sign that glowed out into the night with the school's learning performance indicators on it. The gate noted the identity card in his pocket and flashed his own scores up too, with rankings. "Great scores" he thought "and it's only Tuesday!"

The roots of the fortress school can be seen today, with increasing security measures and a latent 'stranger danger'. However, security is both a design and management issue. Whilst there may be different design security 'thresholds', at the perimeter or within the building, technology (e.g. swipe cards) can provide a less physical means of control and monitoring. Where there are multiple 'thresholds' of security, the resultant rigidity of design and use may encourage a rigid curriculum, inhibiting the agility to offer a flexible and rich learning experience.

With the fortress school, the design challenge is to balance security with a culture of openness and agility. Inevitably this leads to a zone of interface where the 'inside' and 'outside' meet, requiring careful design. In this context, softening the welcome offered at 'reception' without compromising tough security protocols would be crucial in giving the community a sense of ownership and engagement.

Whilst a secure and enclosed school may offer a safe environment for learning (arguably necessary in a tough urban area), the question remains as to whether it would be too sterile to prepare learners for the real world beyond school? And what will this mean for the community that is left isolated 'beyond the gates'?

TECHNOLOGY AND SECURITY

In the absence of more physical (fortress-like) security measures, technology can often provide a high level of security and control, whilst allowing flexibility. There are a number of examples in the UK and world-wide, where this approach is being adopted to create a safer environment for learning. The Chafford Hundred School campus in the UK is open to the community, and uses a system of swipe cards, carried by all students and staff. These cards provide a 'register', allow access to different parts of the school, and enable resources and library books to be borrowed. They can also be charged up with money, to enable purchases of food and drink, resulting in a cash-free school in order to minimise bullying. The Unlimited School in New Zealand operates on a system of trust; students may move outside the physical limits of the school using a mobile phone to report on progress and location.

SCENARIO

3 THE DISPERSED SCHOOL

RESOURCES & INFRASTRUCTURE: No central campus or single location; the school is dispersed across the community. Specialised faculty centres are clustered near to local specialist functions, and in many cases the community resource (e.g. library, sports complex) is shared with the school. The school capital budget is directed at both the shared and dedicated resources, benefiting the community. The greater community use, especially outside of conventional working hours, would ensure that affordable facilities are available 24/7.
LEARNING: Students would learn in much bigger blocks of time (half-day blocks or longer), to avoid excessive 'transfer time'. Pedagogy could remain relatively conventional, and would evolve as elsewhere. Staff would be based at specialist locations, but would rarely meet; new technology would allow efficient organisation without contact. Adult learners may be sanctioned to join classes.

Another good day. Sami was hurrying home having somewhat lost his sense of time; it had been a long day too. The group he was working with had been relishing this block of time for some days and had been preparing for it. Although they'd all been learning in the town for some years, they didn't often get along to the live broadcast media faculty so often and it was a rare chance to work with the school's teachers that were based there. There was always such a buzz around the centre, with local radio and television programmes recording live and a number of community groups enjoying the facilities. This was the beginning of a six-day block of creative, collaborative, media time and yet that morning as they walked the unfamiliar paths they all wondered if they had been too ambitious in their plans.

By that night, Sami knew they hadn't been. There was great support in the faculty building and they knew they could do it, but they were going to see a lot of the faculty this week and they'd planned an early start tomorrow. The building ran 24/7 anyway and no-one had minded when they'd said what time they'd be in. Somewhere in this week Sami also needed to visit the AdminCentre to sort out some face-to-face advice about university. He hadn't ever been to the AdminCentre before.

Sami's oldest friend was due to leave at the end of term and they walked home together deep in thought. "I can't really imagine learning in another town" Sadie reflected, rather sadly, "I've been learning here forever".

Whilst a number of schools internationally are locating learning away from the formal heart of the school campus, none as yet have fully dispersed into the community. Whereas split-site teaching can be problematic (due to transfer time between sites), a significant timetable restructure (with longer teaching periods at specialist locations) could overcome this constraint. In addition, improving ICT could help, as communication depends less upon geographical proximity.

In a lifelong learning context, this scenario would locate learning in unexpected places, accessible to the wider community. Vocational and work-based learning could occur in the workplace. The design of a range of commercial and community buildings would evolve to incorporate 'learning components' and school capital investment would focus on both the specialist and shared locations.

