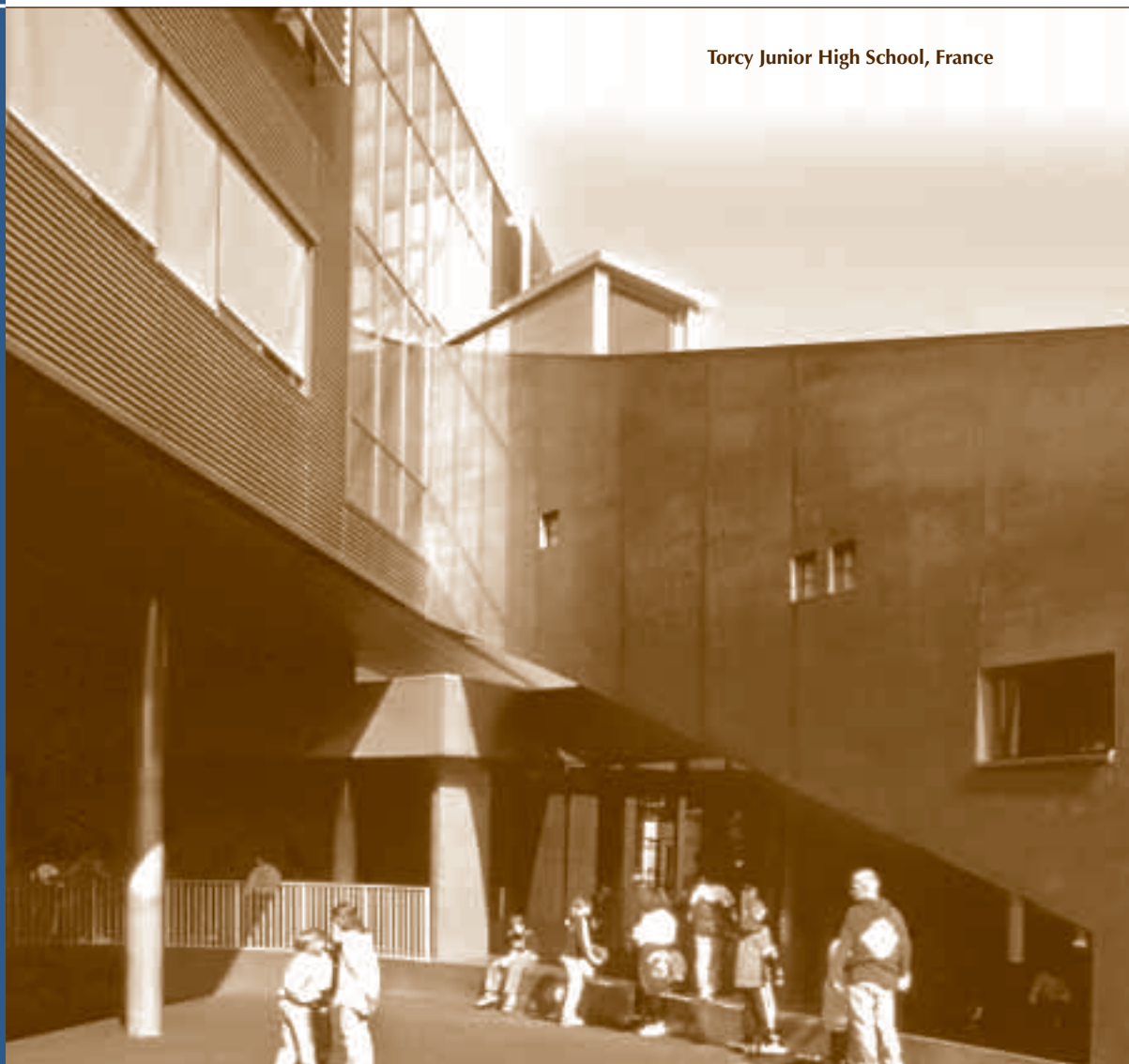
OECD

PEB EXCHANGE

THE JOURNAL OF THE OECD PROGRAMME ON EDUCATIONAL BUILDING

ISSUE 36 FEB 99



Torcy Junior High School, France

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 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
Austria
Czech Republic
Finland
France
Greece
Iceland
Ireland
Korea
Netherlands
New Zealand
Portugal
Spain
Sweden
Switzerland
Turkey
United Kingdom

PEB Associate Members

Albania Education Development Project
A.R.G.O. (Belgium)
Ministerium der Deutschsprachigen Gemeinschaft (Belgium)
Province of Quebec (Canada)
Regione Emilia-Romagna (Italy)
Regione Toscana (Italy)
Service général de garantie des infrastructures scolaires subventionnées (Belgium)
Slovak Republic
Tokyo Institute of Technology (Japan)

PEB AND OECD ACTIVITIES

STRATEGIC ASSET MANAGEMENT FOR TERTIARY INSTITUTIONS

As the use of public funding comes under continuing scrutiny, there is growing awareness of the real cost of facilities for tertiary education, and of the need to make more efficient use of those that have been provided. At the same time, advances in technology mean that alternative forms of course delivery have become educationally and administratively viable. The role of facility managers is changing fast as the realisation grows that their professional skills can give institutions a competitive edge. Thirty-five facility managers from leading Australian and New Zealand universities and colleges took part in a two-day intensive workshop in Sydney last year where they were able to share the latest international thinking on some of these issues, and to work together to develop their understandings of their task.

Key speakers at the workshop included Hans Antonsson, Managing Director of *Akademiska Hus*, Sweden; Bill Daigneau of the University of Texas, USA; Dr Grace Kenny, facilities consultant from the United Kingdom; Denise Bradley, Vice-Chancellor of the University of South Australia; Nigel French, Secretary-General of the University Grants Committee, Hong Kong; David Rowland, New South Wales Department of Education and Training and Peter Coaldrake, Queensland University of Technology.

The conclusions of the workshop will shortly be available from OECD Publications. If you would like to place an advance order for the book, which includes the main points covered in discussion as well as the text of the main presentations, please contact Jill Gaston at the PEB Secretariat. Orders received before 31 March will benefit from a 20 per cent discount.

