A new educational infrastructure agency for Belgium’s Flemish community
Clicks, bricks and spondulicks – FEATURE
An industrial building converted into a girls school in Australia
Korea’s school grounds projects
Sierra University in Mexico
An environmentally sustainable development in Australia
An ultra energy-efficient school in Quebec
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.

Seventeen OECD Member countries and 13 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 2006. A steering committee of representatives from each participating country establishes the annual programme of work and budget.

PEB Members

Australia  Netherlands
Austria  New Zealand
France  Portugal
Greece  Slovak Republic
Hungary  Spain
Iceland  Switzerland
Ireland  Turkey
Korea  United Kingdom
Mexico

PEB Associate Members

Albania Education Development Project
CISEM (Research Institute of the Province of Milan and Italian Provinces Union)
Communauté française de Belgique
Dienst voor Infrastructuurwerken van het Gesubsidieerd Onderwijs (DIGO – Belgium)
Het Gemeenschapsonderwijs (Belgium)
Ministerium der Deutschsprachigen Gemeinschaft (Belgium)
Province of Quebec (Canada)
Provincia di Rovigo (Italy)
Regione Emilia-Romagna (Italy)
Regione Toscana (Italy)
Republic of Slovenia
Service général de garantie des infrastructures scolaires subventionnées (Belgium)
Tokyo Institute of Technology (Japan)

PEB and OECD activities

Upcoming PEB activities

Over the next 18 months, the OECD Programme on Educational Building (PEB) will organise several activities in four areas of work as described below. Anyone interested in participating is invited to contact the Secretariat (see page 28).

Delivering education and training in the knowledge society

This area of work seeks to analyse and understand the impact of facilities on education systems and on the delivery of educational activities at all levels, so that these facilities continue to be of good quality, flexible and appropriate to the needs of the users. Two relevant events are currently planned.

The United Kingdom has expressed interest in hosting an international PEB seminar in spring 2004 on the theme “Creating 21st Century Learning Environments – Transforming Our Secondary Schools”.

In spring 2005 PEB will hold an international conference on designing buildings for early childhood education, in collaboration with the OECD’s Education and Training Policy Division. The conference is planned to take place in Italy’s Emilia-Romagna Region. An exhibition of photographs showing early childhood education and care centres in OECD countries will be held at the same time.

Monitoring and evaluation of facilities policy

The second work area has a two-fold objective:

• to study and understand the changing approaches to financing educational facilities and the policies of performance monitoring and evaluation implemented by governments;

• to analyse how these new approaches are generated by the decentralisation of responsibility to local government, by the increasing involvement of the private sector and by the possibilities for radical changes in delivery offered by new technologies.
Building on past and current OECD work on education statistics and indicators, the Secretariat will collect data and pursue analytical work specifically on school facilities. See article page 4.

Promoting and disseminating good practice in planning and management

PEB will conduct a comparative analysis of facility planning and management and prepare practical recommendations in this field. The growing professionalism in the planning and management of educational facilities observed in recent years has shown the increasing complexity of this task and the utility of international benchmarking that broadens the scope for co-operation and sharing of experience.

An international conference on the role of new technology in space management for tertiary education will be organised in October 2004 in Quebec and Montreal. The meeting will be hosted by the Association des gestionnaires de parcs immobiliers en milieu institutionnel (Quebec Association of Institutional Building Managers), the Quebec Department of Education and PEB.

Safety and security in educational facilities

This area of work aims to explore broad approaches, including methods of best practice, used to ensure that schools are safe and secure places of learning. As this is the first work that the OECD has conducted in the area of school safety and security, the overall objective is to investigate not only how the schools’ physical infrastructure can impact on school safety and security, but also the influence of other factors.

The PEB Secretariat will organise an international seminar in November 2003 at the OECD headquarters to examine how schools are addressing issues surrounding safety and security. See article below.

PEB and GeoHazards International will hold an experts’ meeting on school seismic safety, as a follow-up to an earlier seminar on “Disaster Management and Educational Facilities” held in Thessaloniki, Greece. The proposed timing of the workshop is early 2004. See article below.

SAFETY AND SECURITY SEMINAR 2003

A safe and secure environment is a prerequisite for effective teaching and learning. Threats to the safety and security of people and property can arise from natural hazards, for example earthquake, floods and storms, or from human actions, such as vandalism, arson and violent crime. While catastrophic events and human tragedies cannot be eliminated entirely, there is a role for facility designers, institutional managers, emergency response teams and post-crisis intervention in mitigating their negative impact.

Following a 2002 experts’ meeting in Washington on schools’ response to terrorist acts, jointly organised by the OECD and U.S. authorities, PEB is organising an international seminar on “School Safety and Security” from 12 to 14 November 2003 in La Défense, Paris. Discussion on school safety and security will focus on five main areas:

• safety and security risk assessment in schools;
• crisis planning and management;
• infrastructural approaches to school safety;
• collaborative approaches to school safety;
• education, training and support approaches to school safety.

Participation is open to those in OECD countries who have a professional responsibility for school safety and security, and may include elected representatives, officials of national, regional or local administrations, policy-makers, head teachers, facility managers, planners, architects and researchers.

To register online or for further information, go to www.oecd.org/edu/schoolsafety or contact hannah.vonahlefeld@oecd.org

SCHOOL SEISMIC SAFETY EXPERTS’ MEETING 2004

The recent earthquakes in Bingol, Turkey, which caused the collapse of a four-storey school building, and in Algeria, have once again brought the issue of seismic safety to the attention of the world. In 2001, PEB organised an international seminar on “Disaster Management and Educational Facilities” which explored how schools, architects and governments address issues of risk assessment, disaster preparedness and restoration of buildings in earthquake-prone areas.

As a follow-up to this work, PEB and GeoHazards International (GHI) are planning an experts’ meeting on...
A shake table demonstration shows the benefits of building a school using earthquake-resistant methods. Craftsmen working with GHI’s Nepal partners National Society of Earthquake Technology built two models of a local school; one (on the right) was built like the school before it was made earthquake-resistant, and one (on the left) like the strengthened structure. The models were placed on a table top that moved horizontally, simulating the effects of an earthquake; the villagers saw that the strengthened model withstood the shock.

STATISTICS AND INDICATORS ON SCHOOLS FACILITIES

Over the last 20 years, the OECD has played a leading role in the development and collection of internationally comparable education statistics. Today, education statistics resources such as the OECD Programme for International Student Assessment (PISA) database (see www.pisa.oecd.org) and the OECD Education Database (see www.oecd.org/edu/eag2003) provide researchers, policy-makers and governments with a wealth of national, school and student-level data with which to monitor their education systems.

Some statistics and indicators relating to school facilities have been collected and developed from these statistical sources. National-level data on school facilities-related areas has been collected – on class sizes and capital expenditure – through the annual UNESCO-OECD-EUROSTAT data collection, which are published annually in Education at a Glance and available on the OECD Education Database. In the PISA 2000 school questionnaire, school principals in 43 countries were asked about the extent to which they perceived that learning was hindered by inadequacies of certain physical and educational resources, such as the condition of buildings, heating, cooling and/or lighting systems, instructional space, instructional materials in the library, multi-media resource for instruction and facilities for the fine arts (see also PEB Exchange, no. 48, 2003). A PISA index of the quality of the school’s physical infrastructure was created from several of these questionnaire items (see Figure 1). The World Education Indicators Survey of Primary Schools, which will be conducted in a number of non-OECD countries in late 2004, will also contain several items on the availability and condition of school facilities.

