

PEB *EXCHANGE*

THE JOURNAL OF THE OECD PROGRAMME ON EDUCATIONAL BUILDING

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**Invention,
Maintenance
and Renewal of
Urban Educational
Facilities**



The OECD Programme on Educational Building (PEB)

The Programme on Educational Building (PEB) operates within the Organisation for Economic Co-operation and Development (OECD). PEB promotes the international exchange of ideas, information, research and experience in all aspects of educational building. The overriding concerns of the programme are to ensure that the maximum educational benefit is obtained from past and future investment in educational buildings and equipment, and that the building stock is planned and managed in the most efficient way.

Eighteen OECD Member countries and nine associate members currently participate in the Programme on Educational Building. PEB's mandate from the OECD Council to advise and report on educational facilities for students of all ages runs until the end of 2001. A steering committee of representatives from each participating country establishes the annual programme of work and budget.

PEB Members

Australia	Mexico
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Czech Republic	New Zealand
Finland	Portugal
France	Spain
Greece	Sweden
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Service général de garantie des infrastructures scolaires subventionnées (Belgium)
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PEB AND OECD ACTIVITIES

EVALUATING FACILITIES

The PEB Steering Committee held a workshop on the evaluation of educational buildings as part of its latest meeting in June. Participants exchanged their countries' experiences and considered studies presented by outside experts. Patrick Alt (*Ministère de l'Éducation Nationale*, France) described the method used to select French schools to submit for the PEB compendium of exemplary educational facilities; the Ministry examined building appearance, effectiveness and comfort, equipment, educational projects, the grounds and the environment. Romeo Lajoie (Quebec, Canada) discussed qualitative and quantitative evaluations of facilities from three angles: the student's point of view, the technical performance and the impact on learning. Chris Watson (New Zealand) presented the principles and methods of post-occupancy evaluation in conjunction with users of a building. Sam Cassels (United Kingdom) warned against losing sight of relevance when studying indicators and shared lessons from the private sector. Mukund Patel (Department for Education and

Employment, United Kingdom) presented the methodology and key findings of a study commissioned by the DfEE to determine how much every pound spent on capital contributes to pupil attainment.

In an effort to further develop understanding in this area, PEB is undertaking to gather indicators from Member countries on the age of buildings, expenditure on buildings as a percentage of total capital value and the value of the overall stock of buildings.

IMHE RESEARCH MANAGEMENT PROJECT

The OECD Programme on Institutional Management in Higher Education (IMHE) launched a new project on research management at the institutional level with an experts' meeting on 8-9 June in Paris. Concern with institution-wide management of research was seen as a recent and significant development in higher education, spurred predominantly by changes in the external environment of institutions. The meeting stressed the impact of the growing quality assurance

movement in focusing the attention of institutions on their research profiles, and the growth of strategic planning within institutions which necessarily raises the question of balance between the research, teaching and service aspects of institutional life.

Discussion on sources of funding and associated issues addressed the impact the priorities of external funding organisations can have on universities, particularly in favouring certain fields and certain types of research. Multiple sources of funding was commended as one way of helping institutions keep control of their own research strategies and of providing equalising mechanisms to support unfashionable research, and institutions in less favoured regions. An emerging issue flagged is how to establish full costing for research, given the growing number of commercial activities undertaken by universities.

The growing cost of providing and maintaining infrastructure, particularly for science and engineering, was another concern.

For more complete information on the discussions, contact Jacqueline Smith, tel.: 33 (0)1 45 24 93 23, fax: 33 (0)1 42 24 02 11, jacqueline.smith@oecd.org

SUPPORT FOR SHANTYTOWN SCHOOLS

The OECD War on Hunger Group contributed FRF 30 000 for the second consecutive year toward the refurbishment of 15 nursery school rooms in two shantytowns of Bombay, India. The money will be used for roof repairs, painting and minor masonry as well as for the purchase of basic equipment and teaching materials. The War on Hunger Group is made up of staff members who contribute a portion of their salary

toward local development projects in the world's poorest countries. This particular project is carried out by the

Children in a balwadi (pre-school)



French non-profit organisation *Inter Aide* in collaboration with Indian organisations. *Inter Aide* regards education as the best way to help people in disadvantaged areas improve their living conditions, and attaches particular importance to pre-school as it contributes to a child's development and reduces the risk of failure in school. For more information on education-related activities supported by the Group, contact Ruth Stock: ruth.stock@oecd.org



NETHERLANDS' NETWORK

Four hundred Dutch schools, colleges and cultural institutions are now linked together through *Kennisnet* (knowledge net), a Web site developed under the authority of the Ministry of Education, Culture and Science. The network enables schools to communicate with one another as well as with museums, libraries, educational publishers, broadcasting organisations and the government. The first schools to benefit are those in the vocational and adult education sectors, to be followed by secondary schools and the older classes of primary schools. By January 2003, more than 10 000 institutions will be connected. The schools themselves will decide whether and when they wish to make use of the new network. Ultimately, some three million people (primarily students) will be able to exchange information via *Kennisnet*. The project will cost more than NLG 400 million. The site, in Dutch, is accessible at <http://www.kennisnet.nl>

The research reflects the trend of school libraries changing from providers of traditional hard-copy based data to media centres where residents of the community as well as students can take advantage of paperless information transfer through a digital-based multimedia system.

The study identifies four IRC plans, ranging from 63 to 153 square metres and accommodating 33 to 71 students. Each is based on a seven by nine metre modular area, the size of a conventional classroom, with extensions for the larger plans. Each IRC contains an information area as well as areas for reading, consultation and graphic production. The latter provides services such as scanning, printing high quality documents and the preparation of presentations. The graphic production area is expected add particular value to the IRC by increasing its use by the community.

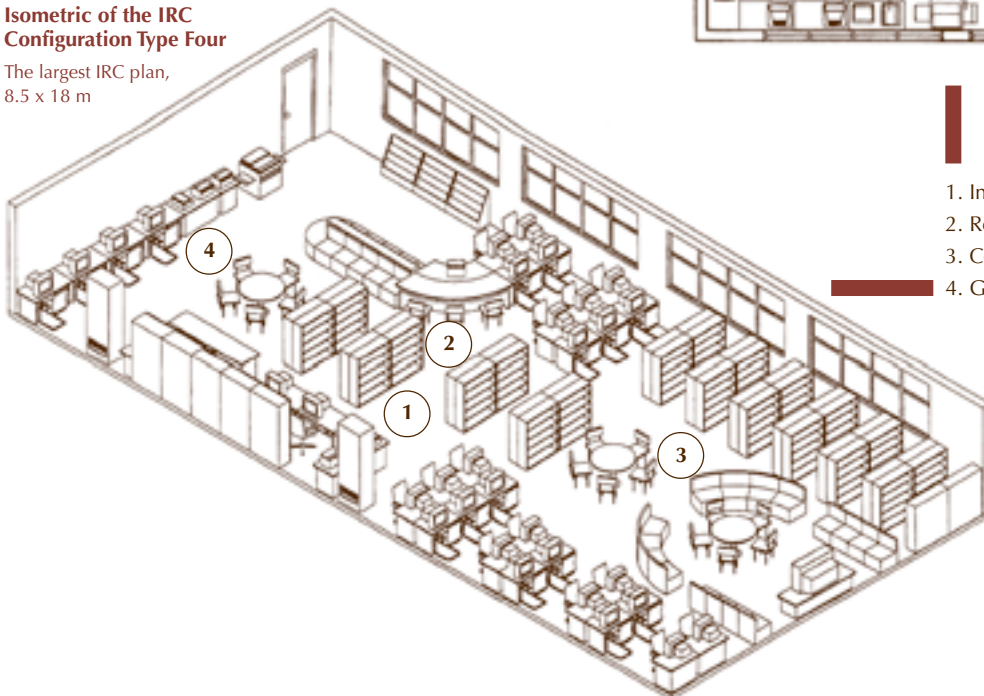
INFORMATION RESOURCE CENTRES IN KOREA



The Ministry of Education of Korea last year conducted research to develop prototype information resource centres (IRCs) for primary and secondary schools. The main objective is to produce design guidelines for both building new resource centres and transforming existing computer laboratories and classrooms into IRCs.

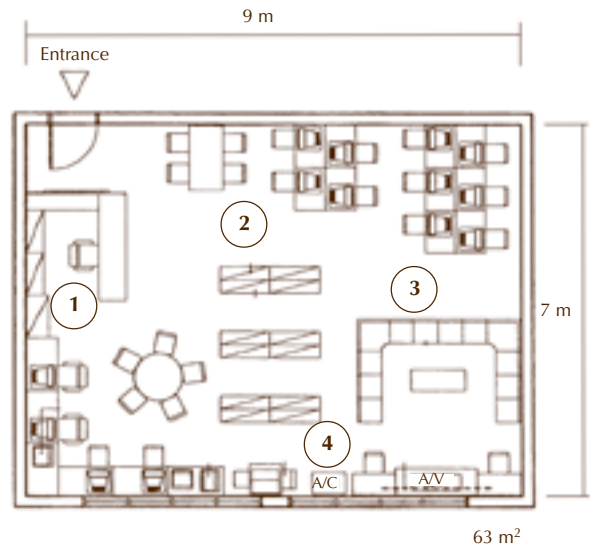
Isometric of the IRC Configuration Type Four

The largest IRC plan, 8.5 x 18 m



IRC Configuration Type One

The smallest of the four IRC plans, 7 x 9 m



- 1. Information Area
- 2. Reading Area
- 3. Consultation Area
- 4. Graphic Production Area

The Ministry of Education anticipates that the IRC configurations will also serve as a model for university resource centres for individual departments. It has distributed the research results to local education authorities and 49 national universities and is now monitoring the institutions' progress in computerising their resource centres.