Whilst the school retains dedicated working spaces, these would be geographically dispersed and in this sense it may be difficult to develop a strong identity. There may also be conflicting issues if the area has multiple schools sharing multiple resources. In addition, it may be that this dispersed secondary school is particularly suited to some social contexts but not others.

The tough design challenge would be to build the necessary strength of community. In the context of the dispersed school, would the 'community' constitute the town, the school, or both? How is it signified and reinforced?

DISCOVERY AND UNLIMITED CHRISTCHURCH, NEW ZEALAND

A radical approach to school provision is being successfully adopted in Christchurch, New Zealand. Discovery 1 and Unlimited are both located within former retail accommodation (a department store and a shopping mall), and represent a shifting culture within school organisation, curriculum, location and design-life. Discovery is viewed as a hub for learning within the community; at the entrance there is a coffee bar and kitchen, where parents, students and teachers mingle. Unlimited is located within former shopping mall space. The building is on leasehold, and is only a temporary home to the school, which will move to another converted building after a few years. In accommodation terms, the construction process is more closely aligned to that of shop-fitting, with a tight timescale and quick turn-round, adapting shop characteristics into those of a learning environment: ceilings are lowered, and spaces are flexibly divided. The curriculum maintains strong community links, and students spend considerable time engaging in activity in local companies and organisations.

SCENARIO

THE EXTENDED SCHOOL

4

RESOURCES & INFRASTRUCTURE: It is a very substantial campus that also houses other public service functions, like police, health or libraries. In addition it would offer small scale start-up enterprise support and even subsidised housing for teachers, nurses and other public service workers. The community buildings benefit from the school capital investment.
LEARNING: Students learn in a complex way due to the diversity of the community learners and experts within the campus, necessitating a flexible timetable. Adult learners may also be in the classrooms or sharing community facilities with the students. Teachers also have a community role; managing the inputs, and the learning, of these other adults in the learning environment. Key community figures (e.g. the campus police officer) provide leadership and mentoring.

"It is nice to see Mum from time to time" Maylene thought as she carried both their selections back to the librarian. "Must dash" and she hurried back towards the snack shop queue. The school was really buzzing tonight with half the neighbourhood out on the wide strip that separated the big public service block from the seminar and lecture rooms. There was something about the evening concerts that seemed to bring everyone out although Maylene didn't really know why, the band were awful and she'd heard them practising in the gig room over the health information centre.

As Maylene looked out of the window she saw a group of police cars rushing out of the school gates. Trouble outside again and she looked to see if they were heading toward her home area, just in case. They weren't, and she let her focus wander back to the concert tonight.

Four hours later, Maylene was revising both her opinion of the band and her French pronunciation as she walked towards the huge school gates listening to her French homework tapes. She felt a slight shiver; she never really liked going back outside; it was darker and although she knew many in her community because she saw them everyday there were others that never set foot on campus. As she left the campus she removed her earphones so that she could remain attentive to the world around, just in case. Taking out those earphones seemed symbolic somehow, a moment when the learning stopped. In truth, most of what she loved doing was right here in the Logan Academy, but she needed to go home, if only to tease her Mum about that strange artefact she'd been choosing from the library.

The extended school currently seems to be a highly fashionable and aspirational concept. It is a large campus, with its own 'street life' and an all-embracing view of learning that reaches out to include the local community, and to form the heart of that community. There is a constant flow of adults through the campus; the school facilities are community facilities (shared library, sports and technology facilities) and benefit from this enhanced investment. However, the school may 'suck in' resources from the surrounding community, depleting provision.

It is unlikely that the extended school would be developed on many of the existing school sites due to the sheer size of the school and its component parts. As community elements are embedded within the campus, an important role of design would be to provide a sense of unity for the learners within the school.

Whilst the extended school improves community access to learning, a key concern would be the potential exclusion of some of the community. Details like the welcome offered at 'reception' and the level of informality would be crucial in giving the community a sense of ownership. If visiting the library or the health centre means entering the school 'campus' area, then how can design ensure that the campus does not alienate some of the community, effectively excluding them from the community resources that they need?

CHAFFORD HUNDRED SECONDARY SCHOOL THURROCK, UK

Chafford Hundred campus contains nursery, primary and secondary schools. The campus houses community functions in addition, with a public library on site, and accommodation for community groups (e.g. mother and toddler). The campus entrance is designed to represent a shopping mall, and in this way presents a familiar and welcoming environment to the local community. Despite the high levels of technology (each student has a laptop enabling access to the wireless network, and learning plans and curriculum resources are stored on the school intranet), the classrooms are laid out in a traditional manner. Students are mainly home class-based, however there is a lot of individual movement between the library and resource areas. Whilst an integrated curriculum can also be problematic to manage, at Chafford Hundred there is an emphasis on individual learning, with each student's curriculum planned individually via learning plans and journals.