While there is scope for PEB to build on current OECD work on education statistics and indicators relating to schools facilities, the development of a conceptual framework is required to ensure that future indicator development on school facilities is policy relevant and feasible to implement (in terms of financial and human resource costs). The PEB Steering Committee has agreed to develop such a strategy. Initial work conducted by this group will focus on outlining a conceptual basis for the selection of indicators about school facilities; identifying and categorising potential indicators within this framework; and identifying research objectives and data collection methods, which may include surveys and country site visits.

For further information, go to www.oecd.org/edu/schoolsafety or contact hannah.vonahlefeld@oecd.org
1. The PISA index of the quality of the schools’ physical infrastructure was derived from principals’ reports on the extent to which learning by 15-year-olds in their school was hindered by the poor condition of buildings; poor heating and cooling and/or lighting systems; and a lack of instructional space (e.g. in classrooms). A four-point scale with the response categories “not at all”, “very little”, “to some extent” and “a lot” was used. This index was inverted so that low values indicate a low quality of physical infrastructure compared with the OECD average.

2. The indices were standardised so that the mean of the index value for the OECD student population was zero and the standard deviation was one.

3. Response rate is too low to ensure comparability.

Source: OECD/PISA database, 2000. For further information, see www.pisa.oecd.org

ARCHITECTURE AND EDUCATION IN FRANCE

After 16 years of decentralisation in France, a symposium has been held bringing together a variety of stakeholders in the field of architecture and education at the lower and upper secondary levels in order to address the following question: “What must be done to ensure that the curriculum, which is designed at the central level and taught by centrally managed staff, is transmitted successfully in school buildings that belong to local and regional authorities?” In 1986, the central government transferred responsibility for the construction of lower secondary schools (collèges) to the départements and of upper secondary schools (lycées) to the regions. The “Architecture and Education” symposium was organised in Paris in January 2002 by the French Architectural Institute (Institut français d’architecture) in partnership with the Ministry of National Education. According to Jean-Richard Cytermann, Director of Planning and Development at the Education Ministry, this event “highlighted the positive effects of close co-operation between the local and regional authorities responsible for school construction and the Education Ministry’s decentralised services, in consultation with the teaching staff using these facilities”.

The proceedings of the symposium presented the following conclusions:

“Throughout the discussions, there was general agreement that the needs of society can only be met by finding solutions that respond to specific local situations. All projects
should be planned in the light of a specific regional or local network and the requirements of a municipality, the nature of a site or neighbourhood and the needs of a specific population, teaching staff and curriculum.

These complex and sometimes contradictory needs and requirements can only be taken into account if the authorities responsible for school construction apply a rigorous methodology in which individual projects and overall programmes are based on a preliminary stage of information gathering and research.

This will ensure that building programmes are not developed merely in quantitative terms and that they address the full range of needs, including those of users, if necessary through trade-offs that can only be made if there is a project head and if the authorities responsible for school construction are actively involved. The flexibility of the process can only be ensured if the various phases are well organised and consistent. This will give those responsible for school construction the means to ask architects to find solutions that are neither conventional nor formulaic, but genuinely relevant to needs.

As for the central government’s role, would not the best way to redefine its missions be to have it support this process, especially in all phases contributing to the development of programmes? This being the case, the following tentative conclusion can be suggested: while the key change resides in the fact that the practical, day-to-day needs of users have now been made an integral aspect of project design, there is also every reason to believe that programmes will now constitute the main area for co-operation between the central government and local and regional authorities.”

A wide range of documentation is available on the theme of the symposium. A 136-page report has been published providing all the presentations made at the meeting. It includes a CD-Rom containing photographs, plans and descriptions of 21 French lower and upper secondary schools; this selection of exemplary buildings is also available on the Internet site www.architecture-pedagogie.cndp.fr.
School design for the 21st century is attracting much attention in Scotland. The United Kingdom’s northern nation, which regained its own parliament in 1999, is embarking on its largest ever programme of new investment in the building and refurbishment of schools. By 2006, 200 new schools will have been newly built or refurbished, rising to 300 by 2009. The majority are supported by funding through public-private partnerships. Architects, local authorities and schools are being encouraged to set their sights high and to collaborate with pupils, staff and the community in creating “centres of excellence”.

Building Our Future: Scotland’s School Estate, published by the Scottish Executive in February 2003, says that schools should not only offer a better environment for children – in supporting learning and encouraging pupils’ personal and social development – but also deliver better services to the whole community.

The building programme is taking place against the backdrop of a recently concluded national education debate initiated by the Scottish Executive to consider what the education system of the future might look like. It asked questions regarding what and when children learn, how learning and teaching is delivered and who can help in the process.

In its response the Scottish Executive noted: “People do want to see change. Above all they want a school system in Scotland that is well resourced and flexible enough to meet the needs of the individual child in a system that adapts to the child, not the child to the system. This will require radical new thinking about the way we design, build and manage our schools” (Scottish Executive (2003), Educating for Excellence: Choice and Opportunity – The Executive’s Response to the National Debate).

Scotland’s new school estate

Objectives for the 21st century school are to deliver better services through the school environment that focus on:

- the child at the centre – meeting the needs of individual children in Scotland;
- the school at the heart of the community – meeting the needs of the community.

Scottish Executive (2003), Building Our Future: Scotland’s School Estate

A wide-ranging programme, including two recent conferences organised by Scotland’s national children’s agency, Children in Scotland, is supporting the improvement of school estate. At their conference entitled “Out of the Box: Designing Spaces for Children and Young People”, Bruce Jilk, a designer of learning environments in the United States and elsewhere, spoke about his “design down” process. The process focuses directly on...
the child as learner and also explores the dynamics of community, family and work. He urged Scotland to learn from international examples. Kapolei High School in Hawaii is organised around the village green with shops for which students are responsible; students learn their skills in an authentic way because there are real-life customers. Ingunnarskoli, a school for grades one to ten in Iceland, was designed to fit in with the school’s learning process, including integrated subjects and individual, small group and large group learning (see PEB Exchange, no. 47).

The conference also heard from children and young people themselves. Design of the MacRobert Arts Centre in Stirling, Scotland, involved a group of young consultants who still make use of the centre four years on. Andrew Martin, a wheelchair user and young consultant told the conference: “Because my ideas were listened to, I now feel more a part of MacRobert. I used to have to go round the back to get into the building because the doors were too heavy, now we have automatic doors at the front. The overall design makes it feels as though everything is at my level. I can go in with my friends and we can sit together. Being listened to is a step forward towards 21st century design.”

A second conference, “On the Move: Developing Services for Young Children in Rural Scotland” held in Nairn, in the north of Scotland, examined the factors that need to be considered when designing rural services. It offered delegates the opportunity to visit some of the newly designed community schools being built in Scotland. Architect Karen Buvik shared the Norwegian experience of enhancing the viability of schools by putting them at the heart of rural communities. Many of Scotland’s rural communities face a dramatic decline in population (in 2001/2, 14 out of 15 rural local authorities had negative natural rates of population change), and the conference concluded that offering access to services at a more local level is likely to be essential in stemming the loss of families with young children.

For further information, contact:

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Relevant Children in Scotland publications: Designing Schools for the Future – A Practical Guide and Out of the Box Conference Report. To order copies, e-mail info@childreninscotland.org.uk

Christopher Ho (age 13) presents his vision of a perfect school for the Children in Scotland art competition, held to coincide with the school building programme in Scotland.