The workshop was jointly organised by PEB and the OECD Programme on Institutional Management in Higher Education, with the co-operation of the New South Wales Department of Education and Training. It is expected that a second workshop will be held in the United States later this year.

ENVIRONMENTAL EDUCATION AND SUSTAINABLE DEVELOPMENT

The Austrian Federal Ministry of Education and Cultural Affairs organised an international conference on Environmental Education on the Way to a Sustainable Future, in Linz, Austria, from 3 to 7 October. The conference was organised in collaboration with the OECD Centre for Educational Research and the OECD Programme on Educational Building.

The conference took place in the framework of the OECD/CERI Project on "Environment and School Initiatives". The project, which started in 1984, attempts to establish a link between the development of environmental awareness and a teaching/learning process which develops dynamic rather than static qualities in students. It also examined how this link is established in practice and how the quality of environmental education can be improved in classrooms and schools.

The conference aimed at examining future perspectives and demands for the educational system regarding environmental education in a sustainable society. Evaluation strategies were pointed out as a valuable resource which should be carefully defined and should not be wasted nor used without consideration of its consequences. The following key questions for evaluating environmental education were posed: 1) what are the purposes of the evaluation and who is the audience?; 2) how are the values and aspirations of environmental education enacted in the practices of learners and teachers?; 3) what happens in environmental education? what is its practice?; 4) how do people value the experience of environmental education? what claims are made for environmental education and how could these claims be substantiated? what are the outcomes of environmental education?

PEB, following the conference held in Winchester, UK, in September 1997 on School Grounds for Learning, sponsored a lecture by Wendy Titman on the "Effects of the Learning Environment and the Culture of Teaching in Environmental Education", which showed the impact of the environment and of school grounds on the learning process. PEB also participated actively in a working group on maintenance and sustainability.

A few comments on maintenance

The working group, lead by Martin Heffernan from the Department of Education of Ireland, examined the relationship between maintenance and issues of sustainability. Some general and important considerations for maintenance and its relationship to the environment were examined and discussed, outlining particular experiences for different countries. The working group tabulated environmental issues relating to school grounds, the appearance of buildings, air quality and air temperature, ventilation, light and noise. The workshop examined how these factors must be defined and maintained in order to ensure a healthy environment.

The full report will be published by the Austrian Ministry of Education and Cultural Affairs in Vienna and should be available in early 1999; for more information please contact the PEB Secretariat.

QUALITY OF SCHOOL FACILITIES AND THEIR MAINTENANCE

The quality of school buildings, physical conditions, facility management and maintenance were the topics of a three-day seminar in Vienna in September. The Austrian Federal Ministry of Education and Cultural Affairs conducted the event in co-operation with PEB, the Austrian Institute of School and Sports Facilities and the working group "Lebensraum Schule" with the support of the Upper Austria Region. Elisabeth Gehrer, Minister of Education, opened the seminar which was attended by about 60 international decision-makers, scientists and school building users.

The quality of a school building is determined by, in addition to the structure itself, improvements, services and maintenance, thus the importance of facility and financial management. Besides the function of school buildings as a place to learn and work, communication and social and cultural aspects play an increasing role, requiring buildings to meet a number of additional needs. Sometimes the users of a school building have a different perception than outside observers; the experiences shared by users during the seminar and the ideas presented by companies from the building sector gave an overview of the wide range of issues involved in providing quality facilities.

Glen Earthman, from the Virginia Technical University, USA, described research on the impact of school buildings on student attainment. Several recent studies carried out in the United States have identified a clear positive correlation between aspects of facility condition and the scores achieved by students in tests. He suggested that as the condition of buildings was one of the few factors which it was within the power of education authorities to improve, this evidence provided a convincing justification for them to do so.

Other reports by experts from Austria, Germany, Spain and the United Kingdom expounded on schools as meeting places, energy-contracting and asset management plans.

A summary report of the seminar is available in German and English from: Doris Karner, BMUK, Abt. Z/A/7, Minoritenplatz 5, 1014 Vienna,
Fax: 43 1 53 120 4482,
E-mail: doris.karner@bmuk.gv.at

APPRAISAL OF EDUCATIONAL INVESTMENTS

PEB and the European Investment Bank (EIB) brought together 90 researchers, planners, managers working on educational policies and architects from OECD countries to address the appraisal of investment in educational facilities. Issues included:

- economic analysis of educational projects;
- performance indicators for educational projects;
- management of physical resources for education;
- design and equipment of physical facilities for education.

Until recently, projects in the field of education were not eligible for EIB financing. This changed radically with a resolution made by the heads of state of the European Union in June 1997. The resolution, aimed to boost growth and employment in the EU, included an invitation to the EIB to direct a substantial portion of its lending to education, health and urban regeneration. The Bank responded by widening its rules for eligibility, bringing education fully into the ambit of its lending.

The emphasis of the EIB however is not on the volume of investment financed but on the quality of the investment. To better understand successful approaches to the allocation of resources in the education sector, the Bank contacted PEB. The resulting collaboration gave rise to the experts' meeting in Luxembourg in November 1998.

During the two days of discussion, the OECD provided analysis of educational inputs and outputs at system level, economic research on the impact of education on economic growth and project-specific experience of best practice. Progress was made toward establishing a methodology for the evaluation of investment, taking into account environmental considerations, flexibility, changing technologies and shared use of facilities.

A full report on the meeting will be published in the coming months.

NEW DEPUTY DIRECTOR FOR EDUCATION

The OECD Directorate for Education, Employment, Labour and Social Affairs welcomed Barry McGaw, from Australia, as its new Deputy Director for Education in September 1998. He was previously Director of the Australian Council for Educational Research (ACER) where he had worked since 1985. Barry McGaw has led numerous inquiries on research funding and priorities for the Government of Australia and was recently the sole reviewer of the Higher School Certificate in New South Wales. He holds a PhD and an MEd from the University of Illinois, USA, in educational psychology and measurement.

PEB HOSTS US EVENT WITH NEW CEFPI CHAPTER

PEB will be cooperating with the newest chapter of the Council of Educational Facility Planners International and the American Institute of Architects to organise a symposium on maintenance and the renewal of building stock. It will take place in Baltimore, Maryland (USA) on 30-31 October 1999. More information on this event will appear in the June issue of *PEB Exchange*.