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UPDATE ON SUSTAINABLE SCHOOL DESIGNS IN IRELAND

The Irish Department of Education and Science has moved through the detailed design stages for two school buildings that incorporate sustainable design principles. The results of analysis to date identify that additional capital investment is required to achieve the long-term benefits of a healthy and energy efficient educational environment. This approach to school building reinforces a number of cogent initiatives currently being encouraged by the Planning and Building Unit. The results advocate:

- a greater use of the school as a community facility, with the school becoming a centre for lifelong learning possibly from pre-school care, right through to study support for students and adult education;
- tighter controls on construction techniques to reduce wind infiltration and improve the energy efficiency of the building fabric;
- a more considered architectural approach to design incorporating a true understanding of a sense of place and function.

It is expected that these two projects will proceed to construction towards the end of the year.

SCHOOL BUILDINGS AND LOCAL AUTHORITIES

On 16 and 17 March 2000, the Brittany Regional Council, the French Regions' Association (ARF), the Association of the *Départements* of France (ADF), and the periodical *La Gazette* organised in Saint-Malo, France, a national colloquium on "School Buildings belonging to Local Authorities – Strategies and

Methods for Improved Management" (*"Patrimoine scolaire des collectivités locales – Stratégies et méthodes pour une meilleure gestion"*).

The work of PEB was presented at this colloquium notably by means of a paper setting out an international comparison of architectural trends in school buildings in a workshop devoted to building programmes. Three other workshops addressed the following topics: managing public works; norms and safety – from conception to use; and financing.

The purpose of this gathering, designed for politicians responsible for school buildings, regional managers, those engaged in organising and carrying out operations, and lawyers, was to examine the approaches adopted by various groups. *Départements* and *communes* were represented, as were all of France's regions, except for Languedoc-Roussillon.

The colloquium brought to light, in particular, the great disparity and diversity of the situations prevailing in different regions. Stock was taken of the consequences of the decentralisation of the education system in France and of the questions arising today at various levels (regions, *départements* and *communes*).

In 1986, education represented less than 20% of expenditure in six regions out of 13. One year later, this was true for only two out of 13, while five regions spent 30% or more of their budget on education. In 1986, only one region allocated more than 30% of its budget to education as opposed to ten out of 13 regions in 1992.

As for financial management, secondary school building also varied widely from one region to another. In 1998, 3 050 procurement works contracts were being executed in the Rhône-Alpes region, 1 721 in Brittany and 1 330 in the Loire valley, but only 331 in the Champagne-Ardenne region, and 107 in Corsica. These contracts concerned 1 240 projects in the Loire Valley, 456 in Brittany and 26 in Corsica, the average being 247 projects per region.

Lastly, situations also varied widely with regard to new technologies. Certain regions, such as Alsace, Le Centre, Brittany and La Haute Normandie – a European pilot region – were very advanced. But the problems of fitting out, cabling, accessing the Internet and integrating new technologies into the school system were noted and discussed.

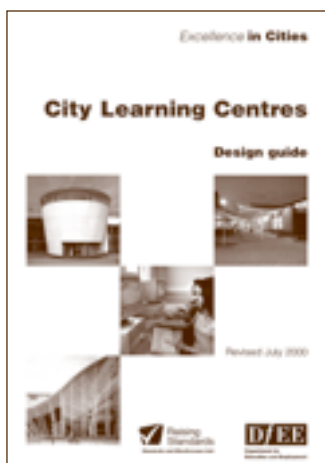
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PROJECTS

CITY LEARNING CENTRES FOR THE 21ST CENTURY

The Department for Education and Employment in England has launched the Excellence in Cities (EiC) initiative, aimed at driving up standards in inner city schools. A key element of this initiative are the City Learning Centres (CLCs). By providing outstanding local facilities, the centres will improve education standards and skills levels, promote employment opportunities and counter social exclusion.



Initially 66 City Learning Centres are planned. They will all be located in secondary schools in urban areas. The aim of CLCs is to enhance learning opportunities of pupils in major cities. To bring this about, the objectives of each CLC must include:

- improve access to, and use of, the latest education technology by pupils and adults;
- improve attainment levels through use of that technology;
- increase staying on rates;
- reduce truancy figures;
- improve employment prospects;
- act as test beds for innovation and new ways of teaching and learning.

While the core client group for these centres will be pupils and teachers, the centres also have a role to play in providing opportunities for the wider community to promote lifelong learning, including supporting the work of the network of Information and Communication Technology Learning Centres. This role will be reflected in each CLCs' objectives.

City Learning Centres must also serve at least five other secondary schools in the area and offer support to primary schools and to adults and businesses in the catchment area.

Links to other EiC initiatives

The CLC will play an important role in the delivery of other linked initiatives. In particular, the National Grid for Learning; Gifted and Talented, Specialist Schools; Beacon Schools and Education Action Zones.

Business involvement

CLCs will be expected to have a key role in developing new ways of learning and teaching using the very latest information and communication technology (ICT). This means identifying and testing out often radically different approaches to the traditional ways of learning and teaching. In particular, City Learning Centres should explore the impact and potential of ICT on home-school learning. For example, can ICT help to create more flexibility in where, how and when children learn; can ICT be used to improve support for children who do not easily fit into the school system; or, more generally, can ICT improve the interface between home and school?

Business partners and individual centres will therefore be free to establish their own links and partnerships. These would involve key companies or consultancies providing individual CLCs, or groups, *pro bono* "Business Process Re-engineering" expertise to help create new models for home-school learning that will remove learning barriers for individuals and raise standards for all.

Funding

Government will provide GBP 1.2 million per centre for design and capital works. This funding can be used for recruitment and training of staff, for purchase of hardware and software and also for contribution towards running costs. Each centre will also receive GBP 220 000 per year for recurrent expenditure. CLCs will also be expected to generate income through nominal charges to adult learners and "start up" businesses that use the centre.

Technical advice

The Department for Education and Employment has issued a "City Learning Centre: Design Guide" (revised July 2000), which covers building design, layout, equipping of CLCs, etc. The key issues for CLC buildings are:



Wandsworth City Learning Centre at Southfields Community College
 Perspective view towards cyber café

High quality architecture – The purpose of a CLC is to deliver high quality educational and communication services, and the architecture should reflect this purpose through imaginative and innovative design solutions. It should look modern and lively. Entrance areas should be visible, capacious and welcoming. Finishes would be similar to those associated with an office building.

Green architecture – Whether rehabilitation or new building, it is a requirement that all building work should be carried out to the highest environmental standards, with excellent insulation and low energy use. Materials should be recycled, recyclable or from sustainable sources. Elements such as natural stack ventilation and PVC-free cabling are encouraged.

Flexibility – The space provided within a building will need to be capable of rapid reorganisation, both on a day-to-day basis and in the longer term. Centres will on a daily basis provide for a range of clients with different needs. They will also cater for both individuals and different sizes of groups. And in the longer term, the future of technology for education can only be guessed. Over time the ICT hardware will change dramatically and teaching methods and arrangements will be subject to frequent reassessment.

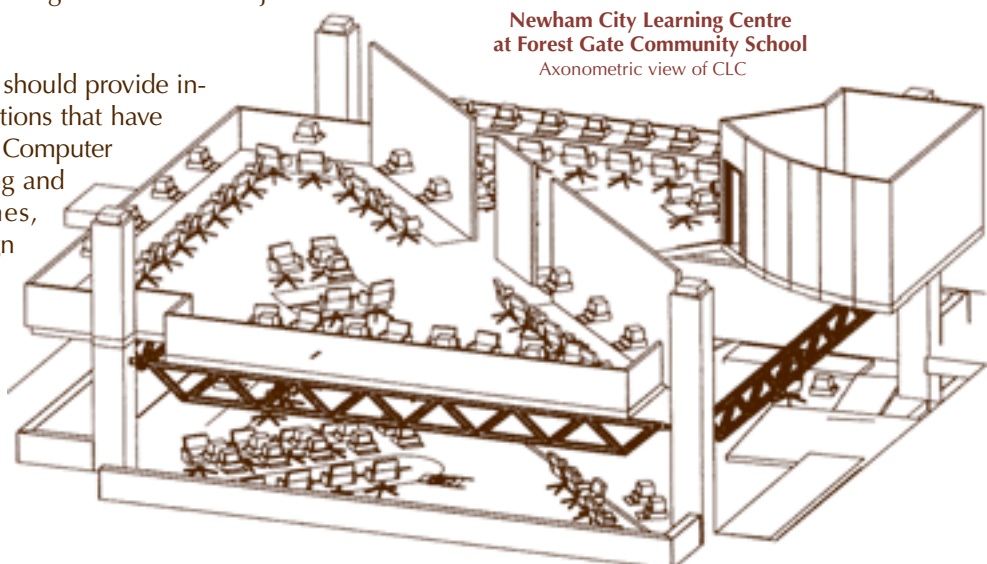
ICT Resources – Each CLC should provide individual computer workstations that have new educational software: Computer Assisted Design engineering and architectural programmes, graphic and Web site design together with digital communications equipment, scanners, laser printers, colour printers, plan printer and photocopier. All workstations should be Internet-connected. ICT

systems should be robust, flexible and adaptive. They should be fast and forward-looking. They should make extensive use of communications, to the Internet, to the schools and to the local community; and wherever possible high broadband connections should be used. They should offer full access to technology for the disabled and special needs groups.

Timetable

The first 32 City Learning Centres began being established in September 2000; 34 more CLCs will be established from September 2001.

Contact for CLC design guidance:
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Newham City Learning Centre at Forest Gate Community School
 Axonometric view of CLC

SCHOOL PREMISES AND VIOLENCE

The following article was contributed by Professor Michel Born from the Department of Psychology of Delinquency and Psycho-social Development at the University of Liège, Belgium. PEB would be interested to receive reactions to his views and asks readers to send feedback to the Secretariat.