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A NEW EDUCATIONAL INFRASTRUCTURE AGENCY FOR BELGIUM’S FLEMISH COMMUNITY

The government of Belgium’s Flemish community is reorganising its administration and grouping into a new agency its two institutions responsible for financing educational facilities.

Reorganisation for improved public policy

In early 2000, the Flemish government took a number of important decisions concerning the reorganisation of its administration and the quality of services for the population, within the framework of its Improved Public Policy project. Comparative international research carried out by the OECD in 1998 ranked the Flemish administration as “sub-top” in terms of modernisation and performance; the aim of the Improved Public Policy project is to raise the government’s performance and public service to the “top” level.

This project required critical reflection on the future role and position of the Flemish government in society, resulting in the following basic principles for reorganisation:

- Central control in public policy should be replaced by a more decentralised government, with an emphasis on “directing” rather than on “central control”.

The conference also heard from children and young people themselves. Design of the MacRobert Arts Centre in Stirling, Scotland, involved a group of young consultants who still make use of the centre four years on. Andrew Martin, a wheelchair user and young consultant told the conference: “Because my ideas were listened to, I now feel more a part of MacRobert. I used to have to go round the back to get into the building because the doors were too heavy, now we have automatic doors at the front. The overall design makes it feels as though everything is at my level. I can go in with my friends and we can sit together. Being listened to is a step forward towards 21st century design.”

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Christopher Ho (age 13) presents his vision of a perfect school for the Children in Scotland art competition, held to coincide with the school building programme in Scotland.
• More attention should be given to quality standards in government. On the one hand, there is a need for more simplicity in legislation, more effectiveness and more efficiency. On the other hand, there is a need for more equality before the law, more legitimacy and more legal protection.

• Governmental institutions should become more “client-minded”, giving people easier access to the public services they require. A more efficient system of communication between the administration and its public is also needed (e.g. e-government).

• Government policy should be provided by those who are politically responsible for it and not by administrations or interest groups, whereas administrations should be made responsible for implementing policy.

Changes have been made accordingly. The Flemish administration has been divided into 13 different areas of policy. For each of these, one minister is responsible. Within each policy area, a central department and one or more agencies have been established: the departments are responsible for preparing and evaluating policy (replacing to a large extent the former ministerial cabinets), whereas the agencies are responsible for carrying out policy. From now on, many agencies will come under the direct authority of their respective minister, meaning in a certain loss of autonomy for many Flemish governmental institutions: the boards of directors of these institutions, which used to have decision-making powers, will be replaced by committees with only advisory powers.

For each policy area, the Flemish government has decided which tasks it will be responsible for and how the tasks should be carried out. Determining the tasks is important since government in general – and the different agencies in particular – will be made accountable for carrying out those they commit to.

**AGION, a new infrastructure agency**

Within the policy area of education, the Flemish government has decided to group under a single umbrella agency the two governmental institutions that have been responsible for financing and subsidising educational facilities in Flanders. To present, one institution – the Subsidized Education Infrastructure Works Department (DIGO, Dienst voor Infrastructuurwerken van het Gesubsidieerd Onderwijs) – subsidises municipal, provincial and private schools, while a second institution – the Flemish Community Education Department (Het Gemeenschapsonderwijs) – finances the construction of public schools. The new Agency for Educational Facilities (AGION, Agentschap Infrastructuur Onderwijs) will operate for both public and private schools, as well as for municipal and provincial schools, under the supervision of the Flemish minister of education. Like the two existing institutions, AGION will function as a statutory body that is able to act in its own name, and it will be made accountable for fulfilling its responsibilities. Pending approval by the Flemish Parliament, the agency will be established in early 2004.
Interest groups in the area of school building will lose a certain amount of autonomy and power as a result of the Flemish administration’s reorganisation. One example is that of DIGO, where the different interest groups in the field of Flemish education are strongly represented on the board of directors. Nevertheless, these interest groups will have the possibility of taking part in an advisory committee for educational facilities which will support and evaluate the functioning of the AGION agency; the committee’s mission will be supportive and its advice will not be binding.

Within AGION, there will be a section for the financing of school building projects and a section for the promotion of public-private partnerships and public-public partnerships (the latter being established between two or more different policy areas).

AGION’s mission

The future infrastructure agency’s mission was formulated by the Flemish government in terms of the following objectives:

- to construct attractive educational facilities, giving special attention to the well-being of both students and teachers, as well as to the prevention of vandalism and anti-social behaviour;
- to reduce existing inequalities in the quality of school buildings so that every student and teacher, without distinction, can learn and work in a quality environment;
- to increase efficiency and effectiveness in the financing, subsidising and use of school buildings through public-private partnerships, public-public partnerships and community use of educational facilities.

AGION’s mission has resulted in five strategic goals and tasks:

- making principals and school boards more aware of the advantages of sound planning techniques for infrastructure, safety, rational energy use, community use of school buildings, etc.;
- improving communication between government and both school principals and school boards;
- advising schools and policy-makers: lending advice for school building projects, analysing developments and trends in school building practice on an international scale, collecting and analysing statistical data, providing administrative and legal support to school boards, and promoting partnerships (public-public, public-private);
- processing and approving requests to finance or subsidise school building projects;
- controlling and evaluating school building projects in regard to the current legislation on financing educational facilities.

More information about the Improved Public Policy project is available on the Flemish government Web site: www.vlaanderen.be/bbb

This article was provided by DIGO, an associate member of the OECD Programme on Educational Building:

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PUBLIC-PRIVATE PARTNERSHIP IN QUEENSLAND, AUSTRALIA

The Queensland Government has given approval to seek expressions of interest for a public-private partnership (PPP) to develop a high-tech education and training precinct in South Brisbane.

In line with government strategies to ensure a smooth transition between secondary schools, vocational education and higher learning, the Southbank Education and Training Precinct will create Queensland’s first multi-sectoral campus. Brisbane State High School and the Southbank Institute of TAFE will share more than four hectares adjacent to the South Bank Parklands, site of the World Expo 88. Redevelopment of the site into a high-tech “hub of learning” will break down traditional barriers that have inhibited students’ progression from secondary to tertiary learning, and will strengthen links with other centres of learning in areas such as information technology, tourism and hospitality, eBusiness, business, art, music, recreation and community services.

The Southbank Education and Training Precinct is the first public-private partnership initiative to be investigated by the Queensland Government. The government is interested in using PPPs to secure the best value for money in delivering infrastructure facilities for public use. The PPP will deliver state-of-the-art infrastructure, with the
core education and training services being provided by Brisbane State High School and Southbank Institute.

The precinct will jointly involve the government and the private sector in a partnership for the planning, design, construction, financing, operation and maintenance of the project. A preliminary assessment was undertaken to examine the likely cost to government of providing facilities to deliver education and training services together with opportunities for joint delivery with the private sector. The government approved the development of a business case to investigate a PPP proposal. Outcomes from the preliminary assessment and the business case were reviewed and cost-effective solutions were investigated for the construction and operation of education and training facilities and commercial initiatives. The government has now accepted the business case and endorsed that the project seek expressions of interest from private sector consortia for the delivery of the facility and associated services.

If private sector submissions demonstrate that a PPP can deliver a better value-for-money outcome, a long-term agreement will be made between the government and the successful private sector consortium for the delivery of the Southbank Education and Training Precinct.

For further information, visit http://www.southbank.tafe.net/site/AboutSouthbank/EducationPrecinct/index.asp
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WORLD EDUCATION MARKET 2003

The city of Lisbon hosted this year’s World Education Market (WEM) meeting from 20 to 23 May. WEM is a major international meeting for both private and public sector representatives in the field of education. It is organised in two major parts: a series of parallel conferences on the one hand and a huge exhibition or “market place” dedicated to educational materials and methods on the other hand. On both stages new technologies were in the spotlight.