The new northeast chapter of CEFPI called Urban Educational Facilities for the 21st Century was created to focus on the unique needs of urban schools, particularly in poverty-stricken areas, with the goal "to provide the best possible learning environment for children". To learn more about their work, contact the president of UEF21-NE, Ed Kirkbride:
Tel.: 1 610 873 1560, E-mail: eek@bee.net

SCHOOL SURVEYS

Governments and the general public need solid evidence of educational outcomes. The OECD has therefore launched an extensive programme, known as PISA, for producing policy-oriented and internationally comparable indicators of student achievement on a regular basis and in a timely manner.

The results of the OECD/PISA tests, published every three years, will allow national policy makers to compare the performance of their education systems with those of other countries. OECD/PISA will provide insight into how student achievement relates to important demographic, social, economic and educational variables, including the quality and availability of school resources and parental involvement.

The OECD/PISA tests will be administered to 15-year-olds in 27 OECD countries as well as in a range of non-member countries, starting in the year 2000. They will cover domains including reading, mathematics and science.

For more information, contact A. Schleicher, OECD/ELS, Fax: 33 (0)1 45 24 90 98,
E-mail: andreas.schleicher@oecd.org

News

FRANCE ANNOUNCES INTEREST-FREE LOANS

In response to demand from students and others, the French Ministry of Education has announced a package of measures to improve conditions in upper secondary education. These include loans to regions totalling four billion francs over four years free of interest. The loans are for constructing student cultural centres and offices for teachers; improving access to resource centres, computer rooms and language laboratories; and bringing equipment up to standard, according to *Le Monde – La lettre de l'éducation*.

£19 BILLION BOOST FOR UK EDUCATION

The Government of the United Kingdom has committed to raise spending on education by £19 billion over the three years from 1999 to 2002. Education and Employment Secretary David Blunkett qualified the sum as "the biggest single investment in education in the history of this country". He said, "This is the fulfilment of our pledge that education would be our number one priority ...."

The money will support measures to improve standards of literacy and numeracy, cut truancy and exclusion and increase access to further and higher education, particularly for people from lower income households.

The increase in spending will ensure that the UK will meet its goal to put two out of three three-year-olds in nursery education by the year 2002 – which requires 190 000 extra places – and meet its class size pledge. The Government had promised there would be no more than 30 pupils per class for five-, six- and seven-year-olds by September 2001. £160 million of the new funds are allotted to provide over 2 000 extra classrooms.

Capital investment to improve school buildings and equipment – rising to £1 650 million in 2001-02 – will double compared to 1996-97.

Plans have also been announced to invest £700 million in information and communications technology for UK schools.

MAJOR NEW UK LEGISLATION

The School Standards and Framework Act, put on the Statute Book in July 1998, gives the Government tough powers to raise education standards throughout England. The Act establishes new categories of schools and sets out the role of Local Education Authorities (LEAs) in respect of maintenance and funding. It defines arrangements for the organisation of schools, provides that each has a governing body and lays out responsibilities of the latter with an emphasis on standards and the promotion of good behavior. The Secretary of State now has the power to close schools that persist in a record of failure.

The legislation also sets out procedures for the fixing of admission numbers and covers staffing arrangements. Additional measures include limits on infant class sizes, the provision of school meals and the outlawing of corporal punishment for all pupils.

Among other plans given the go-ahead by the Act figures Education Action Zones, an innovative partnership between businesses, parents, schools and LEAs to boost standards in areas of social deprivation.

US SCHOOL DESIGN AWARD

The Council of Educational Facility Planners presented the 1998 James D. MacConnell Award for excellence in school design to Buckeye Valley Middle School, located near Delaware, Ohio. The judges commended the project for its collaborative planning, involving district administrators, teachers, staff and community members, which resulted in a building that is innovative, economical and focused on the needs of adolescents. Unique instructional spaces lend flexibility for team teaching, interdisciplinary grouping and high-tech/high touch approaches to promote active learning.

PROJECTS

THE NETHERLANDS' SCHOOL BUILDING PRIZE

The School Building Prize has been awarded every two years since 1992 to Dutch school boards that have proved able to embrace new directions in school building design while keeping within their available budget. The Prize, which has drawn acclaim for the development of high quality educational architecture in the Netherlands, provides publicity for successful projects so that other schools can benefit from the designs and information. Associated with this prize are the Dutch Ministry of Education, Culture and Sciences; the Ministry of Housing, Urban and Rural Planning, and Environmental Management; and the Association of Dutch Municipalities.

For the 1998 award all school governing bodies that had invested at least 500 000 Guilders to build or drastically expand or renovate an elementary school between 1994 and 1997 were invited to participate. The competition was reserved for primary schools, as the previous prize had been given to an adult-education institution. The jury included architects, professors, government representatives and a town planner. They evaluated the projects according to the following criteria:

- process and project: the selection process for an architect and consultants; the client's ability to build a balanced team and manage the project; the layout as a whole and the variety of spaces available to the pupil; the possibility for multiple uses of the building for educational and other purposes at present and in the future;
- architectural interpretation: the interplay between elements such as structure, space, light and choice of materials and their influence on the building's atmosphere and quality of the facilities; the extent to which the architect succeeded in involving the client in the design process;
- construction: the use of durable materials in order to ensure the maximum life of the building;
- adaptation to town planning and the landscape: the building's spatial integration into its neighbourhood as well as a clear delineation between the school and its surroundings;
- quality and cost: the costs incurred in relation to the quality of the building and the available budget.

First prize winner: British School in The Hague

First prize

The 1998 School Building Prize was awarded to the British School in The Hague, an elementary and junior secondary school. Although the school was built according to Dutch building regulations by a Dutch architect and construction company, the school's governing body is not subject to the Dutch decision-making procedures for educational construction. This perhaps gave the British School more freedom to manoeuvre, but its construction costs, Gld 11 241 955, were considered comparable to those of the other entries.

The jury found the school to be remarkably well adapted to its surroundings. The building is placed on a site with a previously existing sports hall and garden, and the garden is harmoniously incorporated into the school's landscaping. However with regard to its neighbourhood, the school occupies an isolated position.