The eruption of violence in society is a natural phenomenon; its rise or fall depends on complex, interrelated social processes. The same applies to violence on school premises, any study of which must address the individual characteristics of young people who perpetrate violence and the specific social context of the school. Violence is a generic term, covering violence towards property as well as people. When we speak of violence towards property, we mean acts of defacement, vandalism, graffiti, etc. In the case of violence against people, we make a distinction between verbal violence and physical acts of violence (fights, assaults, etc.), whether directed towards other pupils or teachers.

Violence amongst young people

Like any form of delinquency, violence can be experimental, particularly during adolescence – and therefore in schools – but it may also continue throughout different periods of life.

Discontinuity

Non-habitual violence is exceptional and results from a particular situation. It is part of a process culminating in a crisis, in the sense in which this is understood by the Belgian criminologist De Greeff. It normally occurs where the individual experiences conflict or tension, though it can also be a group phenomenon. Although it may sometimes have serious consequences, it is an isolated act, occurring where the individual's relationships develop in such a way that violence erupts in a given situation. It arises, for example, where temptation is too great or where there is a crisis induced by alcohol. It may take the form of shouting, slamming doors, kicking walls, slapping, punching and more serious assaults.

Developmental violence

Such violence reflects the absence of any link between the person and society. Its origin is to be found in childhood, for example where parents are themselves violent, or where there is a general lack of respect for the law in the immediate domestic or social context.

In adolescence, violence is often aggravated by the peer group, which provides role models and encourages anti-social behaviour, seen as conferring prestige. Violence then becomes an habitual way of reducing personal tension or a way of life through which the individual asserts himself or herself.

Scale of the phenomenon

Statistical studies (based on surveys and data provided by the authorities or the police) clearly show that violence in schools is a reality. This is nothing new; we might recall that in François Villon's time, pupils were told to leave their daggers in the cloakroom before entering classes.

United States statistics for 1996, published jointly by the Departments of Justice and Education, show that 12- to 18-year-olds committed 225 000 serious crimes not involving homicide (rape, assault, armed assault) on school premises, and 671 000 outside school. Furthermore, 12% of the students in the last year of secondary education said they had been attacked by unarmed assailants, while 5% said they had been victims of armed attacks, either on the school premises or on the way to or from school. As for headteachers, 10% reported serious incidents to the police and 47% complained of "minor" offences (vandalism, theft, etc.). It should be pointed out that primary schools experience less vandalism, which occurs mainly in urban secondary schools. In the period 1992 to 1994, *i.e.* in two school years, 76 murders or suicides were recorded in school or on the way to or from school, which is small compared with the total number of murders of young persons (aged between 5 and 19) in the same period (7 357). During the school year 1993/94, 341 000 teachers (12%) complained of having been "abused", and 120 000 (4%) said they had been victims of physical assault.

In France and Belgium, the situation is fortunately less serious. Nevertheless, several studies (see Bernard Charlot and Jean-Claud Emin, *Violences à l'école: États des savoirs*, Paris, 1997) have clearly shown that the phenomenon is widespread, even if some schools are more exposed to it and others protected from it.

Attempt at an explanation

The changes in western society have undeniably encouraged a considerable, almost unlimited, growth in opportunities for delinquency, whether through the availability of goods of all kinds and the ease of access to them, or through the massive increase in appropriate resources (transport, weapons, computers). Being democratic and liberal,



*Violence in Schools:
Today's Knowledge*



society offers opportunities to whoever wishes to take advantage of them. The role models presented by the media are often violent, and barriers to delinquency no longer take the form of obstacles imposed from outside (parents, school, police) but of obstacles freely consented to and internalised. The individual must draw upon his or her system of moral references to find effective obstacles to behaviour that falls outside socially accepted standards. School has become the one place where the references underlying individual action are acquired, like a moral beacon serving as a guide to individual action. These points are relevant not only to schoolchildren but to citizens in general, and thus to society as a whole. This system of references is not dissociated from any context but is of general relevance. The references acquired at school are related to all aspects of life in society; if they were not, social values would not extend beyond the school precincts. Schools would not be fulfilling their role and would be legitimate objects of protest or even attack.

Children and adolescents are thrust into a society whose system of values varies according to period, culture and current events. This is a cultural legacy, built up over generations, with the shifts in society's values producing a strong impression of inconsistency, particularly during certain periods, such as the present day. In today's school system, values are rarely presented

affirmatively. The reason for this is the reaction against what had formerly been a bar to freedom. Traditional values and institutions – state, church, school, marriage, justice, police – have also been called into question; confidence in democracy is in decline.

Some adults, feeling that authoritarian, dogmatic attitudes are outdated, abandon their children to moral relativism. Children need guidance, however, and it is therefore essential that they be provided with clear, strongly held values.

Learning to control oneself is a fundamental requirement in western democratic societies. There has been a shift away from control imposed from outside (the law, the police) towards control exercised autonomously and freely accepted (responsibility). Unfortunately, not all citizens have adequately mastered the process of referring to a value system. Such mastery presupposes an advanced level of moral development, based on social awareness and substantial powers of self-control, which are by no means universal in adolescence or even in adulthood.

The school premises

The school is required to develop the individual's powers of autonomous control in his or her interaction with society and life within a group. Whatever the age of the child, the school buildings and the outdoor areas of the school may or may not provide the opportunity for the exercise of control.

The school should be a place where children are prepared for society. But it should not be closed in upon itself like a fortress, so that such preparation is conducted in an isolated environment that bears no relation to the realities of our society. On the contrary, the preparation should involve a process of social awakening, in which the children are made aware of the world and the world is present to them. The school should therefore enter into a symbiotic relationship with the surrounding district. Leaving aside the ideological conflict over the comparative merits of "closed" structures that are cloistered and isolated, and structures that are "open" to other areas, and thus to society, we know that:

- The trend in contemporary history is towards openness.
- Opening up the school does not necessarily imply pedagogical innovation.
- Open areas are more appropriate to those with an advanced degree of autonomous control.
- Autonomous control is not directly related to age in the development process.

- Open structures, by definition, provide those who are not at ease in the establishment with the possibility of escape; however, they also allow access to persons whose intentions are reprehensible.

The school premises are the scene of preventative action

A telling example of intervention in a school is provided by Michel Floro in *Questions de violence à l'école*, Eres, 1996. First of all, thorough research was carried out in order to identify the problems; after that, strategies were worked out and applied; lastly the situation was evaluated. The opinion of the educational establishment was sought regarding the layout of the premises. An administrator was appointed and two target areas were designated: the playground and the canteen. Several changes were made:

In the playground:

- Game rooms were set up, used by different classes in turn during break-time. This area was decorated by the children with a fresco; cupboards were installed in the corridor.
- The entrance hall was renovated: it was cleaned and painted, and children's work was exhibited; the means of access to classrooms were increased.
- A garden was laid out.
- A running track was laid down, and basketball facilities were installed.

In the canteen:

- Better management of time was instigated: two sittings were introduced.
- The canteen was transformed with the fitting of moveable partitions.
- Old furniture was replaced with furniture that could be moved more quietly.

The results were very positive: jostling and fighting disappeared from the playground and the corridors (violence persisted only in the street after school), and food was no longer thrown around in the canteen. Achieving this result had required consistent action and simultaneous work on two fronts: refurbishing the areas and encouraging participation.

In conclusion

Consequently, even if the trend in the ideology and history of democracy is towards open areas, we should not act naïvely. It is necessary to create protected

areas, as well as places that are not visible (not "tempting"), properly isolated storage spaces allowing controlled access, parts of buildings that can be isolated from the rest, materials that do not lend themselves to defacement or graffiti and can be restored easily and cheaply, as well as the will to keep them in good condition (the well-known broken window syndrome). Above all, everybody in the school community (teachers, pupils, parents) in association with the local residents, must ensure that moral development and social responsibility are incorporated into the process of acquiring skills and knowledge.

The school, in view of its underlying principles, should be regarded as the property and the "flagship" institution of the community as a whole (those associated with the school and local residents), forming part of a dynamic system; every system seeks to achieve a balance between its constituent elements and between itself and the outside world. Interpersonal relations require material conditions, which are not the same in an open system as in a closed one. Everybody needs and seeks security, but children adapt to change more quickly than adults. All depends on securing balance, *i.e.* the appropriate relationship between the different elements, and harmony, *i.e.* the proper management of this relationship.

Given the changing conditions, we need an "ecology" for schools, providing a secure space in which persons and groups can engage in collective activities, discover their identity, acquire citizenship and forge social bonds, the only effective cure for violence.

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INVENTION, MAINTENANCE AND RENEWAL OF URBAN EDUCATIONAL FACILITIES

PEB co-hosted a symposium entitled "Invention, Maintenance, and Renewal of Urban Educational Facilities: Global Challenges and Community Solutions" with the American Institute of Architects' Committee on Architecture for Education and the CEFPI Urban Education Facilities NE Chapter in October 1999. The meeting aimed to provide arguments and evidence for system managers seeking to secure resources for maintenance as well as to sharpen their abilities to use those resources well. Over 60 architects, facilities planners, school officials and governmental resource providers representing 11 countries gathered in Baltimore, Maryland (USA) to discuss the design and condition of school buildings, and their capacity to respond to changing educational demands. Below are excerpts from the symposium papers, including keynote presentations and workshop reports.

Improving the Effectiveness of Educational Facilities, a workshop report by Jean Drouin, Canada

Managers, faced with a perpetually changing environment, scarce financial resources, ageing premises, collective agreements governing the working conditions of teachers and other staff, environmental and energy-efficiency concerns, shrinking or on the contrary soaring enrolment, urban sprawl, new technologies and recent pedagogical changes, are obliged nevertheless to meet immediate and future student needs. To do this, they are having to revamp existing schools and re-design new facilities.

Advantages and drawbacks of existing facilities

Existing school buildings are old and in need of maintenance. In highly urbanised environments, it is inconceivable that they will all be renovated, given how numerous and dilapidated they are and hence the cost involved. Furthermore, lack of available space makes extension difficult. Yet older facilities have their importance, both symbolically and architecturally. They create not only a feeling of belonging but also an image that remain in the minds of all former students.