In her opening keynote speech, Viviane Reding, European Commissioner for Education and Culture, reaffirmed the European Commission’s commitment to making Europe’s education and training systems a world quality reference by 2010. She highlighted programmes such as Erasmus Mundus, as well as the importance of private sector involvement and the respect of cultural diversity in cross-border initiatives.

Keynote speaker Carl Dahlman, a knowledge economy expert from the World Bank Institute, delivered a speech on new challenges for tertiary education, examining the rapid transformations that are taking place in developing and transition countries and the increasing importance of knowledge as well as of information and communications technology. Gwang-Jo Kim, a senior education specialist from the World Bank, presented an overview of the situation in Korea and detailed that country’s effort to provide lifelong learning for all.

WEM 2003 attracted 761 organisations from 68 countries and a total of 1 519 participants, including leading education decision-makers and professionals. On the exhibition floor, 330 exhibiting companies and organisations showcased resources, systems, platforms, solutions and expertise from around the world. An E-Village provided a window on the future of technology-enhanced learning, featuring innovative products and projects. Local and regional authorities, as well as PEB, were represented in the first Learning City and Region Forum, with participants from France, Germany, India, Italy, Spain, Sweden and the United Kingdom.

The conference presentations are available on the Internet at www.wemex.com under Conferences/Conference Proceedings.
Feature

Clicks, Bricks and Spondulicks

“Clicks, Bricks and Spondulicks” is the title of a seminar organised by PEB to examine the relationship between the built learning environment and information and communications technology (ICT), as well as cost implications. The meeting sought to determine whether educational buildings and ICT should continue to be seen as separate entities competing for the same funds, or whether they should be treated as one holistic component of educational infrastructure. The international seminar, held in Brisbane, Australia, in March 2003, concentrated primarily on vocational training and higher educational buildings. A full report with references will be available soon at www.oecd.org/edu/facilities

The seminar presented benefits of integrated capital planning strategies, taking into account life cycle expectancies and ICT advances such as online delivery; modes of knowledge production and flexible delivery; government policies and implications for planners; and implications for policy-makers.

Integrating ICT with building planning

Possibly one of the most critical issues faced in integrating ICT planning with building planning is the difference in their life cycle expectancies: for educational buildings it is ten to 15 years for their interiors (in the commercial sector more like seven to ten years) whereas in ICT it is closer to three to four years. The balance between the two is not only played out in funding strategies but also in social contexts. How to sustain communities of learners in both face-to-face contexts and virtual contexts is a key factor.

A seminar presentation which focused on the Australian Science and Mathematics School, sited on the campus of Flinders University in South Australia, outlined the ways in which many issues are tackled in an integrated way. The school facilitates the teaching and learning of mathematics and science in a research environment where teachers engage in staff development, where research is carried out into new technology-enhanced pedagogies and where Flinders University science faculty staff foster in students a willingness to pursue learning and careers in science and mathematics. Students spend time equally in the school, the university facilities including laboratories and cafeterias and in the community studying action research projects. Staff in the school are challenged to teach in an innovative student-centred environment in a building with no traditional classrooms or laboratories. Staff development is seen as a critical part of the success of the school, and the staff are trained in how to use the building itself as a “learning tool”, in much the same way as they are already trained in the use of information and communications technology.

Other seminar examples presented include the Singapore Republic Polytechnic, which is to be a completely wireless campus based on the principle of problem-based learning, and the RMIT University Mode 2 knowledge study. These illustrated how pedagogy, ICT, the educational building and partnerships with the community are part of a seamless whole.

Online delivery has seen significant investment the world over and the likely impact of e-learning on the built learning environment is yet to be fully understood. Key elements of an extensive online delivery programme in New South Wales presented at the seminar included cross-organisational collaboration in the development of learningware, with all materials shared across systems, accessing courses not otherwise available at the local campus, together with building Web design skills capacity for the long term across the organisation. The online “rollout” also improved flexibility and student access to vocational education study programmes and helped to create enhanced and enriched learning experiences using blended learning and all-online delivery formulas. The project objectives expected that a return on investment would be achieved from a reduction in capital infrastructure overheads and the incorporation of learningware in commercial, local and international training partnerships and licensing arrangements. Significant growth in interstate and international student programmes is expected, as “the Internet knows no boundaries”.

Modes of knowledge and flexible delivery

Two different modes of knowledge defined in ongoing research of how new knowledge is produced are reflected in campus planning. Mode 1 knowledge is based on traditionally accepted notions of academia which are essentially discipline-based, whereas Mode 2 knowledge “operates within a context of application. Here problems are not confined within a disciplinary framework. Knowledge production is trans-disciplinary rather than mono/multi-disciplinary and is carried out in non-hierarchical, heterogeneously organised forms that are essentially transient. It involves the close interac-
tion of many actors throughout the process of knowledge production and as a result becomes more socially accountable and thus becomes diffused throughout society.\(^1\)

Within traditional campuses, educational institutions are largely constituted in Mode 1 format, with classrooms, laboratories and seminar rooms predominantly related to faculty disciplines. Mode 2 facilities are more responsive to collaboration, transience and informal learning but they also make greater use of technology rich environments such as seen in the flexible learning centres emerging in Australian higher education campuses.

The Queensland University of Technology (QUT) is in the process of embracing such a Mode 2 approach with its Kelvin Grove Urban Village. This development will “create a community which links home, work and learning environments to foster a vibrant, diverse and sustainable way of life.” Within that complex (currently under construction) sits the Creative Industries Precinct: “A purpose built, hi-tech site, the Precinct will be a centre of creative experimentation and commercial development, made possible by 24/7 all year around access, with wired and networked facilities, flexible working environments and exciting public spaces resulting in a vibrant community of like-minded individuals.”\(^2\)

Also at QUT, due to a need to increase floor space, it was decided to integrate both the building and ICT programmes in the capital planning process to achieve a coherent asset management planning strategy, to foster greater integration of the two in practice, and to understand the dynamics between the virtual and the physical investment.

Conversely, Griffith University has opted for a middle path inclusive of new technologies, new pedagogies and new designs for learning environments. The university is strongly committed to the concept of flexible learning, a concept which requires new approaches to pedagogy, technology enhancement and flexible learning spaces. Flexible delivery “is an educational approach using a variety of student-centred teaching and learning methods, resources and flexible administrative practices that respond to the needs of a diverse student population.”\(^3\) For Griffith University recent surveys have indicated that flexible learning has given 25% of students the ability to study at their own pace, a further 20% study from a variety of resources or home without going to campus, and students are readily able to gain Web access to resources. 13% of students believe that they are no longer disadvantaged if they do not attend class and 7% of staff believe that they have a lighter workload. This commitment to flexible learning is evident in the significantly differing balance between ICT and buildings compared with the implied national average in Australia as demonstrated in funding applications specifically for innovative projects (note that university applications may have concentrated on built projects rather than software development projects which could skew the data). The percentages in the table below show the relative breakdown of funding for buildings, computing equipments and course development.

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Government policies and implications for planners

There are emerging examples worldwide of PEB member countries focusing government policy more closely on ICT. In the Netherlands, for example, the Dutch education system launched a high speed electronic network system across the country between 1996 and 2002, where all educational institutions and student homes were linked by broadband networks. The project, called Kennisnet, attempted to tackle the issue of shared language across the system and provided funds for teacher development. It has not been without its problems however as, although “a success in terms of its business case, the opportunity to embrace teaching methods and to maximise the offerings of the network has yet to take place, as people didn’t want to confront the education system.”