The school building consists of two main parts, a rectangular section and a curved one, each with its own functional and architectural style. The classrooms are situated in the curved section overlooking the garden, and the rectangular area contains all of the other functions. An area uniting the two parts of the construction forms a spacious hallway with a mezzanine from which student circulation is fully observable.

It is a genuinely "green" building constructed of durable materials. Wood, glass, metal and concrete are visible in their natural state and are applied in an environmentally-friendly manner. Colour has been added only here and there.

The building makes use of natural climate regulation: cooling takes place by means of a sophisticated air

British School in The Hague

circulation system involving the "chimney effect" created by operable skylights in the central hallway. Because of this system, in place of drop ceilings, ceiling strips were applied where needed, taking maximum advantage of the thermal capacity of the exposed concrete.

The temperature can be regulated in each area separately; only the skylights are operated centrally. The garden side of the building benefits from a southern exposure; in the winter sunlight enters through the aluminium slats of an external structure, which, in the summer, can be closed to deflect the sun's heat.

The building exudes a pleasant atmosphere which is reinforced by good acoustics. The openness of the construction allows a sufficient view of each area for the children to situate themselves, and in spite of the building's size – 6 187 m^2 – it does not give an impression of sheer mass.

It was clear to the jury that discussion between the architect and client led to the project's enhancement.

Honourable mentions

One of two honourable mentions was given to a Montessori elementary school, De Petteflet, in Tilburg. It was built at a cost of Gld 3 485 000 with a gross surface area of 1 750 m^2. The school's design is based on the three primary shapes that play an important role in Montessori teaching:

- the circle – created by the cylindrical tower that houses the staff areas;
- the triangle – represented by the building that contains most of the classrooms, those for the first years on the ground floor and the highest years on top;
- the square – formed by the section containing classrooms for the intermediate grades and indoor play areas.

The jury found the basic idea of the geometric shapes to be effective though somewhat contrived in places. Each of these sections has its own colour scheme and construction materials. The natural colours of the materials are exposed, making them easily recognisable by the children.

There are individual study spaces both inside and outside the classrooms, including study areas in the window sills for the older pupils. The youngest pupils have their own playground next to their classrooms.

The school is located in a town planning zone between different neighbourhoods. The area is characterised primarily by industrial buildings and sports fields and is separated from the residential area by roads.

De Petteflet in Tilburg

Again the architectural inspiration and the educational vision provided by the client were demonstrably united through constructive dialogue.

A second honourable mention went to the primary school Het Spectrum, in Almere. It has a gross surface area of 2 520 m^2 and cost Gld 4 600 000.

Het Spectrum in Almere

The school offers a clear structure and a spaciousness that the jury felt would have a lasting effect on the children. It houses a wide variety of spaces, with each classroom being a different shape. Like the De Petteflet school, classrooms for the first, middle and upper grades are grouped separately, each with a unique colour scheme. There are many cheerful elements to the school, such as a beautiful playroom and the communal area's creative "theatre wall". It was apparent to the jury that the client gave clear direction in the construction process and that the architect was sincerely concerned with reflecting the world of children, which led to a playful, exciting and flexible building.

General findings of the jury

Many of the 41 participating schools were found to have too lightweight a construction, requiring extra heating, cooling and ventilation to correct the internal climate and therefore raising operating costs. The jury reported that in most designs, information and communication technology as well as facilities for new teaching methods did not receive sufficient attention. The school playground was also often neglected; the result is that attractive schools are situated in poor settings and lack a clear delineation between the school grounds and their surroundings. Other common errors related to staircases designed with steps too high or built of steel, making inevitable falls more dangerous.

The art of designing a school is to create an environment whose structure, visual stimulants and acoustics contribute to the harmonious development of the pupils. As primary education increasingly encourages children to independently explore their surroundings, buildings should provide freedom of movement inside and outside the classrooms, sufficient individual study spaces where children feel at ease and additional areas for a variety of activities.

It is important that prior to the design process the consultants, architects and client agree on the main needs. Then each party should evaluate, and if necessary re-adjust, the project from the point of view of his or her own competence. While the architect is responsible for the structural quality of the building, the educational programme of the school must remain the highest priority. Its reflection in a building's design requires conscious detailing of teaching styles, work methods and the educational situations that the school wishes to create.

Financial risks can be reduced by designing flexible buildings, which increase the possibilities for other uses (while too much flexibility should be avoided as it can lead to anonymity and a loss of the characteristic school identity).

The jury concluded that those investing in the future would be well advised to demonstrate willingness to devote the extra financing which is often required to construct well-conceived school buildings.

A 48-page book in English and Dutch gives full details of the award process and provides photographs and plans of the nine finalist schools. Copies of "School Building Prize 1998" are available from:

ICS Adviseurs
P.O. Box 282
2800 AG Gouda, Netherlands
Tel.: 31 182 575200
Fax: 31 182 575201.

EDUCATIONAL BUILDING AND DECENTRALISATION IN MEXICO

Mexico at a Glance

Total area: 1 973 000 km²[1]

Population (in 1996): 96 582 000[1]

Population under 15 years old (in 1995): 36.2%[1]

Children between 6 and 14 years old attending school: 93.6%[2]

Children having at least one year of preschool education:

– before decentralisation: 74%[2]

– after decentralisation: 90%[2]

Children having completed elementary school:

– before decentralisation: 72%[2]

– after decentralisation: 85%[2]

The Mexican Educational System

Preschool – optional: 3 years

Elementary school – compulsory: 6 years

Junior secondary school – compulsory: 3 years

Preparatory school (upper secondary school) – optional: 3 years

Historical background

The Administrative Board of the Federal School Construction Programme (CAPFCE) has been in existence for 54 years, but it was only in 1977 that initial efforts were made to transfer responsibility for educational building to the administrations of the 32 states of Mexico. In 1985, legislation was introduced to change the CAPFCE's structure, powers and functions with a view to bringing them in line with the objectives of decentralisation and modernisation of the country. Initiatives were implemented in order to promote the participation of state governments, municipal authorities and communities in educational building, resource management and building maintenance activities.