Lack of space may sometimes be more a problem of space management, which can be solved by re-arranging timetables to suit the number of students, the functional aspects of the premises and user requirements. Sound timetable management can prevent schools being overcrowded at certain times and lying empty at others.

Methods of assessment

Most assessments of the effectiveness of educational facilities focus on the physical aspects of the building and on student achievement. It is widely acknowledged that colours, lighting and acoustics play an important part in the learning process, but it is hard to quantify the direct effects. These assessments are often contested, since the inclusion of criteria such as teaching-staff quality and user satisfaction can lead to contradictory findings.

Carmi Bee, a New York architect, reminded the symposium that thirty years ago there was already talk of assessing facilities with a post-occupancy evaluation focusing on student achievement, satisfaction and social behaviour and on the "human" side of school premises. In his view, architects did not help or influence users sufficiently. Post-occupancy evaluation of educational facilities should take into account the users' comments, attitudes and moods. And cultural differences affect the way we interpret our environment.

Once people have moved into a building, adjustments are mainly a question of engineering. For temperature, lighting and air quality, controls and adjustments that are familiar to and readily understood by users are built in at the design stage.

New information and communication technologies

With regard to new technologies, computing and new information technologies such as the Internet have certainly spread rapidly throughout education, but there is much uncertainty as to their impact and how best to handle their introduction.

There is very high demand for teleconference rooms, computer labs and Internet connections. Several building projects are being undertaken with temporary cabling until wireless communications have developed further. However, nobody knows whether this is the right solution and whether wireless buildings will really be more commonplace in a decade's time.

New technologies are increasingly important in schools and sharing is encouraged. Mary Dietz, a New Jersey architect, demonstrated this in the project to renovate Wadleigh School. Built in 1904 to house 1 500 secondary students, the premises have been converted to house 1 040 students in four schools (art,



The Wadleigh School, New York City

literature, science/technology and media/technology). However, the four separate schools share a single multimedia centre.

In order to ensure that a school's ICT project is a success, it is crucial for all the stakeholders to be involved, *i.e.* teachers, parents, students, administrators and politicians. Mary Dietz stressed that, if handled well, computing as a teaching tool can develop children's independence, ability to work with others, creativity, commitment, self-esteem and decision-making faculties.

The new information technologies will not replace teachers. Children need interpersonal contact if they are to learn. Constant reminders are needed that information technologies are not goals *per se* but tools that can serve to facilitate learning. As such they are excellent, though some concerns remain.

Solutions

The most important key to successful school design is the programme. It specifies the number of students and identifies necessary building work, surface areas, service requirements and optimal use. All this requires teamwork. Regardless of whether teachers, professionals, administrators or politicians want to enhance the effectiveness of school facilities, they cannot do it alone. They must work with their peers, management, students and parents.

In most cases, designers can identify solutions to architectural problems and eliminate them. Politicians and administrators, however, have their own agenda which in many cases means building new schools rather than renovating old buildings.

Flexibility and adaptability are required when seeking solutions. Education is perpetually evolving, particularly with the advent of new information and communication technology and pedagogical developments.

We need places where children learn to live, want to learn and feel safe. School is a gathering place. Its symbolic dimension must not be overlooked. Students have a strong sense of belonging, years after they have left school.

There is no consensus on optimal class numbers. For some, there is an irreversible trend towards small schools. The ideal school is small, with a family atmosphere. And yet the smaller the school, the less variety it can offer in terms of the curriculum and other activities.

Regardless of the purpose a building must serve, the human aspect remains important. Designers should create an environment that is conducive to learning. They should choose colours meticulously and pay close attention to acoustics and lighting. Areas should be designed to be welcoming and comfortable, stimulating or calm.

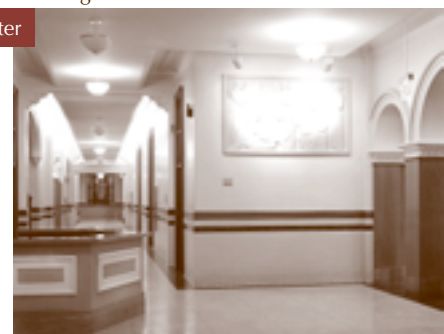
Nevertheless, when people move into renovated or new premises, they need help to make the best possible use of the facilities. Otherwise they will stick to their old habits, and fail to understand functional aspects or the full potential of the designer's changes and innovations.

The post-occupancy period is just as important. We should question those who represent teachers, students and administrators on what they find pleasant or disappointing and what they consider to be improvements on the previous situation.



Before

Renovation of the Wadleigh School



After

More effective use of educational facilities

To use educational facilities more effectively, close attention should be paid to the three following stages of any project:

Pre-project:

- involvement of teachers, students and administrators at the drawing-board stage;
- analysis of research into the performance of educational facilities;
- a user committee set up for the duration of the process;
- regard for the school's mission and student learning patterns.

Project implementation:

- involvement of the user committee;
- information to alleviate the adverse impact and stress of change and innovation;
- technical quality and creativity demanded from the design team, with a view to creating an environment that is stimulating by its form, textures, light, adaptability and outreach, a place that will be conducive to culture.

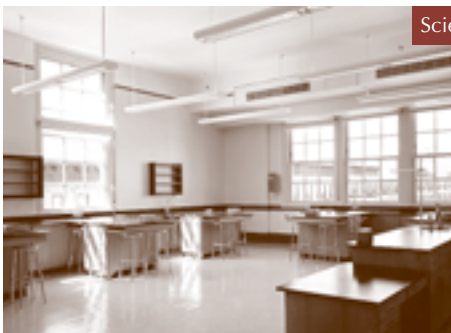
Project monitoring:

- user training in the design principles, scope for development and technical aspects of the facilities;
- post-occupancy evaluation one year after opening, to make the necessary adjustments and changes in use;
- repetition of these two phases where appropriate, to ensure that the school continues to thrive.



Media center

The Wadleigh School



Science laboratory

Managing Educational Facilities Infrastructure, a workshop presentation by Manfred Hinum, Austria

Many countries, regions and communities are becoming extremely concerned about issues such as the maintenance of ageing stock, vandalism, the reuse and adaptation of buildings, up-to-date furniture and equipment, the use of premises for more than one purpose and the reduction of premises, as well as related expenditure. In many cases, however, even the basic information necessary for effective management is lacking.

The influence of facilities

As witnessed at an international seminar in Austria in 1998 on "Improving the Quality of Educational Building", the conviction is strengthening that the quality of facilities has an impact not only on educational outcomes but on the well-being of students and teachers. There is a growing awareness of the role that educational facilities play in shaping attitudes toward the environment and the contribution they make to urban renewal.

Glen J. Earthman of the Virginia Polytechnic Institute and State University, USA, reported at the Austrian seminar that studies have demonstrated a relationship between student achievement and behaviour and the condition of the built environment. Some of the most important factors that influence learning and living are those that relate to control of the thermal environment, proper illumination, adequate space and furnishings. If, as studies and experience strongly indicate, achievement (*i.e.* student test scores) is greater in above-standard schools than in substandard buildings, it is the obligation of the responsible authorities to improve the facilities.

The quality and duration of a building are affected by how it is looked after, the ways in which servicing and repairs are carried out, and the rate at which needs and requirements change. Therefore it is necessary to develop strategies for managing educational facilities but also to do research to better understand how facilities influence student behaviour and achievement.

Maintenance

A marked deterioration in the condition of facilities and in the morale of facility-users is one of the main problems experienced. Insufficient funds, poor management of funds, and estate management and provision that do not match educational needs contribute to the "maintenance gap".

Poor maintenance increases running costs, such as for energy and cleaning. Energy expenditure, for example,

can amount to more than one third of premises-related expenditure; reducing energy consumption can help not only to save money but also to reduce carbon dioxide emissions and other forms of pollution. Further consequences of poor maintenance are deterioration of parts of the building; an unsafe and unhealthy environment; vandalism; and a lower quality of teaching, learning and living.

On the other hand there are educational, social and environmental advantages of good maintenance. The condition of the environment indicates society's support for education. It sets an example to pupils, that the environment in which we live should be cared for. Good maintenance promotes the aims of education.

Steps towards keeping schools in good and up-to-date condition include:

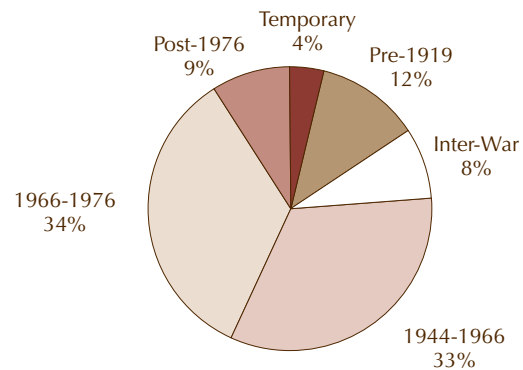
- Have accurate information about the condition of the facilities and the scale of funds needed. Keep the condition of the building stock and resources under regular review.
- Define priorities for expenditure.
- Ensure financing by convincing authorities and other key people.
- Establish resource and funding allocation mechanisms.
- Stick to planned maintenance schedules.
- Act promptly to repair damage.
- Give responsibility for the condition of the facilities to people who are close to the facilities concerned.
- Involve the users in the management.

**Modernising the Schools Infrastructure in England, a keynote speech
by Ken Beeton, United Kingdom**

Most of England's school buildings are now at or past the end of their design life, only a relatively small proportion are modern. School inspectors consider that one in five schools have unsatisfactory accommodation. The poor condition of many buildings is partly due to past under-funding, but the system for handling capital has also had many perverse incentives within it.