In Japan this reluctance to change and capitalise on ICT has been managed through recent legislation. In 2000, the government introduced the Fundamental Law on the Formation of an Advanced Information Network Society (IT Fundamental Law). This was followed in 2003 by the establishment of the e-Japan Strategy, the e-Japan Priority Plan and the e-Japan 2002 Programme, all of which were designed to actively promote IT in the community. In the higher education sector the government has introduced increased numbers of IT courses for professionals, and the use of lectures over the Internet has been recognised as a legitimate form of lecture. Nevertheless, some problems are still recognised: “Some have pointed out (the increased potential for the) isolation of individuals, weakening of human relations, lack of natural and social experiences, the proliferation of harmful information and moral hazards and regulation problems on networks as negative effects of the IT revolution.” It was suggested that one direct way out of this problem is greater interdisciplinary planning across government agencies and with industry.

Planners also have to deal with the myriad realities of what forms of ICT should be adopted in the short and long terms, the cost benefits of which path is chosen and the whole of life costs of the options. At the University of Quebec in Montreal this issue was faced recently in the decision needed to upgrade telephony and computer data systems. The 100 km of fibre optic network needed upgrading to support teaching, research and administratively capable; concurrently the telephone system of 5,000 lines was close to retirement and not able to be supported by manufacturers for much longer. One option for their replacement was VoIP, or voice over Internet protocol. This seamless system provides flexibility for collaborative teaching and research through its integrated communications, with voice being given a priority over the system. Such an integrated system was considered by the university to offer greater productivity, to save money by purchasing the combined system rather than upgrading two separate systems, to improve reliability and to protect future network investments.

Implications for policy-makers

There is a range of issues that stand out for immediate consideration by policy-makers. The key ones would appear to be the following:

Integrating capital planning processes for both ICT and building infrastructure – Intelligent buildings, building management systems, passive and active environmentally sustainable systems and ICT are all merging within the building fabric as one technology. Building planning, design and management and ICT should be planned seamlessly. National funding authorities might consider extending the requirement for capital management plans for campus developments and maintenance to include ICT procurement and renewal.

Finding the correct balance in funding ratios between ICT and buildings – There appears to be little data or performance measures available comparing, contrasting and tracking the balance of investment between ICT and educational buildings. Real difficulties are faced in collating data for educational buildings that is reliable,

<table>
<thead>
<tr>
<th>Australian Government Special Capital Development Pool</th>
<th>Griffith University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings</td>
<td>64%</td>
</tr>
<tr>
<td>Computing hardware and networks</td>
<td>25%</td>
</tr>
<tr>
<td>Software and content development</td>
<td>11%</td>
</tr>
</tbody>
</table>


consistent and current across intra-national and international boundaries. Countries should consider the need for performance measures for educational buildings, particularly in light of accrual accounting and increasing maintenance liabilities. This data can be collated together with ICT investments with the integration of the two providing a much clearer and comprehensive picture of the investment in capital expenditure in post-secondary education.

**Developing Mode 2 learning and research environments** – Mode 2 learning environments are critical to maximising the extent of student-centred learning and lifelong learning through ICT as an enabler. Many existing campuses are approximately 90:10 in terms of Mode 1:Mode 2; whilst the correct balance is unknown it is likely that many programmes will always be taught in Mode 1 contexts. However, capital management plans should explore the balance between the two, and link this balance to the pedagogical practices especially related to flexible delivery, professional development programmes, academic business plans and infrastructure quality performance reviews of each institution.

**Balancing distributed and central learning spaces** – Large numbers of new campuses are being opened, often accompanied by the closure of others, reflecting both demographic change and the cost of operating less than optimal sites. Learning centres or portals do not necessarily need to be associated with traditional core campuses. Indeed, to optimise the impact of lifelong learning and the re-entry of disaffected students, non-core campus learning centres might well become a norm. Distributed learning models supported by ICT and tutors should be considered as part of a capital management plan and as a valid means of serving dispersed and diverse community needs.

**Implementing new performance measures for educational buildings** – Managers of physical assets and planners at regional, national and global levels have continued to struggle with performance measures for educational buildings. Rather than pursue the continual challenge of trying to get countries to account for their building assets in a consistent and structured form, usually complicated by national accounting requirements, it might be time to explore other performance measures. The qualitative level of measuring learning outcomes per square metre, rather than simply the number of student hours per square metre, could become a new performance indicator of educational buildings and the associated ICT, as recommended by Susan Stuebing (2003).

**Increasing professional development of staff** – Professional development programmes have traditionally been associated with pedagogy, curriculum, finance, management and ICT training. It might well be time to examine the implication of space and place in teaching, learning and research, to provide a deeper understanding of how they interact. The classroom, seminar room and lecture theatre all continue to feature prominently in education...
and training, despite the impressive impact of ICT on learning and teaching and the rather few examples of flexible learning illustrated at the seminar in Brisbane.

*Extending government funding policies to foster innovation* – Funding programmes need to be extended to restructuring existing buildings and campuses to include innovative teaching, learning and research methods. Innovative funding programmes normally favour new buildings; thus a refocus towards funding innovations within existing physical fabric and how it can be reconfigured to meet the challenges of new and emerging ICT would be timely.

*Planning for future uncertainty* – The methods adopted in traditional and rigorous strategic planning are being overtaken by rapid developments in ICT, emerging models of flexible learning, globalisation and the difference between the lead times and life cycles of both ICT and the built environment. What is now required is a more flexible approach to planning and budgeting. In this scenario much more collaboration is required, across disciplines, and in a continuing conversation which is reflexive. Further, planners in association with the operational staff must interact constantly during this process.

**Outcomes**

Current practise suggests that return on investment is a key assessment criteria based on the building life cycle and residual value. This philosophy is in contrast with the reinvention of education over the past decade which challenges us to be concerned with “return on learning” rather than “return on investment”. Therefore, new assessment definitions and methods need to be developed to better recognise the educational “eco-system” in which our decision-making thrives. As Stuebing notes, an educational institution which is in tune with current market-based knowledge production articulates its operation in a business case, which optimises costs, as the mix of context (the combined digital and physical environment) and assistance, and value added (learning effect).

In the national arena, policy development might focus on funding strategies for innovative projects (particularly refurbishment) and could also support increased research studies such as Australia’s Clicks on Bricks study. National ministries of education might also examine ways to develop new performance measures for both educational buildings and ICT infrastructure, particularly related to learning, teaching and research outcomes.

On the international stage there is clearly a need for more benchmark studies on educational buildings and ICT.

Perhaps the most powerful message coming from this seminar is that the two critical elements in learning infrastructure – educational buildings and ICT – should be seen as one entity, for they are both learning technologies albeit with differing life expectancies and life cycles. They should not be seen as competing for funds but as collaborating in ways which will see limited resources used in balance and to the best effect in terms of student learning outcomes.

*Report by Kenn Fisher*

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PROJECTS

AN INDUSTRIAL BUILDING CONVERTED INTO A GIRLS SCHOOL IN AUSTRALIA

An industrial building in Perth, Western Australia, has been converted into a secondary school to suit the particular needs of girls with educational and social difficulties. The aim of the building project was to provide a small school for approximately 30 students that caters to the needs of adolescent girls who are unable to operate within the mainstream or independent school systems.