The key points of the agreement on the decentralisation of the CAPFCE, which defined the decentralisation strategy at the beginning of 1996, are as follows:

- Planning of work: the states are responsible for the planning of all primary education infrastructure.
- Construction and management of buildings: state and municipal authorities are now responsible for managing educational buildings.
- Allocation of funding: a funding allocation procedure that takes into account a number of variables, such as the wealth or growth rate of the local population, has been drawn up.
- Secondary education: the federal government and states, which now have joint responsibility for the planning of secondary school facilities, will examine decentralisation in this field, and in particular the process by which schools will increasingly assume responsibility for developing their infrastructure.
- Restructuring of the CAPFCE: because of the substantial differences in the technical and administrative capacity of the various states and municipalities, the CAPFCE will temporarily act as a fund for financing educational infrastructure while at the same time retaining certain supervisory functions.

The programme for decentralising the CAPFCE

During the first stage, which took place in 1996, the broad lines of the above agreement were laid down, formally launching the decentralisation programme at the primary education level. In 1997, during the second stage, the Administrative Board consolidated the process at the primary level, extended it to the secondary and university levels and launched initiatives to create educational building agencies in states.

The programme's implementation revealed a number of shortcomings in the organisational structure of the governments of the various states. Technical and administrative deficiencies have slowed down the implementation of investment programmes, and a lack of institutional co-ordination and difficulties in defining procedures for implementing the plan have prompted some states to create their own educational building agency.

Creation of state educational building agencies

In line with the decentralisation programme, a major effort was made in 1997 to set up state educational building agencies, which were seen

1. OECD (1998), "OECD in Figures", supplement to *The OECD Observer*, No. 212, June/July 1998, Paris.

2. *4th Report to the Government*, September 1998 (summary of President Zedillo's mandate for the past presidential year).

as the institutional mechanism that would make it possible to decentralise educational infrastructure construction completely.

In 1998, the CAPFCE managed a budget of 615 million pesos for the construction, equipping and maintenance of educational facilities. The Administrative Board considers that it is essential for each entity which has established a local educational building agency to be able to receive its funding allocation directly from this agency, now that the CAPFCE's human, physical and financial resources are being transferred to local entities under the relevant legal agreements.

The CAPFCE is being transformed so as to ensure a broader and more equitable distribution of responsibilities and greater participation of executive authorities, municipalities, local communities and society at large. This change is taking shape through consultations and agreements between the various sectors and the nation's political and social actors.

The CAPFCE's new role

The CAPFCE is now a body that sets standards, exercises technical supervision and provides financial assistance. A 1985 decree laid down that "the Board shall define technical standards for the construction, equipping and authorisation of buildings and school facilities". Once its original functions have been decentralised, the CAPFCE will have the new responsibility of setting technical standards for educational infrastructure nation-wide. The CAPFCE will be responsible for defining and approving architectural projects involving the design and use of space in educational facilities, and for establishing methods and procedures for certifying diplomas in accordance with the applicable standards.

The decentralisation will be implemented as follows:

- By the end of 1998, the states were to have established local agencies responsible for the construction, renovation and maintenance of their schools.
- The CAPFCE will transfer the physical infrastructure and resources necessary to enable the new agencies to operate.
- Municipalities and local communities will be increasingly involved in all aspects of educational infrastructure.

As for the CAPFCE, it will now have the following responsibilities:

- To promote scientific and technological improvements in the construction of educational facilities.
- To establish the most adequate technical standards for the construction, equipping and renovation of the country's educational infrastructure.
- To supervise the progress and quality of the work being done in decentralised entities.
- To provide financial support to these entities for the development of their respective programmes.
- To provide training in all areas mentioned above.

FEATURE

SCHOOL SCIENCE LABORATORIES: TODAY'S TRENDS AND GUIDELINES

This article reports on practice in a selection of OECD Member countries. It is not a comprehensive survey. PEB is compiling a dossier on this subject which we plan to make available on the PEB Web site. We invite readers to send other recent references to the Secretariat.

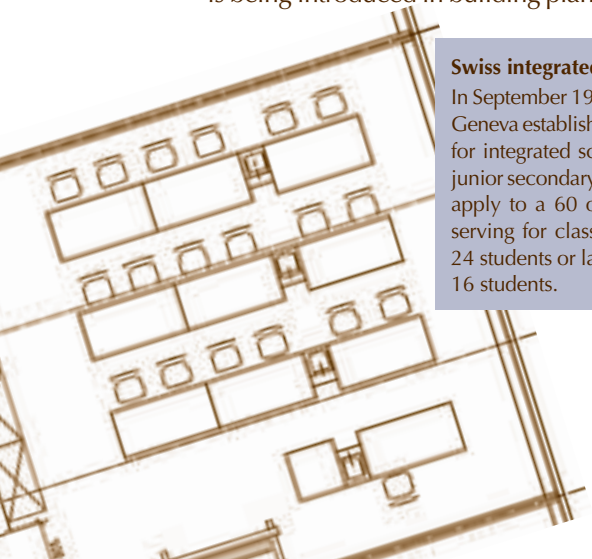
Science laboratories in schools are expensive to equip and maintain. Specific pedagogical needs, new technology and safety requirements contribute to the costs. In an effort to get the most efficient use of facilities, some countries are rethinking school labs with a move toward more flexible approaches.

Switzerland: flexibility and integration

In junior secondary schools in the Canton of Geneva, chemistry, physics and biology are taught for the most part in "versatile" classrooms; each subject has one room which serves for both whole-class teaching and individual practical work. All equipment is mobile other than a series of stations with outlets for water, gas and electricity. While at the level of upper secondary education each science subject traditionally has its own laboratory and separate classroom, versatile classrooms are replacing these in new and renovated buildings (where theatre seating for example is being removed).

The Public Education Department of the Canton of Geneva cautions against choosing designs with fixed installations that are so rigid and sophisticated that they cannot be adapted to changes in use. It promotes "simple solutions allowing for change, not only because of costs and installation time, but mostly because of the need to be able to easily adapt the facilities to different uses in the future."

The idea of integrated science laboratories – one space shared for biology, chemistry and physics experiments – is being introduced in building plans for the future.