In May 1997, a new Labour Government was elected and announced its priorities as being: "Education, education, education". The government, recognising that to improve standards it needs to modernise school

Age of existing school building stock in England



buildings – which will also prepare the way for greater ICT based education – has made more money available for schools and education generally. Over a four year period, over GBP 6 billion will be spent on capital building works at schools.

The large inflow of extra capital has set many new challenges, and government innovations have focused on three main areas:

- how to target money more effectively to raise standards;
- the need for better delivery mechanisms to improve value for money and the stewardship of school premises;
- how to evaluate capital spending.

Better targeting

The condition of schools varies widely and there are also huge differences between Local Education Authorities (LEAs). So how can one make sure the money goes where it is most needed and where it will have the biggest effect on standards?

The traditional method in England has been to invite bids for individual projects. But this approach generates much wasted effort. In 1998, LEAs and schools bid for six times more money than the Department for Education and Employment (DfEE) had available. It also involved those sitting in the ivory tower in London making decisions on local priorities. The government wants to move away from this approach to one in which LEAs and schools have greater ownership and assess their priorities locally on a proper basis.

The vehicle for doing this is Asset Management Plans (AMPs).¹ AMPs are essentially a framework for assessing capital needs and agreeing priorities locally in a robust, fair and improved way, and in a spirit of

good partnership and collaboration. Capital requirements will be assessed for three main types of need: condition, suitability as related to the curriculum, and sufficiency – the number of schools and total areas available.

Delivery of capital

To respond to the challenge of putting money where it will be most effective, the DfEE developed a new capital strategy. Its first key components are AMP appraisal and formula capital allocations to LEAs for condition works at schools. This is very much on the principle of “intervention in inverse proportion to success”. If an AMP is appraised as being sound – with good collaboration across all schools in prioritising need, value for money in the proposed solutions and a track record of good maintenance – the government will make a big formulaic allocation of capital to the LEA and leave it to get on with managing its capital programme. The other side of the coin is that it will bypass the LEA and provide grants direct to those schools where it considers investment is needed if the local processes are shown to be weak. And, from 2002/03, the government will start to make capital allocations with a “discretionary” element – initially only 5% – but enabling it to reward Authorities by giving them extra money for good asset management.

Since April 2000, England is also providing an annual ring-fenced allocation of capital direct to all schools – typically around GBP 25 000, although the amount is likely to get much bigger in future years. This gives schools the ability to direct capital funds to those areas which they regard as high priority and, for bigger projects, to enter into a real partnership with their LEA, based on their own, tangible stake. Clearly, the dynamics are changing, with schools having much greater ownership and influence. Another innovation is the use of Seed Challenge funding where the government is making available to each LEA seed money which can be used by schools to help lever in money from the private sector (such as from sports or arts bodies) for important but lower priority work. Public private partnerships are being pursued as well. Already 550 schools in England are benefiting from large private finance deals, with many more in the pipeline. Public private partnerships are becoming the preferred method of procurement, subject to satisfactory value for money checks and transfers of risk.

1. *PEB Exchange* issue 38, October 1999, “An Update on Asset Management Plans in the United Kingdom”, pages 17-18.

PEB Exchange issue 36, February 1999, “The United Kingdom’s School Asset Management Plans”, pages 14-16.



Evaluation

There is clearly an assumption that investment in schools has a positive impact on pupil performance. The DfEE recently commissioned PricewaterhouseCoopers to carry out a study to test the assumption about this link. The aim of the project was “to measure the additional effect, in terms of pupil attainment, of every GBP 1 invested in schools capital”. The study is attempting to

distill out from all of the very many other factors which have an impact on performance, the effect on standards of capital investment. If this link can be measured, it will be possible to focus investment where it will have the maximum effect and, hopefully, justify further additional money.

The starting point for the study was a literature review. The consultants identified 38 relevant existing studies from around the world and the preliminary findings were:

- The evidence linking capital expenditure to school performance is mixed (some studies find positive relationships, some negative, some no relationships at all!).
- There is broad acceptance that capital expenditure can have an effect on performance (particularly when starting from a low level of initial capital – for example, in developing countries or, for advanced economies, more strongly in the earlier part of this century than in more recent decades).
- The general ambiguity in findings can probably be related, at least in part, to how the work was specified and carried out – the nature of the studies, and the qualitative and methodological differences.

The consultants have also developed a conceptual model to illustrate how capital investment works its way through into educational attainment, and have listed a whole range of inputs and intermediate outputs. Whilst it may be possible with some confidence to identify the impact of capital investment on the intermediate outputs – such as improved teacher recruitment and retention, or better staying on rates or reduced truancy – it is of course extremely challenging to identify the impact of capital investment alone on the final output of attainment levels.

A large number of structured interviews have taken place with a representative sample of individual schools and headteachers to help prove the model, and a whole load of data is currently being assembled and interrogated to try and measure the link.

The study has already identified strong links between capital investment and performance. For example, capital investment was seen by headteachers as being one of the two most powerful levers on teacher motivation which, in turn, links directly to the quality and amount of teaching, before feeding through into the quality of learning and pupil performance. There were also strong correlations between a high quality learning environment and good teaching, leadership, attitudes and behaviours. Expenditure on such areas as heating, air quality and lighting was a particularly strong influence on performance.

The Impact of Education Trends on School Facility Designs, a keynote speech by Prakash Nair, United States

There is a great divide between the current thinking in the educational community and the work that school facility professionals are producing. Most of the older stock of existing buildings and newly built school facilities inhibit the proper delivery of education. The uniformity of school facilities is suited to the outdated one-size-fits-all approach to education which does not consider that: “The ways children learn and develop are highly individual – even idiosyncratic – and the attempt to have them learn the same things in the same way at the same pace is a form of educational folly” (Scott Thompson).

Certain questions are not asked often enough:

- Architects: Should the focus be on creating better buildings or better students?
- Politicians, educators and administrators: Should the focus be on achieving higher test scores or creating better students?
- Parents: Should school simply focus on academics or seek to develop responsible citizens?

The most important function of a school may not be to deliver academic education in the traditional sense, but to provide social skills for survival in the adult world. To survive and thrive in the next century, children will need proficiency in many types of literacy, not only academic but autonomous, community, family, workplace, etc. Learning is not about simply understanding the subject nor even retention; learning is about engagement. Once children are engaged in a task, they become partners, collaborators and even teachers. As expressed by Chip Wood, co-creator of the “Responsive Classroom” approach to school reform: “If the focus were really on creating better students, children would have time in school to consider and reflect on what they were learning and time to care about and contribute to one another and their school. They would have time to ponder where their lives were headed. School would be a learning community, not a fact factory.”

One must be careful of the information-rich/experience-poor paradigm. Technology is a tremendous tool, but it cannot compensate for real life experiences. Schools should get children out into the community, in supervised settings such as after-school programmes, doing volunteer work, gaining skills, e.g. visiting the elderly, taking care of animals at animal shelters, reclaiming patches of land through neighbourhood gardens. The opportunities for children’s involvement in the community are endless.

If school can be conducted in the outside community, so too can the outside community come into the school. "Classrooms organised as theatres, a newspaper, art galleries, stores and post offices provide opportunities for acquiring literacy skills by simulating situations that make sense in children's everyday life" (Carol Walker and Frank Yekovich).

One should keep in mind that schools in poorer districts need more services and that older buildings need more money. Poorer districts should get a larger allocation of public money because they are less likely to attract private money.

When it comes to the future of schools, the school planning and design community can no longer afford to be bit players on the sidelines. Facility professionals need to assume leadership roles in shaping both the present and future of schools, not school buildings.

Classroom of the Future – New York City design competition entry



Most new schools in the United States and Canada are still using conventional furniture layouts as shown in this newly constructed school in New York



School for the Physical City – an alternative school located in an old manufacturing building in New York City



Planning for the Future of Education, a keynote speech by John Mayfield, Australia

What will education be like in the future?

In the future, everyone will be a learner all their lives. The educational service must respond to everyone, not only but certainly including the young. Education will enable individuals to live full and fulfilling lives. It will be essential for the development of the community and for economic development, including the development of education as a service industry in its own right.

Powerful new learning technologies will be available alongside conventional teaching technologies. Education will be a traded service as well as a free, public, compulsory and secular service. The content, accreditation and assessment of learning will be more national and international in outlook. Education will take place in the home, workplace and institutions. It will take place anywhere, anytime and on demand.

Education will be much more learner centred. Teachers will remain essential and will do increasingly different things.

New partnerships will be crucial for the educational service to be appropriate to the special, immediate and future needs of the learners. Education will no longer be a monopoly. Co-operation, collaboration and partnership are necessary for maintaining, inventing and renewing the educational service, including the places in which people (especially children) learn.

Communities will need to meet these five needs:

- reintegration of the functions of the urban environment: live, learn, work and play;
- the opportunity for accessing, processing and publishing their own new knowledge;
- a set of learning services including advice, brokerage and assurance, but also a responsive local public learning service;
- a process for continuous improvement;
- connection and partnerships with other communities.

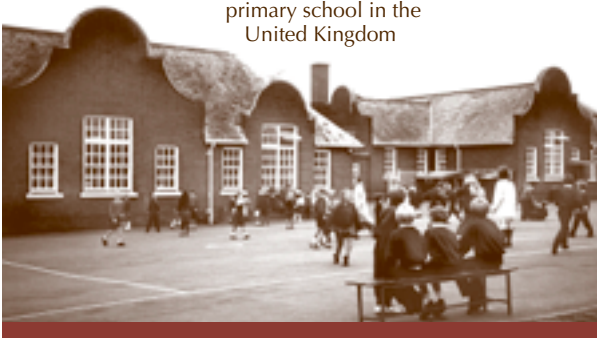
Recommendations for facility planners

- Work with others: Identify the school as one part (perhaps the focus) of the lifelong learning service. Recognise the links between education and economic development. Recognise the importance of inclusion – everyone will be involved all their lives.