6 LESSONS FOR FUTURE LEARNING ENVIRONMENTS

It would seem that the UK is not yet building a broad enough, or brave enough, variety of schools. Importantly however, there is sufficient political commitment and creative imagination already in place. In addition, there is also a confidence that through engaging learners themselves in the design process, it will enrich their learning and in doing so will continue to progress school standards. It is essential that money is spent on learning environments that are of high design quality, are sustainable, flexible, adaptable and able to serve their communities both now and in the future.

Education will play an increasing role in the future sustainable community[2]. In designing learning environments for the future, it is important to consider whether schools can evolve to meet the changing demands of a new century, or whether alternative learning environments should also be developed to create a greater diversity of choice to serve a range of individual, community and societal needs. In addition, it is necessary to look critically at the schools that are currently being built. Is the design quality enabling the attainment of high standards within performance, creativity, teaching and learning? Will these schools have the agility to accommodate change, both known and unknown?

[2] ODPM (2003), 'Sustainable Communities: Building for the Future'.

PLANNING A LEARNING ENVIRONMENT OF THE FUTURE

Canberra Primary School, Singapore, ©Ultralab

Philosophy:	What is the educational thinking that underpins this plan? What are the models and metaphors for education that it adopts?
Pedagogy:	What styles of learning and what mix of those styles will be supported by the teaching, and through what media? Who will be the educators? How will the learning be managed?
Policy:	What is the policy context for education? Planning? Cultural development?
Priorities:	What key social and cultural concerns does this plan address?
Purpose:	What are the purposes and functions of the learning environment?
People:	Who will be the learners that will use this environment? Who else will work in it?
Partnerships:	What individuals, agencies, organisations, institutions can work together to develop this as a learning environment?
Programme:	What programmes will support learning? How will they be managed?
Place:	Where will the learning happen? What is the potential of the various locations or settings for learning, inside and outside, within 'school' and outside 'school'?
Physical attributes:	What will the learning environment look like?
ImPact:	How will it impact upon the wider environment? Physically? Socially? Economically? Environmentally?
Potential:	What are the possible strengths and weaknesses of this model?
Price:	Who will pay for it? What will it cost? To design? To build? To service, maintain and repair? To manage? To replace?
Planning:	How will it relate to how the wider environment is shaped and managed?

LESSONS FOR FUTURE LEARNING ENVIRONMENTS

The conclusions presented within this document are not intended as a comprehensive list embracing all aspects of the design of learning environments; instead they aim to provoke debate. There are many publications available that explore different issues concerning the design of learning environments, and the processes involved; further publications and resources are listed in the appendix. From the work undertaken within the Building Futures project, there are a number of emerging lessons, ranging from a need for increased investment in research and innovation, to a need for perceptions and assumptions to be challenged.

Investing in the renewal of a 'safe' school building stock without investing far more substantially than at present in research exploring radical alternatives is not justified. We cannot easily evaluate alternatives because we haven't built any, or at least not many. It is very hard to see how we might optimise learning without a considerable diversity of solutions and we do not yet have that diversity in our portfolio of possibilities.

Stephen Heppell, Ultralab

Investment in research and development: There needs to be a commitment to put the 'learning' back into the learning environment. Increasing investment in both formal and informal means of review, research and development (at both central and local levels), is required. This will ensure that ongoing capital programmes respond not only to current needs but foster innovation in tandem with enhancing quality and standards. The sector would significantly benefit from the patronage of an independent organisation to champion the issues, in addition to funding and promoting research, development and innovation. For example, within the health sector, the Nuffield Trust promotes independent and informed debate on UK healthcare policy, whilst the King's Fund is an independent charitable foundation whose goal is to improve health. In addition, the formation of an independent school buildings design think-tank, funded from across the sector, would help to coordinate and drive forward innovation in design.

Informed and reflective design: There should be a commitment within each learning organisation and within each design team to reflect upon current knowledge and experience, and to ensure that each 'intervention' (in design/development terms) takes into account the lessons learned from previous design interventions. Adequate time should be given to review and reflection, both within the design process, and prior to the design process. Examples of innovation and good practice within the UK and internationally can contribute to this process.