The girls, aged 12 to 17, are referred to the school for a variety of problems including chronic truancy; inability to function in a large classroom (because of poor literacy or social skills, lack of concentration, low achievement levels or disruptive behaviour); and drug-related and psychiatric problems. The students are in years eight to 12; however classes are grouped according to social development rather than age group. The classrooms accommodate small class sizes, typically six to eight students per teacher with a high degree of supervision and support for the students.

St. Clare’s School was registered in 1957 and had operated over the years in many temporary locations around the city under the management of the Catholic Education Centre of Western Australia. In 2001 two adjoining industrial workshops in a central city location were purchased in order to be converted into a permanent home for the school.

The school administration required the atmosphere of the school building to be homely and welcoming with light and bright spaces, more like a community centre than a typical classroom environment. A comfortable, safe and secure environment was essential.

Courtyards

The existing building was gloomy, with daylight entering only from high level windows in the “sawtooth” profile roof – a typical industrial shed. In addition the plan was very deep and did not allow for natural ventilation of the building once the space was subdivided into classrooms.

The architects’ response was to cut three courtyards into the building – each with its own character and purpose. These courtyards bring sunlight and fresh air deep into the building and allow all rooms to have an external outlook. (This is unusual in Australia where schools are typically a campus design with freestanding buildings linked by open air covered walkways.)

Of the three courtyards, the “active” courtyard is the largest and almost fully paved; it is used for ball sports such as basketball and volleyball.

A second courtyard, the “quiet” courtyard, is heavily landscaped and offers a peaceful setting for reading or...
meditation. It is also the nearest to the staff office to allow close supervision of students.

The third courtyard, the “recreation room”, is an internal space but is open to the elements. It has a translucent roof, a brick paved floor and large perforated steel shutters that can be opened to the landscaped garden outside the schools walls.

The recreation room, a multi-use area

The recreation room is the heart of the school and is intended for multiple uses, as an assembly area, a social café and an informal meeting place; located directly outside the core classrooms, it encourages impromptu encounters and discussions. The school principal, Sister Geraldine Mitchell has described this area as an “embracing” space that brings students together as a group.

It is here that meals are served and students interact with staff and each other. The recreation room has a café kitchen at one end and is open to the garden at the other. The space has been designed to feel more like an adult-oriented café than a typical school canteen – a task made easier by the small number of students involved. Morning tea, lunch and occasionally breakfast are provided here by the school, as well as tea and coffee at break times; breaks are short to reduce the risk of harmful interactions between students.

Furniture has been selected to be used in dining table configurations or drawn together to accommodate large groups.

As it is an “intermediate” (indoor/outdoor) space, the room has proven to be uncomfortably cold in winter, although the cool breeze is necessary in summer. Translucent blinds will be fitted to the openings to rectify this.

Nooks and crannies

The school has one central glazed corridor which adjoins the two external courtyards and passes through the internal courtyard. This allows for small alcoves along the corridor to protrude into the courtyards and the classroom areas, creating a range of north-facing sunny places for students and staff to meet – the intentional design of “nooks and crannies”.

Conversely this circulation path also allows easy supervision of the entire school from a central point. This is an important feature as students are occasionally at risk of self harm or demonstrate aggressive behaviour toward others.

Construction and costs

Almost all of the original industrial building has been retained, with the steel structure and concrete block walls painted and left exposed within the rooms. However the deliberate use of “homely”, non-institutional colours internally and externally has been effective in changing the perception of the industrial building.

The classrooms are naturally ventilated (supplemented by gas furnace heaters in winter) with high raking ceilings, ceiling fans, fixed louvres and banks of operable glass louvres allowing the evenings breezes to penetrate the building in summer so that it can cool down overnight.

New materials were selected on their recycled content with a general preference for natural materials over synthetic. Care was taken to specify low toxicity/zero emissions from paints and glues.
The school is entirely accessible to staff or students with physical disabilities.

The building has a gross area of 702 square metres and construction took seven months at a total cost of AUD 780 000, which is AUD 1 112 per square metre or AUD 26 000 per student. Construction costs per student are particularly high by Australian standards; however this is a by-product of the specialist nature of the school, i.e. offering a full curriculum to just 30 students.

The areas where costs came under the most pressure were the budgets for garden landscaping and loose furniture which are seen as interim installations to be supplemented in the future.

The building has been in use for almost one year and has proven both to be spatially efficient and to promote interconnectedness between students and between staff and students.

It is hoped that a similar school offering facilities for boys who require like support will be built in Perth in the near future.

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Once the project plan was finalized on 20 March 2003, directives were sent to the provincial offices of education. The plan provided for the provincial offices to designate pilot schools for the next two years (2004-5) and to provide incentives for participating school staff.

One hundred and one schools from a total of 417 applicants were selected following review by a committee in each region. The level of education was taken into consideration to include facilities from elementary, lower and upper secondary schools as well as schools for students with disabilities. Also considered was the type of project the schools planned to carry out, such as creating areas for learning about nature, ponds with their own ecosystems, parks for relaxation, gardens dedicated to study, and wooded and grassy areas.

The selected schools receive a two-year budget of KRW 50 million as well as technical advice. Recommendations for basic design and for purchasing and planting trees and shrubs are provided by the School Grounds Committee of Hak-Gyo-Sup Wi-won-hye (Forest of Life), a non-governmental organisation founded by a group of concerned citizens.

MOE&HRI set aside KRW 2 billion for special local education financial subsidies for the first year of the Green School Project. In addition, the ministry has applied for KRW 5 billion from the general accounting budget for 2004 in order for the project to reach more schools.

KOREA’S SCHOOL GROUNDS PROJECTS

Korea has undertaken two projects to improve its school grounds: the Green School Project and the School Forest Pilot Project. The Korean Ministry of Education and Human Resources Development (MOE&HRI) recently launched the Green School Project centred on existing urban schools with poor outdoor environments. The project encourages schools and local community members to work together to improve school settings, with the intention of cultivating students and creating a sound relationship between the educational and local communities. By developing wooded areas, ponds, grassy areas and places for growing study plants, the project aims to improve the learning environment and create environmentally-friendly schools.

Urban schools are developing green spaces similar to those at rural schools
Expectations about the effects of the Green School Project are growing. It is hoped that the project will serve to improve educational activities and the urban environment, restore a local-community culture and expand green areas. The project is expected to be a turning point for increasing educational attainment levels in addition to enriching the learning environment.

A second project for improving the outdoor school environment by developing wooded areas is currently being promoted by Forest of Life’s School Grounds Committee. The School Forest Pilot Project is co-financed by the government (Office of Forestry) and a private company (Yuhan-Kimberley, Corp.). For this project, 127 schools were chosen out of 298 applicants.

The national government plans to reward efforts to improve school grounds. The Minister of Education’s Award will be given to school staff and community groups that actively participate in the two projects. And to encourage local authorities to invest funding in school grounds, the ministry will acknowledge local authority heads with an official letter of recognition.

In an effort to exchange information and develop contacts between those responsible at the provincial offices of education and schools participating in the Green Schools Project and School Forest Pilot Project, a workshop was held at the Education Information Institute in Kyeonggi Province in June under the aegis of the School Grounds Committee.

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Sierra University was designed to promote the development of the mountain communities in the State of Sonora, Mexico. The university offers high school graduates an opportunity to pursue their studies in their home region, in order to stimulate economic development and contribute to social cohesion in the highlands area. The university is equipped with modern facilities, while its architecture is rooted in the past. The main campus, built in 2002 in the town of Moctezuma, is strategically located in the heart of Sonora, which has over 90,000 inhabitants and attractive natural resources with scope for economic growth.