- Develop a signature: Identify a speciality as a point of difference. Build on existing strengths. Recognise how to operate in a global community without losing the sense of being special or unique. Develop a way of contributing to the network.
- Master the technologies: Maximise the use of the new information and communication technologies. Establish some form of an ICT centre. Work with every partner that can be found. Link with others of the same speciality. Access, process and publish.
- Contribute to the social process of learning: Create a facility in which people can engage in social processes. Recognise the purpose of technology.
- Aim for sustainability: Education is both a public investment and a traded service. Think of the educational service as a business. Develop a business plan. Identify and quantify the tangible contributions of the educational service to the economy of the community.
- Ensure that the range and nature of fixed assets are responsive to inevitable and rapid change: Facilities are now more likely to be dispersed, leased, shared, part of the urban fabric and open all hours. They are likely to include the home and the workplace. They should still be architecturally recognisable.
- Set up the process of continuing improvement: The aim is for education to contribute to making the community a better place in which to live; the aim is not simply a better school.
- Invent, re-engineer, create: Try to work out why the plant is rundown, unloved and not working. Identify (with all those concerned) what has changed. The argument for reform is stronger today because there is an acute sense of need for lifelong learning, the technology is available, the models are emerging and the resources are available.

The symposium papers presented here are available in full in the Resources section of the PEB Web site: <http://www.oecd.org/els/edu/peb/>

Over hundred years old primary school in the United Kingdom



References

DALE, Julia (1999), "Inner City Primary Schools in Havana – the Casas Adaptadas". Presentation, UEF/CAE/PEB Symposium "Invention, Maintenance and Renewal of Urban Educational Facilities: Global Challenges and Community Solutions", 30-31 October.

Impact of Facilities on Learning Page. National Clearinghouse for Educational Facilities, 31 July 2000.
http://www.edfacilities.org/ir/impact_learning.cfm

LACKNEY, Jeffery A. (1999), "Track 2: Impact of Social Patterns on Education and Facilities". Presentation, UEF/CAE/PEB Symposium "Invention, Maintenance and Renewal of Urban Educational Facilities: Global Challenges and Community Solutions", 30-31 October.
<http://www.edi.msstate.edu/track.html>

PEB Exchange issue 40, "New York's School for the Physical City", June 2000, pages 6-7.

PEB Exchange issue 39, "Urban Educational Facilities", February 2000, pages 3-4.

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NEW TECHNOLOGY AND EDUCATION IN FINLAND

ICT policy: a new strategy for 2000-2004

On 23 April 1999, the Ministry of Education published a new National Strategy for Education, Training and Research in the Information Society for 2000–2004.¹ This strategy is a sequel to the National Strategy for Education, Training and Research completed in 1995.

On the basis of the review of the previous strategy period, it can be said that the development of the Finnish information society is faring well in international terms. This specifically applies to technological infrastructure. The utilisation of information and communication technologies in educational establishments has, however, been uneven. Moreover, commitment to the strategy has varied a great deal. According to the evaluation, only one fifth of educational staff extensively resort to new technology to support teaching. However, almost all pupils, students and teachers would be willing to utilise new technology in teaching and studying to a greater extent. Although pedagogical utilisation of information and communication technologies has succeeded in pilot projects, the more extensive use of positive experiences has thus far been defective. The majority of information society appropriations have been targeted at equipment acquisitions and network building in educational establishments, universities, libraries and archives. Funding for education, training and research related to the information society has also increased, and the status of research has been strengthened by increasing student intake and the number of teachers and researchers. These investments, however, are insufficient.

As approached in the new strategy period, the development of Finnish high-level know-how must include:

- a greater emphasis on the development of contents and modes of operation;
- an increase in international co-operation in education, training and research;
- an increase in co-operation and co-ordination between the public and private sectors;
- the notion of media development and the impact of its integration into education, training and research;
- providing equal opportunities for all citizens.

The research and education sector will operate through networks. Networking projects will develop and crystallise into virtual universities, virtual schools and versatile research networks.

Creating favorable conditions for learning in Finland

By the year 2004 Finland will be one of the leading interactive knowledge societies. Success will be based on citizens' equal opportunities to study and develop their own intellectual capacity and extensively utilise information resources and educational services. A high-quality, economically sustainable mode of operation in network-based teaching and research will have been established.

These objectives will be achieved through the action programme, the all-encompassing theme of which is the development of a Finnish general knowledge base and learning environments. The majority of the programme will be implemented through ordinary operational development. In order to keep Finland on a steady course in developing the information society, the focal areas of the action programme will require reallocation of resources and well-focused additional funding. The focal areas of the action programme include:

- information society skills for all;
- the versatile use of networks in studying and teaching;
- accumulating digital information capital;
- strengthening information society structures in education, training and research.

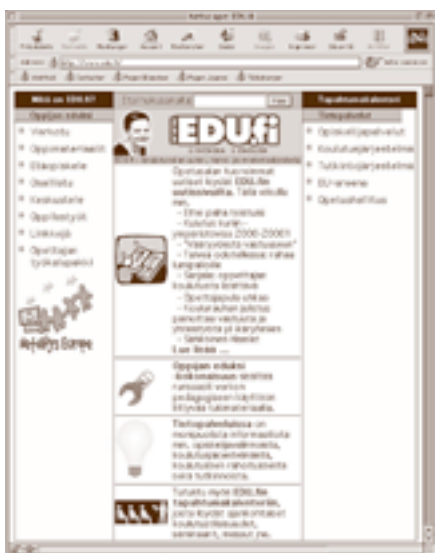
The Finnish school network service "EDU.fi"

EDU.fi² is a national service maintained by the National Board of Education. It contains different kinds of classroom resources, information about administrative matters pertaining to education, events and matters connected with schools in general. The EDU.fi pages contain basic information about education, including the Finnish education system, its financing, building of schools and matters concerning legislation. In addition, EDU.fi serves as a news channel through which schools can get the latest and most topical information. This channel also provides information on the European Union and on in-service training for teachers.

1. The strategy can be found on the Internet in English, <http://www.minedu.fi/julkaisut/information/englishU/index.html>

2. <http://www.edu.fi>

EDU.fi also contains solid support materials for the pedagogic use of networks and various learning environments for those studying through, for example, distance learning upper secondary school, the virtual academy for adults, Internetix or the open university system.



The Finnish school network service "EDU.fi": <http://www.edu.fi>

technology equipment has turned homes into diverse study environments.

- The diverse use of existing school premises and technical resources will be intensified.
- Student apartments will be provided with permanent datalines.
- Experience in new solutions for constructing and equipping educational institutions will be gathered and communicated.
- In the renovation and construction of schools, closer attention should be paid to the needs of the knowledge-based society through education and training and through supporting co-operation between experts in the areas of the physical environment and technical and pedagogic planning.
- The advent of digital radio and television and the technical development of information networks will significantly expand the technical infrastructure for open and distance learning.

In an open learning environment, learning is active and communal, and utilises a variety of media. Openness is also linked to the opportunity for networking in learning situations, the mobility of learners, and partial independence of time and place. Options support the self-directed learning and motivation of the student.

The planning of educational establishments and libraries

Changes in operational culture caused by the developing information society also present challenges for the design of concrete study and research facilities. Some objectives settled in the strategy concerning school buildings and equipment are:

- Schools will have high-quality network connections to other schools and libraries in the municipality and to the information resources and services of other libraries. The computer system used at the school library must be compatible with the municipal public library system.
- The spatial planning of schools and school libraries must be carried out to take into account a variety of working methods.
- The equipment must be placed so as to achieve a maximum utilisation rate and a user-friendly approach.
- Public libraries and the libraries of educational establishments will increasingly serve as places where learning based on information technology is carried out alone or in groups. This will also happen at the workplace. Improved information

Virtual school and distance learning

Learning must take place in a setting which as far as possible corresponds to the future operational environment. This requires strong utilisation of information and communication technologies and an aptitude for network-oriented studying.

Because of the long distances and the small population, educational establishments in Finland are relatively small and scattered far from each other. This increases the cost of education. Information networks offer new opportunities to support small educational establishments as an alternative to closing down schools. Virtual studies also make it possible to support the education of Finnish children living abroad. Information networks bring study opportunities closer to the people, increase flexibility and options also in units with a small number of students, and help increase co-operation between various groups of educational establishments. Virtual studies are possible from the lower stage of the comprehensive school to upper secondary schools and vocational institutions. Ever-diversifying wireless communication is also strongly utilised. These are the foundations of the Finnish virtual school, which will combine the advantages of high-quality contact and distance education.



Heinävaara Elementary School, © Reino Tapaninen

The main aim of the virtual school project, which has started in 2000, is to develop and implement a study system based on open and distance learning for upper secondary school pupils, comprehensive school pupils and vocational school pupils, a system which is independent of students' place of study or residence. In the long run it will enable the completion of courses of different depth and grades, and even degrees. The project aims to solve technical, pedagogical, social, administrative and statutory problems involved in the adoption of new forms of studying. The project will also help every school to develop its activities towards virtual school. The fundamental purpose of the virtual

studies is to develop and introduce co-operative interactive open learning environments and teaching methods. The prerequisites for this are systematic research and development and effective application of the results, not only in virtual studies but also in learning material:

- A network-based user interface will be launched with tutoring, counselling, study material and educational services serving the whole educational system.
- Networking by teachers will be supported.
- A multi-disciplinary research and development network of learning environments producing and supplying high-quality educational services will be established. The prerequisites for network activities will be created so as to facilitate new entrepreneurial activities, new services in operational organisations, new products and new intellectual rights. Teacher education units are expected to substantially capitalise on the innovative development of information and communication technologies.