Swiss integrated laboratory
In September 1998 the Canton of Geneva established specifications for integrated science rooms for junior secondary education. They apply to a 60 or 80 m^2 surface serving for class work for 16 or 24 students or lab work for 12 or 16 students.

Computer-assisted experiments in France
Within ten years at a school with two laboratories, each equipped with six PCs, 4 000 students were able to do computer-assisted experiments. New installations are designed to allow students to work in groups.

France: incorporating new technology

The French Ministry of Education sees a growing need to equip upper secondary schools for science instruction using modern technology, such as multimedia computers connected to local networks and Internet, video recorders and players, overhead projectors and televisions that can be connected to computer and video equipment in addition to picking up stations.

Beginning in 1987, facilities were installed in upper secondary schools for computer-assisted experiments. Since 1997 France has been installing multimedia stations and computer peripherals in biology labs. PCs are being networked so that students can share materials and work together. Portable equipment for computer-assisted experiments will be introduced in the years to come. The laboratories remain equipped for traditional experimental work.

In junior secondary education, chemistry and physics share facilities: laboratories, combination collection/preparation rooms and teacher research rooms. At the upper secondary level this is not always the case; physics and chemistry do however share laboratories for computer-assisted experiments.

The Government recommends a classical layout for science labs, one that is wide and not too deep in order for students to see teacher presentations and experiments at the front of the room. The Ministry warns that no other discipline should be taught in physics and chemistry labs for "safety reasons and in the presence of fragile and costly materials .... This constraint allows major savings in the institution's maintenance by avoiding damage."

Ireland: safety first

The concern for safety is the starting point for guidance from the Irish Department of Education to

schools and teachers. Below are examples of Ireland's recommendations concerning various aspects of school laboratories, published in the government manual *Safety in School Sciences*:

Design and accommodation:

- Structural: There should be ample light (500 to 1000 Lux) and good ventilation (7 to 15 air changes per hour).
- Organisational: Areas should be available in the laboratory for on-going experiments, for wet and dirty work and for permanent apparatus and specimens.

General services:

- It should be possible to isolate the supply of gas and electricity by emergency stop buttons at the teacher's position and at the exit or outside the classroom.
- Gas taps should be such that they cannot be turned on accidentally.
- There should be no steps in the laboratory or between the laboratory and the preparation room.

Electrical services and equipment:

- Equipment must be suitably identified and marked, including the maker's name and its electrical ratings.
- Where possible such equipment should have a pilot light to indicate when it is switched on.
- Portable electrically operated equipment should be inspected at regular intervals and a record kept of inspections made.

Hygiene and first-aid:

- One or more fully trained first-aid persons should always be available on the school premises during normal class times.
- Laboratories should be equipped with an adequate supply of waste boxes, preferably of two distinctive kinds, one for dry and broken waste and one for wet waste such as filter papers and biological materials.

South Australia: planning for sustainability

Ann Gorey, of the Administration and Information Services which advises the South Australia Department of Education, Training and Employment on technical details, legislation and asset management strategies, stresses that planning for school science laboratories should address long-term educational and structural implications. This requires a careful look at three key areas of sustainability of the design:

- Educational sustainability: meeting the needs of the curriculum and matching ways in which students learn (e.g. team work, collaborative learning or self-directed research);
- Environmental sustainability: including design features such as natural light and ventilation; planning for the responsible disposal of chemical and other waste;
- Physical sustainability: ensuring the building's "fitness for purpose"; complying with legislative requirements; providing flexibility.

Facilities that respond to these criteria run from low-cost to high-cost options. At the Unley High School in Adelaide which has older style classrooms, the senior science teacher has been able to create a dynamic learning environment by using moveable tables and a wide range of low technology. St Peter's Boys School is an extensive new centre designed to demonstrate the principles of natural lighting and flexibility; features of its buildings include recycled water, solar energy and linking of indoor and outdoor areas.

Maryland: a comprehensive approach

Science facilities in upper secondary schools in the US State of Maryland are being renovated to provide students with state-of-the-art facilities. In the six years since the governor initiated the LOOK OF THE FUTURE programme, 345 labs were approved in 77 schools with a state investment of US$27 941 000.

Planning guidelines prepared by the state are intended to respond "to evolutionary changes in education, including emphases on the processes of science, the application of scientific thinking to broad content areas, the introduction of electronic communications into the science laboratory, and the inclusion of all students, including those with disabilities, in the full range of science activities," as described by State Superintendent of Schools, Nancy Grasmick. Maryland is sensitive to environmental implications and encourages "ecologically-sound design practices".

Maryland's science facilities other than labs and lecture areas include student project rooms, for advanced research and long-term projects, greenhouses and science studios. The latter is a new programme space, for projects involving more than one discipline, which "supports a hybrid of pure and applied science and is particularly appropriate for team teaching science and technology education."

REFERENCES

Guide d'équipement: physique et chimie en collège **(May 1998),**

Guide d'équipement: physique et chimie en lycée d'enseignement général **(June 1998),**

Guide d'équipement: physique et chimie dans les sections d'enseignement professionel **(June 1998); Ministère de l'Éducation nationale, de la Recherche et de la Technologie, France.**

These equipment guidelines for different levels of secondary education cover all issues related to installing facilities in new or renovated buildings: teaching objectives, technology, costs, hygiene and safety. They provide layouts for classrooms, traditional and computer laboratories, collection/preparation rooms and teacher resource rooms, and they list the most suitable equipment and quantities of materials needed.

Safety in the School Laboratory: Disposal of Chemicals **(1996), Irish Department of Education, Dublin.**

This a collection of "user friendly" safety data sheets on 161 chemicals – all those on the syllabus and other common chemicals – compiled for quick reference by teachers.

Safety in School Science **(1996), Irish Department of Education, Dublin.**

This 114-page document written for teachers and school management is a code of practice on laboratory design and services, organisation and management, hazards and safety precautions, emergency procedures and useful practical techniques. The principles and guidelines given aim "to allow the efficient conduct of practical work ... with a view to preventing accidents."

"School Science Laboratories: Planning for Sustainability" (1998), Ann Gorey, South Australia Department for Administrative and Information Services, Adelaide.