Identifying underpinning principles for design: Research, development, and review and reflection are all necessary to identify underpinning principles for the design of learning environments. Some of these principles may be universal, whilst others may be highly context specific:

1. Understanding the local learning culture: Within each local context, the purpose of learning and the function of the 'school' should be defined as clear aims. This will become increasingly important as new models of learning emerge. The design (and the design process) of each education setting should take every opportunity to reinforce these aims; the environment can be a very powerful tool for learning.

2. Understanding what makes a 'good' learning environment: Greater understanding is required of the physical elements that can most effectively support teaching and learning. In addition, identifying and addressing the barriers (both physical and management-driven) to innovation and effective learning is also of critical importance. The design of learning environments should be user-centred, whether they are traditional or more experimental. This will become increasingly important as new physical models are developed and explored.

3. Understanding indirect relationships- policy, pedagogy and environment: Learning and education do not exist in a vacuum; many policies or protocols within the sector and indeed beyond the sector have a significant impact upon both learning and the learning environment. This includes capital funding regimes, employment issues, salaries, parental choice, and social policy. Greater understanding of the implications and more sensitive management of inter-related factors are required.

At the Design Council we have been compiling international examples of great learning environments. The best examples we've seen are where architects have taken the time to design from the inside out and where manufacturers have really responded to the issues facing teachers and students with innovative products. The products resulting from our work show how with a bit of user-centred design input even furniture can be redesigned to better support teaching and learning.

Jennie Winhall,
Design Strategist,
Design Council

Involvement of users in the design process: This reflects the most effective way of embedding local insight into the design process. It will become increasingly important as existing models of learning evolve in the future, resulting in an increasing diversity of provision and culture within different contexts. User involvement can also foster greater understanding (and hence more effective use) of the environment. Involvement of the wider community can foster links, engagement and 'ownership' for the long-term.

Embracing innovation and challenging assumptions in design: This involves actively creating opportunities for innovation and experiment, as well as facilitating the exchange of good practice both within the UK and beyond. Greater understanding of the attitudes and procedural factors that inhibit innovation are also required, in tandem with mechanisms to alleviate these constraints.

Integrating management, pedagogy and technology with design: Design of the learning environment should be considered in tandem with the management framework for the organisation, the pedagogy of teaching and learning, and the means by which technology is harnessed. This can involve consideration of the structure and hierarchy of the staff and the students, the daily timetable, the location of individuals, and the movement patterns of the inhabitants. Dealing with the paradox of interaction (openness) and security through design will be paramount.

Achieving flexible and agile design solutions: The design solution should integrate the underlying elements of infrastructure (management, pedagogy and technology), whilst allowing for flexibility, both in the short term and the long term. The design of 'loose-fit' building shells with infrastructure integral to the design can allow for a variety of layouts and provide a good level of flexibility. Flexible 'settings' for learning can accommodate different styles of teaching.

AUSTRALIAN SCIENCE AND MATHEMATICS SCHOOL ADELAIDE, SOUTH AUSTRALIA

AUSTRALIAN SCIENCE AND MATHEMATICS SCHOOL, ADELAIDE © ULTRALAB

The aim of the ASMS is to create an environment for interaction between educators, professional scientists and mathematicians. There are no 'subject classes' or 'year groups' at all. The school is ICT-rich, and focuses on inquiry-based project work and research, within different settings, including workplace and university-based learning. The school is situated on Flinders University campus and is designed with a strong sense of identity, giving a clear 'home base' to the students who spend a considerable time learning elsewhere. Clear viewing angles, and a culture of 'openness' are embedded in the design of the school, with glass walls and open alcoves used for different functions and activities. The school clearly illustrates how radical approaches to learning organisation impacts upon every detail from the architecture to the school-parent relationships.

THERE ARE MANY ISSUES EMERGING THAT DESERVE FURTHER EXPLORATION, IF LEARNING ENVIRONMENTS IN THE FUTURE ARE TO SUCCESSFULLY MEET THE NEEDS OF YOUNG PEOPLE, THE COMMUNITY AND SOCIETY. HOWEVER WITHIN TODAY'S CONTEXT OF PRESSING NEED FOR ADEQUATE SCHOOL ACCOMMODATION, THE FIRST STRUGGLE IS TO CREATE THE SPACE FOR SUCH EXPLORATION AND REFLECTION. ABOVE ALL, THE ENTHUSIASM, COMMITMENT AND SKILLS TO DO THIS ARE ALREADY IN PLACE.

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