The use of ICT in schools

Finnish school curricula require that all pupils be provided with basic skills in information technology

ICT STATISTICS FOR FINLAND

Computer situation in educational institutions in 1999 (min. 386 level PCs or equivalent):

	Number of institutions	Students per PC	Students per PC 2000 target
Comprehensive primary schools	31 000	12 – 13	10
Comprehensive secondary schools	16 000	11 – 12	8
Upper secondary schools	12 000	9 – 10	6
Vocational institutions and polytechnics	34 000	5 – 6	3 – 5
TOTAL	93 000		

Percentage connected to networks in 1999

Comprehensive primary schools	90%
Comprehensive secondary schools	90%
Upper secondary schools	95%
Vocational institutions and polytechnics	100%

in comprehensive school. Information technology does not, however, have its own specific subject, but the main principle is rather to integrate it with other subjects. Elective or voluntary courses for acquiring skills in the use of computers may also be offered to students in comprehensive secondary school, upper secondary school and vocational institutes.

In the new strategy for 2000-2004 the local ICT strategies in education will be integrated into curricula. Through the evaluation and development of curricula, educational establishments will now have new tools enabling them to meet new educational challenges. Creativity, problem solving and co-operation will be emphasised in the activities and development strategies of educational establishments. Towards the end of the strategy period, media literacy will become a part of general education.

The Finnish National Fund for Research and Development (SITRA) in 1998 at the request of the Parliamentary Select Committee on the Future carried out an evaluation project entitled Information and Communications Technology in Teaching and Learning. The purpose of the project was to evaluate the current situation regarding ICT and to ascertain the most important development challenges which should be met in order to utilise the technology more effectively in teaching.

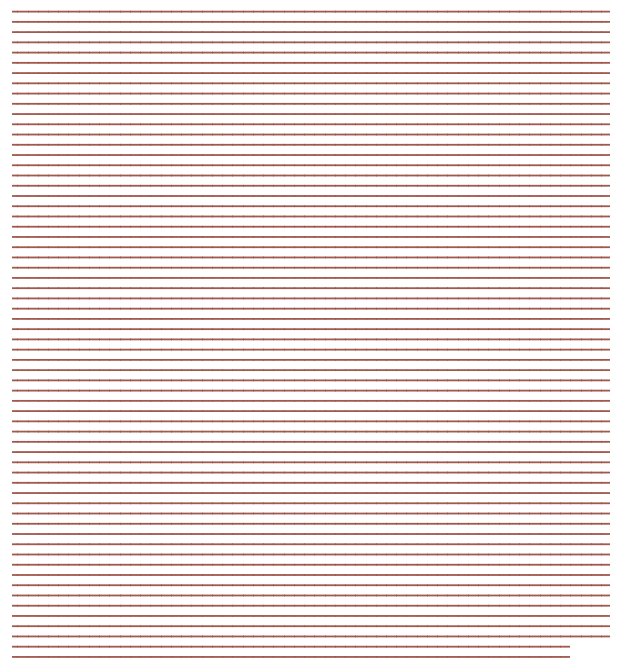
The research analysed the level of expertise and utilisation of information technology by comprehensive and upper secondary school teachers. It also analysed the pedagogical beliefs associated with the use of information technology for teaching. The analysis of the research material showed that there was a wide divergence in the teachers' level of expertise in information technology and only a small proportion of the teachers had a wide ranging command of the use of various ICT equipment. In the sample studied, most of the teachers did have a good command, however, of some information technology application, and regarded ICT as an appropriate tool. The research also showed that most of the teachers had a computer available for use both at home and at school. Almost half of the comprehensive secondary and upper secondary teachers who answered used information technology daily in the preparation of their own teaching. Only about 20% of the teachers used ICT in their own teaching daily, but as many as 60% used it at least once a week. Currently the most commonly used applications of information technology are word processing, World Wide Web services and e-mail. Although the teachers who participated in the research have already adopted information technology as a tool, they feel in need of a great amount of ICT support,

particularly regarding pedagogical support and training in the use of information technology in teaching.

The questionnaire for educational institutions ascertained how the students utilised the Internet. The Internet is most usually used as a means of retrieving information (84% of the schools that answered). Almost half of the schools had their own Web page, but this was mainly to present the school, because only 20% of the schools published material produced by the students on the networks. Increasing the variety of teaching methods using networks is in its infancy, as only 10% of the schools reported that they used networks for sending and returning student assignments and for student guidance. Networks already have a clear significance in the administration of schools as 50% of the schools used networks for this purpose.

Ritva Kivi's article was also published in the 86th issue of Administration et éducation, the review of the French association of educational administrators (AFAE). See page 26, *Bâtir pour apprendre*.

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THE SCIENCE RESOURCE AREA IN THE STATE-OF-THE-ART HIGH SCHOOL

It appears that science education is moving more and more toward individual and small-group, hands-on projects and away from the “sage on the stage” lecture and “one size fits all” laboratory projects. The Thomas Haney Centre in Maple Ridge, British Columbia (Canada) operates on individual study plans for each student, requiring that a student demonstrate proficiency in the subject matter to complete a course, but allowing students to progress at their own rate of speed and to learn in their own most effective manner (following Gardiner’s suggestions on multiple intelligences).

If this is truly the future of secondary education, it seems that fixed, designated-subject science laboratories may become dinosaurs. Perhaps a large, flexible student project space could be combined with a number of other, support spaces, to provide the appropriate learning environment for science. As students become more and more responsible for developing their own projects with which to explore the science curriculum, the need for individual laboratory/classrooms and prep areas should be greatly reduced. Rather than daily doses of large-group lectures in a classroom, more and more content would be delivered either by reading, study of documenta-

tion on a computer (CD-ROM or Internet), or by actual experimentation, thus requiring significantly less traditional classroom space and significantly more project space.

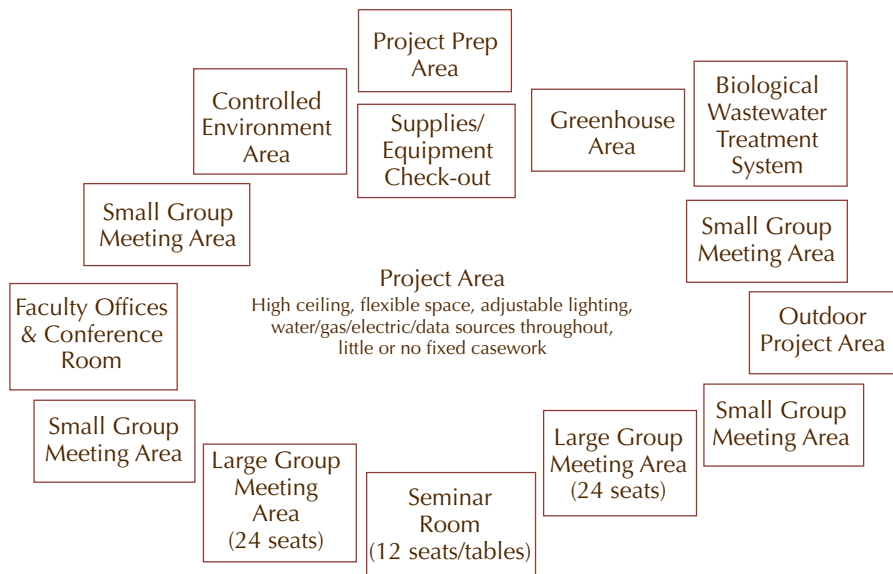
The diagram below suggests the science resource area of the state-of-the-art high school and includes the following facilities:

Project Area: This is the primary learning space for all students. It would have a high ceiling (or no ceiling), flexible and adjustable lighting, water/gas/electricity/data connections throughout the space, and little or no fixed casework. The primary furniture would be tables and chairs which students could arrange to suit their needs. One or more fume hoods would be provided for those projects requiring same, and increased ventilation of the project area would be required. Space and resource allocation would be the function

Flexible Project Area
Thomas Haney Centre, Maple Ridge, BC



FLEXIBLE, INTEGRATED HIGH SCHOOL SCIENCE RESOURCE AREA



of the teachers who are now truly facilitators with the knowledge and experience to guide students in their learning process. As this space would serve all students in all grades, it would necessarily be large and might, for acoustical purposes, need to be subdivided into two or more such spaces which could be connected through large, roll-up doors to permit rearranging equipment or long-term projects.

Outdoor Project Area: Ideally, the main project area could open directly, via overhead or sliding doors, to an adjacent outdoor project area where outdoor experiments such as weather observations, stream mechanics, animal and plant studies could be conducted.

Supplies/Equipment Check-out: With small group and individualised projects being accomplished on a random schedule, a centralised storage and check-out space for supplies and equipment would be required, replacing the individual storage and prep rooms normally associated with dedicated laboratory/classrooms. If the project area is subdivided, it might be necessary to have more than one supply/equipment check-out room, or one such space might be located strategically between two or more project rooms to serve all. The supplies/equipment check-out space would have a number of banks of shelving, possibly rolling, compact shelving to save aisle space, and would have service windows with roll-up grilles opening into the project areas. At the Thomas Haney Centre, kits for individual laboratory projects are put together in advance in plastic tote trays of various sizes; when a student or team is ready to do a particular project, they merely check out the appropriate tote tray which also includes instructions and safety precautions. The student or team would then proceed to a vacant workstation or table in the project area to set up and perform the project. Staffing for this area would depend on the number of project areas being served and the number of students in the student body. This space would be open at all times that the project area is open.

Project Prep Area: This would be the make-up area for the project kits. Rather than scurrying to prepare a dozen laboratory set-ups for a class of 24, a teacher would prepare several tote tray kits for each project at a convenient time, and place them in a pre-assigned location in the supplies/equipment check-out space. When kits are returned, the various glassware and instruments must be cleaned and the consumables replaced. This work could be performed by students or by teachers as convenient.

Greenhouse Area: Rather than provide the type of environment appropriate to a greenhouse in the entire project area, a separate greenhouse area should be



Greenhouse

Samuel Shepard Jr. Gateway Education Park, St. Louis, MO

constructed. This space could be located adjacent to the project area, or be remote, but should have access to the supplies/equipment check-out space. The size and equipment of the greenhouse will depend on the planned curriculum which would make use of this facility. It could be used for long-term demonstrations of composting, solid and liquid waste processing, growing of biological specimens such as fish and plants, etc.