Paper available on the PEB Internet site under What's New at http://www.oecd.org/els/edu/peb/els_peb.htm.

The paper describes what is meant by educationally, environmentally and physically sustainable laboratories. It lists fifteen questions to ask when planning to build or refurbish a facility, such as who is responsible for identifying new trends, what is the focus of the space and whether a staff familiarisation programme has been planned. Three Australian schools are described whose facilities range from low-cost to high-cost options.

Science Facilities Design Guidelines **(1994), Maryland State Department of Education, United States.**

This publication provides details of all aspects of science facilities – from planning and the role of each party involved, to construction, to Post-Occupancy Evaluation – for all new schools, renovations and additions, from kindergarten through upper secondary education. Planning recommendations include evaluating outside assets (e.g. partnerships with local colleges, industry and museums) that can affect requirements within the building, and designing the school site for use for science and environmental education.

FURTHER READING

Changing the Subject – Innovations in Science, Mathematics and Technology Education **(1996), OECD/Routledge.**

Drawing on 23 case studies from OECD countries, the authors concentrate on the origins and purposes of innovation within and across the science, mathematics and technology curricula and explore the involvement of teachers and students. They reflect on strategies adopted to cope with and bring about change.

Fume Cupboards in Schools **(1998), Architects & Building Branch of the Department for Education and Employment, United Kingdom.**

This bulletin "covers the level of provision that is desirable to meet curriculum needs and makes recommendations for good practice in the design, specification and installation of fume cupboards."

Middle Schooling Matters in Science: Strategies for Learning and Teaching **(1998), South Australia Department of Education, Training and Employment, Adelaide.**

This manual is a professional development package designed by teachers for teachers, to support effective learning and teaching in science for students aged 12 to 15. It advocates a "hands on" approach to science.

Planning Guidelines: Secondary School Science **(1998), South Australia Department for Administrative and Information Services.**

This guide provides a broad description of the requirements for facilities and makes specific reference to requirements that are legislated.

Safety in Science Education **(1996), Department for Education and Employment, United Kingdom.**

This document provides legal advice, relevant health and safety legislation and information on risk assessment for teachers and technicians.

Utrymmen och Utrustning för Undervisningen i Naturvetenskapliga Ämnen (Space and Equipment for Teaching Natural Sciences) **(1997), Marja Montonen (ed.), Finnish Ministry of Education.**

This publication covers:

- objectives and methods for teaching sciences at the primary and secondary levels;
- designing instructional space; planning for ventilation, electricity and water supply and evacuation;
- equipment; labelling, storage and destruction of chemicals and biological matter;
- first aid training; safety practices for teaching in laboratories.

"Widening the Appeal of Science in Schools" (1998), Edwyn James, *OECD Observer*, No. 214, October/November.

This article is an overview of the knowledge gained from *Changing the Subject* (above) and presents implications of the current learning situation for the teacher.

WEB SITES

Association for Science Education – http://www.ase.org.uk/

The full text of "Inspecting Safety in Science: A Guide for Ofsted Inspectors in Primary Schools", produced by CLEAPSS, is found here along with a guide for secondary schools. Safety-related articles from ASE journals are also available at this site, as well as a list of publications on safety.

Centre national de la recherche pédagogique **– http://www.cndp.fr/**

Recent articles on multimedia laboratories are available under the section *Publications en ligne*.

Le groupe "Sciences Physiques Internet" de l'Académie de Grenoble **– http://www.ac-grenoble.fr/phychim/cadrprin.htm**

This site provides a variety of references on safety in the chemistry laboratory.

Multi-média et Internet : des outils pour l'enseignement **– http://perso.wanadoo.fr/svt1/**

This site of the French National Research Group for ITC in Life and Earth Sciences offers a visit to a biology laboratory and an example of student lab work using information technology and communications.

THE UNITED KINGDOM'S SCHOOL ASSET MANAGEMENT PLANS

Provisional Guidance on Asset Management Plans (AMPs) for schools was published by the Department for Education and Employment (DfEE) in August 1998[1]. These plans will help English Local Education Authorities (LEAs) to identify, agree and address the most urgent and important priorities in their school capital programmes, and to help in their longer term planning and management of the school estate. They will also help to underpin LEA applications to DfEE for capital support. LEAs will be expected to have the first stages of their AMPs in place within about a year, and have them fully operational within two to three years.

Background

Shortly after coming to power in the May 1997 British election, the Labour government announced its commitment to tackling the school repair and maintenance backlog by increasing capital spending by some £1.08 billion. This, together with £1.5 billion made available following the 1998 Comprehensive Spending Review, as well as private sector investment secured through the Public Private Partnership Programme, will mean that total capital expenditure on premises will have more than doubled by the end of this Parliament. The central aim of this new investment is to help raise standards and attainment in schools through improving the quality of the teaching environment.

Asset management plans

The aim of AMPs is to set out the information needed, and the criteria used, to make decisions about spending on school premises which raise standards of education and provide value for money.

The objectives of AMPs are to:

- provide an agreed basis for local decisions on spending priorities;
- bring together and co-ordinate the capital needs of other LEA Plans;
- help schools in developing their educational plans by making fair and transparent the process of decision-making across the authority;
- help in the development of public-private partnership projects;
- provide assurance to the DfEE that LEA prioritisation systems are sound;
- provide policy makers with a better national view of the state of the school building stock.

AMPs will cover all capital spending on schools. This will include spending from budgets held centrally by local authorities as well as those delegated to schools.

Five years should be a reasonable time scale for an AMP, with annual updating to reflect changing needs and priorities. This would allow time to programme and budget for repair and maintenance works, and for most small to medium-sized capital schemes. This period also corresponds with the system of quinquennial condition surveys and five year rolling maintenance programmes that many authorities operate. The Plan may, however, need a forward-look element beyond five years for larger scale projects and longer-term public-private partnership schemes.

AMPs will need to develop through a partnership of headteachers, governors and LEAs within a DfEE policy and funding framework. It will be essential for the respective bodies to understand their roles and responsibilities to make the partnership work. AMPs will need to reflect the needs and priorities of individual schools and take account of their educational development plans. LEAs, however, will also have strategic responsibilities that might not always match exactly the perceived needs of individual schools. In such circumstances, openness and consultation across all schools will be essential.