The university aims to produce graduates who can not only provide competitive labour and perform to high standards in the productive economy but also play an active part in the life of the community. Its mission is to form technicians, professionals and specialists of high academic and cultural attainment who bring a humanist outlook to their various disciplines of knowledge. Sierra University offers students three diplomas at University Higher Technical level, with the option of continuing to degree level at the same university in the following areas: Administration and Management, in the field of Social and Administrative Sciences; Systems and Industrial Technology, in the field of Engineering and Technology; and Biology in the field of Natural and Exact Sciences. Courses are based on a credit system, and students can take part in exchange programmes to benefit from the learning environment available at other institutions of higher education.

Sierra University possesses a modern and up-to-date technological infrastructure that allows the central campus to exchange information with its 13 regional annexes located in towns throughout the highlands of Sonora which have high schools. These annexes deliver distance learning courses to both registered and unregistered students, as well as host academic and cultural events and extramural studies.

The design of the central campus seeks to identify the building with the region. Its architectural forms, elements and materials from the past are integrated harmoniously into present-day spaces. The building surrounds a classical central patio, a common configuration historically used for residential accommodation, public buildings, schools and monasteries. Arcades surrounding the patio form a cloistered area that exudes a sense of calm and community spirit. The process of building and equipping this new university was carried out in accordance with the standardised procedures of the state-run Sonoran Institute of Educational Infrastructure (Instituto Sonorense de Infraestructura Educativa) which was responsible for its design and construction.

As part of the university’s policy to reduce social inequalities and foster non-discrimination, there are a number of support programmes, funded by local councils and regional authorities, in the form of grants for medical expenses, food and transport.

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AN ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT IN AUSTRALIA

The future Kelvin Grove Urban Village in Queensland, Australia, is an example of how principles of environmentally sustainable design have translated into practice. Those responsible for the new project recognise the importance of building design that respects the environment by using resources efficiently and minimising pollution. The site’s master plan requires developers to comply with environmentally sustainable design principles adopted for the site’s buildings.

The 17-hectare mixed-use development of Kelvin Grove Urban Village will comprise university facilities, residential and commercial buildings, and public facilities. Queensland University of Technology (QUT) and the Queensland Department of Housing agreed to develop jointly a master plan for the site, located within two kilometres of Brisbane City. QUT, whose Kelvin Grove Campus backs onto the site, was keen to expand and particularly to develop a presence on the busy arterial Kelvin Grove Road. The state housing authority saw it as a means to develop land that could be sold to support their low income housing schemes both within and external to the site. There are more than 800 residential dwellings planned, with around 100 of these expected to be developed by a new state and local government-supported affordable housing company.

The very concept of this partnership on a brownfield site, its master planning and its development set out to pursue a broad sustainability agenda. Private and public developers, on acquiring a site, are required to provide a statement of compliance with the environmentally sustainable design policy set out in the implementation plan for all future development and to apply minimum performance criteria. Performance criteria for environmentally sustainable design were developed with the intention to translate broad community sustainability principles into specific practices to be adopted in the design and construction of the individual buildings. The minimum performance criteria will be continually revised to reflect changing practices and further contribute to the community sustainability goals.

Development bonuses may be provided in some circumstances in order to achieve environmentally favourable outcomes which would otherwise be difficult to justify economically. Subject to the local authority’s approval, a bonus of up to 10% in additional gross floor area may be accorded to developments that include sustainability measures, such as for facilitating on-site wastewater treatment or generating electricity through solar photovoltaic cells.

The table below provides a sampling of requirements from six of the nine priority areas for the project’s environmentally sustainable design strategy and minimum performance criteria; the remaining areas are transport, biodiversity and atmospheric management.

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### Environmentally sustainable design strategy

#### 1. Energy efficiency

**Hot water systems**
Ensure that hot water systems not only meet demand but also reduce reliance on supply infrastructure and minimise greenhouse gas generation.

**Lighting**
Design buildings to maximise use of natural light and minimise energy use for lighting.

**Space heating and cooling**
Design buildings to reduce the need for heating or cooling and ensure that any mechanical heating or cooling will be energy efficient.

#### 2. Water management

**Water conservation**
Reduce the demand on potable water supplies and infrastructure by reducing the peak demand and annual usage within the development.

**Stormwater management**
Reduce the demand on town stormwater systems during peak stormwater flows and on the town water supply by collecting and reusing stormwater on site.

#### 3. Indoor air quality management

**Low off-gassing paints and adhesives**
Use paints with low pollution emittance on building interiors.

**Indoor pest control**
Use mechanical means rather than chemicals to exclude pests from buildings.

#### 4. Waste management

**Construction materials**
Take into consideration the environmental effects of construction materials and products over their whole life cycle.

**Construction waste**
Reduce the amount of construction waste and conserve resources through reuse or recycling to reduce the environmental impact from material manufacturing and transport.

#### 5. Light and noise pollution

**Light spill**
Reduce light pollution from the development onto adjacent residential properties and the local environment.

**Noise pollution**
Reduce the impact of noise generated within the development.

#### 6. Monitoring and implementation

**User information**
Inform tenants of the sustainability measures included within their unit and what they can do to help minimise energy consumption and waste.

### Minimum performance criteria

#### Install all buildings with energy efficient gas or solar hot water storage systems.

#### Design buildings so that lighting consumes no more than 12 watts/m² averaged over the whole building through the use of good design and energy efficient lighting.

#### Ensure that heating and cooling systems target only critical spaces and be zoned for maximum efficiency.

#### Install AAA-rated flow restricted showerheads and taps in all developments. Use timers and soil moisture sensors on all irrigation systems. Use infrared Sensor Activated urinals. Ensure that 50% of plants introduced to landscaped areas are native to Southeast Queensland.

#### Use porous pavements where pavement is unavoidable, and where possible direct the run off to gardens, storage or retention basins.

#### Use zero-VOC (volatile organic compounds) paints on internal walls (i.e., no VOC’s added in the manufacturing process). Use only products and adhesive compounds with no or low VOC’s. Use floor finishes with no or low VOC’s.

#### Ensure that the buildings are sealed and caulked and that points of entry are protected by adequate mechanical means from insect and pest entry. Provide properly fitting door seals on all exterior and hallway doors. Cover all ventilation openings, including openable windows, with insect screens.

#### Select construction materials and products based on balancing the following environmental criteria: recyclability; sustainable sourcing; low embodied energy (the energy used in their manufacture); low pollution from manufacturing; low transport costs; minimal environmental impact; durability and minimal maintenance; non-hazardousness; and eco-labelling and certification.

#### Implement an on-site recycling system for waste materials including separating waste (timber for reuse, concrete and bricks for crushing and steel and copper for recycling). Reuse or recycle demolition materials. Recycle cardboard, metals, concrete, brick, asphalt, beverage containers, clean dimensional wood, plastic, glass, gypsum board and carpet.

#### Control light spill so that a minimum is directed beyond the site boundaries or upwards.

#### Ensure that sources of noise, such as car parks, are not directed towards the neighbouring properties. Attenuate noise of the source, and locate noisy activities far from residential areas in particular.

#### Provide future owners and tenants with a user pack or brochure which includes information on use and maintenance of the sustainability measures. This should also explain functions and benefits.
AN ULTRA ENERGY-EFFICIENT SCHOOL IN QUEBEC

For the construction of its newest school in Quebec (Canada), the Grandes-Seigneuries School Board, which has long been noted for its energy efficiency approach, wanted to set itself an especially challenging project which would reduce greenhouse gas emissions to close to zero. From an architectural standpoint, a series of simple methods, well within everyone’s reach, were used in combination to reduce energy needs. This pilot project has made Le Tournant School one of the most energy efficient in Canada. The concept initiator explains.