Biological Wastewater Treatment Area: Where possible, the use of an environmentally sensitive, biological wastewater treatment system could act as both a building utility and a science demonstration area similar to that installed at the Boyne River Ecology Centre of the Toronto (Canada) Board of Education. This space should be located on the exterior wall with direct sun and could be adjacent to or a part of the greenhouse area.

Biological Wastewater Treatment

Boyne River Ecology Centre, Toronto, ON



Controlled Environment Area: This space would offer the opportunity to conduct projects requiring a more controlled environment than would be available in a large, open project area. Dust control, humidity control, lighting, temperature and other variables could be different in this space than elsewhere in the resource area. As with the greenhouse, this space could be



Weather Station

Samuel Shepard Jr. Gateway Education Park, St. Louis, MO

located adjacent to the main project area or be remote. It probably should not connect directly to the supplies/equipment check-out space so as to avoid contaminating the controlled environment, but should be near by this space. The space is meant to be as flexible and functional as the main project area.

Small Group Meeting Areas: These conference rooms should open directly off the main project area and should have glass partitions to allow for supervision and to create a sense of connection to the projects in the larger space. The small group meeting areas are meant as places for small groups or teams to meet to discuss the progress of their projects or to analyse the appropriate method for achieving a particular project goal. As separate spaces they can have sound isolation from the general noise of the larger space while allowing the small group to conduct their own discussions without disturbing those in the project space. It might be possible for a team to check out such a space for several days at a time if the requirements of a project produced a need for extended discussions, paperwork and computer-related activities. The space should be equipped with electrical outlets, appropriate lighting, computer networking capabilities and, possibly, a desktop computer connected to the Internet. A markerboard and tack surface should be standard equipment.

Larger Group Meeting Areas (24 Seats): In spite of the individualised or small group nature of the science experience, there will still be times when teacher and students need to meet as a group to present a new concept, lay out ground rules for a new project, etc. Other uses might include a group presentation of project results by an individual or team or the group viewing of a film or other media presentation. The room should be sized to hold an entire class group (*i.e.* 24) and should be equipped with markerboard, tack area, projection screen, LCD projector, computer network connections, adjustable lighting and adjustable seating to permit a wide variety of functions to make use of the space. The number of such lecture areas should be calculated by determining the likely number and frequency of group presentations in the curriculum. These spaces would **not** be assigned to individual teachers as “home” spaces.

Seminar Room (12 Seats/Tables): In the Thomas Haney Centre experience, full class size meetings are rare; teachers make presentations on a particular issue when a sufficient group of students are ready for the material. One or more smaller seminar-sized spaces with movable tables and chairs should be provided. Teachers can hold group discussions, or review material with two or three teams of students at once; the spaces could also be used by groups of students working as a larger team or several teams working on the same project to discuss findings or plan out a method of attack. Both the lecture areas and the seminar rooms could open directly off of the project area or be more remote.

Faculty Offices & Conference Room: These are the “home” spaces for the faculty and may be individual offices, small cubicles in a larger space or offices shared by two teachers. They should be adjacent to the project area so as to allow students to visit with teachers as necessary during the course of their projects, but should also have enough privacy that a teacher can conduct a private meeting with a student or carry on a private telephone conversation. One or more small conference spaces should be provided in this area to allow teachers to meet with small groups of students, or with a student and his/her parents, or for groups of teachers to meet to plan curricula and projects. If a science library is part of the school’s resources, it might also be located in this area.

In the contemporary high school where individualised study and group project spaces are the rule, such a science resource area will fit right into the plan; whether the science resource area could be integrated with other project areas depends on the types and extent of science projects attempted. It might be possible to equip the multipurpose project space used by all disciplines with the appropriate utilities for science; the question remains, however, if the noise, clutter and smells of science projects would be tolerable if integrated with the other disciplines.

Many of the individual concepts elaborated in this paper have been constructed in schools within the United States and Canada by various architects. However, the proposal of combining all of them into a flexible science resource area is the intellectual property of Inside/Out Architecture, Inc. and is copyrighted material.

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PUBLICATIONS

OECD PUBLICATIONS

Available from OECD distributors. See page 27.

From Initial Education to Working Life: Making Transitions Work

How did the transition from compulsory education to work change during the 1990s and which types of transition policies worked best? The experiences of 14 OECD countries are examined in this volume to address these two key questions. This study reveals the complex and many-faceted national institutional arrangements that can result in successful transitions to working life. It argues not for single solutions or models, such as the adoption of apprenticeship, but for coherent national policy packages that draw from a limited number of success ingredients.

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Motivating Students for Lifelong Learning: What Works in Innovation in Education

Young children rarely lack curiosity, but as they enter the teenage years their appetite for learning often appears to shrink. Many eventually drop out before the end of compulsory schooling. What can governments and education systems do to inculcate the "zest for learning" that young people will need if they are to thrive in 21st century post-industrial societies? This is one of the key questions which is addressed in this review of eight countries offering innovative schemes that appear to be developing the skills and attitudes necessary for lifelong learning.

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Literacy in the Information Age: Final Report of the International Adult Literacy Survey

This publication offers new insights into the factors that influence the development of adult skills in various settings across the 20 countries for which comparable household assessment results are included. Improving the literacy skills of the population remains a large challenge for policy makers. The results suggest that high-quality foundation learning in schools is important but insufficient as a sole means to that end. Policies directed at the workplace and family settings are also needed.

OECD Code 812000051P1, 188 pages
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OTHER PUBLICATIONS

Bâtir pour apprendre

This 86th issue of *Administration et éducation* brings together articles on educational building written by researchers, teachers, architects and community leaders responsible for school and university buildings from France, the United Kingdom and Finland. They offer reflections on the design and layout of buildings, their use in teaching, security, the pedagogical use of information technology, the openness of institutions toward the outside, financing, etc.

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ISSN 0222-674X, 176 pages, 2nd trimester 2000

A Guide for School Governors: Developing School Buildings

This guide is intended to help school governors appreciate what is involved in looking after and developing the buildings in which children are educated. The first part, "Managing the School Environment", establishes the context in the United Kingdom in which capital and recurrent funding may be used. The second part, "The Project Process", describes the processes one might go through to carry out a building project, whether it is minor repairs or a major development.

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40 pages, 2000, GBP 5

1997-1998 Comparative Costs & Staffing Report for Educational Facilities

This report focuses on total costs in the key functional areas of facilities management: administrative, custodial, grounds, maintenance, safety, waste and others. It also includes personnel data and costs, and utility costs and consumption.

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November

1-3 - "Schooling for Tomorrow" is the theme of a conference organised in Rotterdam by the OECD Centre for Educational Research and Innovation and the Netherlands Ministry of Education, Culture and Science. Its aim is to forward understanding of how different policies and innovative initiatives can address the challenges confronting schools in the future. Contact: Mariko Kuroiwa, OECD/CERI, tel.: 33 (0)1 45 24 91 85, fax: 33 (0)1 45 24 91 12; e-mail: mariko.kuroiwa@oecd.org

6-11 - The Committee on Architecture for Education of the American Institute of Architects is organising a conference and exhibition entitled "Innovative Alternatives in Learning Environments" in Amsterdam, Netherlands. Participants will explore changes in culture, society and technology, the impact of these changes on learning and the corresponding impact on the design of the physical environment. Visit <http://www.e-architect.com/pia/cae>. Contact: Dean Innerarity, AIA/CAE, tel.: 1 202 626 7453, fax: 1 202 626 7518, e-mail: dinnerarity@aia.org

December

8-9 - The OECD Centre for Educational Research and Innovation will hold an international roundtable of students and policy-makers on "ICT and the Quality of Learning". 17- to 20-year-olds from each OECD country will share their experience and perspective on the use of information and communication technologies in education. Senior representatives from Member countries will also be invited. The meeting will take place in Aix-en-Provence, France, in French and English. Contact: Edwyn James, OECD/CERI, tel.: 33 (0)1 45 24 76 03, fax: 33 (0)1 45 24 91 12, edwyn.james@oecd.org

2001

January

28-29 - CEFPI (Council of Educational Facility Planners International) will hold its 8th Annual Technology Conference in Scottsdale, Arizona (USA). It will address planning for tomorrow's technology at the district and building level and present up-to-date techniques for integrating technology into schools. Highlight sessions will focus on media centers, science laboratories and distance education. A trade show exhibit will be included. Contact: Barbara C. Worth, 9180 E. Desert Cove Drive, Suite 104, Scottsdale, Arizona 85260, tel.: 1 480 391 0840, e-mail: cefpi@cefpi.org, <http://www.cefpi.org>

April

10-14 - "What We Know and How We Know" is the theme of the 82nd Annual Meeting of the American Educational Research Association to be held in Seattle, Washington (USA). It is expected to comprise more than 1 300 sessions, with 4 500 presentations on a broad spectrum of topics related to educational research. For information about professional development and training sessions, contact Taya Dunn, e-mail: tdunn@aera.net. For questions about exhibits, contact Nancy Kabel, e-mail: nkabel@aera.net, <http://www.aera.net/meeting/am2001/>

September

3-6 - The "6th European Conference for the Advancement of Assistive Technology" will take place in Ljubljana, Slovenia. The main topics for the scientific conference and exhibition are rehabilitation and assistive technology for different age groups and disabilities. The event is organised by the Association for the Advancement of Assistive Technology in Europe. Contact: Gorazd Cad, Cankarjev Dom Cultural and Congress Centre, Pre ernova 10, SI-1000 Ljubljana, Slovenia, tel.: 386 61 17 67 134, fax: 386 61 217 431, e-mail: gorazd.cad@cd-cc.si, <http://aaate2001.ir-rs.si/>

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