St-Constant, a suburb of Montreal, 15 January 2003, outdoor temperature: -16°C – The outside air enters Le Tournant School’s ventilation system at +5°C, a cost-free heat gain of 21°C.

Le Tournant School, which opened in November 2002, is the most energy efficient institutional building in Quebec, the second most efficient in all of Canada. It has exceeded the minimum requirements of Canada’s “Model National Energy Code for Buildings” by 60%.

Combining simple methods

These results were achieved by using only simple, tried and tested methods. The school is small; with its 2 682 m², it is designed to accommodate 220 pupils. The compact architecture centres around a multi-purpose common room. The wall and roof are slightly better insulated than usual. Window orientation was optimised and low-emission glass was used in the appropriate locations. The asphalted areas are away from the building, and careful planting was used to encourage heat gain in winter and block the sun in summer. Even the colour of the bricks was selected to optimise absorption.

The mechanical engineering option selected was a closed loop geothermal system. A mix of methanol circulating through five kilometres of pipe connecting to 18 independent wells transfers heat to and from the ground. In winter, heat from the ground is transferred to the school, and in summer, heat from the school is returned to the ground. Depending on the weather conditions, the system selects one of the two air intakes which, during the heating period, pass behind one of the two solar walls (plain black perforated plate) and benefit from substantial heat gain. The fresh air intake rate is regulated by a CO₂

Figure 1
Comparative performances of Le Tournant School and other primary and secondary schools in Quebec, particularly those of the Grandes-Seigneuries School Board (CSDGS) and those with heat pumps (HP)
sensor. So that none of the heat is lost, a thermal tube heat exchanger is also used to heat intake air from the outside using the heat extracted from evacuated stale air. Inside the building, heating and air conditioning are ensured by 25 heat pumps. Should it be necessary, an electric coil can provide back-up. The use of electricity is reduced to the minimum so that, even though the heating coil runs on fossil fuel, the impact on CO$_2$ emissions is negligible.

Ventilation and lighting are slaved to presence sensors, and the control of all school systems is centralised and can be remotely monitored.

**Daring to go over budget**

With the help of a subsidy from the Canadian Government equal to twice the expected annual savings, the budget granted by the Minister of Education was exceeded by only 10%. One could speculate that on a larger scale project, the cost overrun would be even less. At current energy prices the additional cost would be recovered in ten years.

Deciding to spend more today in order to generate savings for tomorrow seems so obvious that, when I reflect on it, I deserve to be taken to task: not because of anything I did, but because I did not do it earlier. The fact is that, since the technologies used for this construction have been available – for about ten years now – I have headed the construction of six schools. While energy savings have always been a must, I never dared to “invest” budgets that I did not have in order to generate savings later.

The usual approach is to stay within the funders’ budget or to ask for more, stifling any innovation by designers, who then stick to “cutting-and-pasting” standard designs. But we must remember that these facilities we are acquiring will last 40 to 60 years. So where is the risk in borrowing over ten, 15 or even 20 years? This is more apparent in the field of energy where results can be measured directly, but it is equally true for other sorts of options that reduce life cycle costs in the long term.

To conclude, I will sum up the factors that help to make a project like this possible and that are well within the reach of all. First, make a firm commitment to doing things differently, particularly as relates to the “environment”. Then, force the design office to innovate, or at least to bring together as many concepts as possible that have been known for some time. Finally, dare to go over budget and put together financial packages over the lifetime of the facilities.

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**Figure 2** Intake air temperature after gain from solar walls and heat recovery, on a sunny day

The graph shows the no-cost heat gain to building intake air from the solar walls and heat recovery (on cloudy days, the gain is also remarkable and heat recovery is more efficient).

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Temperatures in °C

- External temperature
- Temperature after solar wall
- Temperature after recovery

The graph shows the no-cost heat gain to building intake air from the solar walls and heat recovery (on cloudy days, the gain is also remarkable and heat recovery is more efficient).
OECD PUBLICATIONS

Reading for Change: Performance and Engagement Across Countries: Results from PISA 2000

Reading for Change is the first in a series of thematic reports that follow the publication of the Programme for International Student Assessment (PISA) 2000 survey results: Knowledge and Skills for Life (OECD, 2001). This report looks closely at reading performance of 15-year-olds in 32 countries.

January 2003, 264 pages
OECD Code 962002071P1, ISBN 9264099263
EUR 24, USD 24, GBP 15, JPY 2 800, MXN 220
For further information, see www.pisa.oecd.org

Education at a Glance: OECD Indicators 2003 Edition

This annual publication of OECD education indicators provides comparable and up-to-date measures on the functioning, development and impact of education, covering almost two thirds of the world’s population. The 2003 edition focuses on the quality of learning outcomes, the policy levers and contextual factors that shape these outcomes, and the broader private and social returns that accrue to investments in education. This edition will be published in French, German, Japanese and Spanish.

September 2003, 454 pages
OECD Code 962003061P1, ISBN 9264102337
EUR 49, USD 56, GBP 33, JPY 6 300, MXN 570
For further information, see www.oecd.org/edu/eag2003

Literacy Skills for the World of Tomorrow: Further Results from PISA 2000

This publication presents evidence on student performance in reading, mathematical and scientific literacy; the extent to which students are able to identify and pursue their own learning goals by applying strategies and drawing on their motivation; and factors that influence the development of knowledge and skills at home and at school in 42 countries. Co-edited with the UNESCO Institute for Statistics, it presents results for an additional ten countries who participated in the first survey cycle of the Programme for International Student Assessment (PISA).

July 2003, 392 pages
OECD Code 962003071P1, ISBN 9264102868
EUR 21, USD 24, GBP 14, JPY 2 700, MXN 245
For further information, see www.pisa.oecd.org.

OTHER PUBLICATIONS

Creating New Schools

This pamphlet, published by the United Kingdom organisations School Works and TEN (The Education Network), presents nine articles on various aspects of building and furnishing a new school. It offers key points for local education authorities, an explanation of an online game for pupils to redesign their own schools (see www.school-works.org/game/) and a report on the importance of environment to learning, among others.

Download the pamphlet at www.school-works.org, or for a hard copy write to mail@school-works.org

2003, 12 pages
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PEB DIARY

2003

November

11-14 – The International Union of Architects and UNESCO will hold a seminar on new architectural designs that meet the needs of quality education in the future. The international event will take place in Santiago, Chile.
Contact: Jadille Baza, e-mail: jbaza@mineduc.cl

12-14 – PEB will host a seminar on “School Safety and Security” in Paris. See article page 3.

15-18 – The Buenos Aires International Forum of Educational Architecture will hold its fifth meeting where it will award an international prize, with the support of UNESCO. To submit a project or register to attend, contact: fidae2003@yahoo.com.ar

2004

Early 2004

PEB and GeoHazards International are organising an experts’ meeting on school seismic safety. See article page 3.

January

The OECD Programme on Institutional Management in Higher Education will hold an international seminar on “Financial Monitoring and Effective Institutional Management”.
Contact: Jacqueline Smith, tel.: 331 45 24 93 23, e-mail: jacqueline.smith@oecd.org

October

A PEB conference on the role of new technology in space management for tertiary education will be organised in Canada. See page 3.
Contact: Isabelle Etienne, tel.: 331 45 24 92 72, e-mail: isabelle.etienne@oecd.org