Stages in developing an asset management plan

Six main stages are identified below. Though these are listed sequentially, in reality there will be overlap and interrelationship, both between the different stages and the processes they contain. Furthermore, the whole sequence will need to be regularly reviewed and updated in a cyclical manner as capital programmes are implemented

1. Available from the Department for Education and Employment Publications Centre, PO Box 5050, Sudbury, Suffolk CO10 6ZQ, UK, Tel.: 44 845 6022260, Fax: 44 845 6033360.

and new programmes are identified. Development of the Plan by the LEA will probably require a multi-disciplinary approach involving the Education Department and its property advisers. The LEA will need to ensure that schools and their property advisers are also fully engaged in this process.

Stage 1. Initial policy statement. This sets out the framework of respective roles and responsibilities and the scope of the AMP. It would be worked up with the other partners, and provide the underpinning for the remainder of the Plan.

Stage 2. Assessing existing premises. This involves assessing the totality of the existing school premises in the area and gathering key data and premises performance indicators. To aid this process, and to help ensure national consistency, the DfEE will shortly be issuing guidance on these aspects (see "Next steps" below).

Stage 3. Identifying needs. This stage involves considering LEA Plans and School Development Plans; determining the "gap" between existing provision and current needs; and identifying areas of concern. The investment needs of school premises can be categorised broadly in terms of condition, sufficiency and suitability as follows:

- **condition needs** focus on the physical state of premises to ensure safe and continuous operation;
- **sufficiency needs** focus on the quantity and organisation of school places;
- **suitability needs** focus on the quality of premises to meet curriculum or management needs and other issues impacting on the role of the LEA in raising education standards.

Although described separately, in reality more than one of these elements may be addressed in a single project. For example, many of the advantages gained by designing suitability for curriculum into buildings should be achieved through projects which have been funded to tackle deficiencies in condition or to provide places.

Stage 4. Determining priorities. Using information provided in Stages 2 and 3, and in consultation with the other partners, LEAs will need to seek a consensus on local premises priorities. To enable schools to focus their funding applications on those areas which are most likely to attract funding, it may be helpful for the LEA to set out the agreed priorities in standard formats and circulate copies to schools.

Stage 5. Feasibility studies and option appraisal. This stage involves establishing the feasibility of alternative potential solutions to priority problems. For larger projects, consideration of a range of options is needed for a rationally based decision. Two "base-line" options would be the "status quo" and "do minimum" options. For each option, analysis of the main costs and benefits will establish the most effective and economic solution. This will normally involve the use of investment appraisal techniques.

Stage 6. Implementation, review and evaluation.
Implementation. In this stage, favoured options are further developed, funding and procurement issues are finalised, and approved schemes would be included with the appropriate capital programmes of LEAs or schools. On completion of new works, and consistent with good stewardship of the premises, LEAs/schools should draw up and implement planned maintenance programmes. Similar programmes should be put in place for existing school premises.

Review. AMPs are dynamic in nature. The outcomes from capital and maintenance programmes will therefore need to be reflected within the ongoing updating and review of the Plan, in terms of reprioritisation of projects, identification of new needs, etc.

Evaluation. It will be necessary to evaluate how well the Plan has worked in practice, some two or three years after introduction, in the first instance. As part of this process, the nature of the local situation at the outset will need to be clear to ensure that the effect of the Plan can be separated from underlying factors.

How DfEE will use LEA AMPs

Over time, DfEE plans to increasingly use the evidence from AMPs to inform the national distribution of capital resources for schools, and make less use of the one-off, mainly annual, bidding systems that have operated in recent years.

A key output from the AMP would be a prioritised programme, regularly updated, of projects that address the most serious and urgent needs of the LEA's school building stock in terms of condition, sufficiency and suitability. Where this is underpinned by a sound planning process, DfEE would aim to be able to respect those priorities and allow LEAs to tackle their needs with no further intervention from the Department. DfEE's intervention could then be in inverse proportion to LEAs' success in developing and maintaining an effective AMP process.

The DfEE will need to ensure that applications from LEAs for capital support are soundly based. Mechanisms are therefore planned to assess the robustness of AMPs. These will need to cover the quality of the Plan itself and of the underlying processes. These will include:

- the thoroughness of the LEA's consultations with schools;
- the commitment the LEA has secured from schools to the way it approaches the assessment of their premises;
- the objectivity, transparency and fairness with which the LEA prioritises capital applications across all schools;
- the realism of the LEA's plans to maintain and monitor the development of the AMP.

Next steps

To facilitate the development of AMPs, the DfEE will be shortly publishing further guidance on standard methods for assessing the condition, sufficiency and suitability of school buildings. Guidance will also be produced to encourage the development of a common framework for property information systems in LEAs.

This article was contributed by Alan Jones of the DfEE.

ALBANIAN MODEL SCHOOL

The school soon to be completed in Paskuqan, a suburb of Tirana, was created to meet the present and changing needs of the community. The long-lasting, flexible structure designed to stimulate learning is the result of a close collaboration between pedagogical and building experts. The Albania Education Development Project (AEDP) of the Soros Foundation has financed the school – for pupils in the first eight years of education – as part of its larger programme to foster the country's educational system.

Design for education

The design team has taken care to maintain structural quality while providing for the school's educational and extra-curricular vocations. The building's interior and exterior environments are expressly planned to facilitate the work of the pupils and teachers. Centred upon efforts of modernisation, the construction exceeds current Albanian building standards.

The Paskuqan School project

The final blueprint was chosen because of its composition of functional units. Teaching areas, administrative offices, faculty rooms and sports facilities are grouped according to function. Elementary grades (ages six to nine) and junior secondary grades (ages ten to thirteen) are separated but share an administrative centre, a central multifunctional hall and a gymnasium. Each grade system has its own entrance, and its classrooms communicate internally; the corridors of both sections lead to a spacious multifunctional area that can be used by part or all of the school for meetings, festivals or recreational activities. Administrative offices are located on each of the three floors of the building conveying easy access, while they are also connected by an independent staircase. The school's functional sections, in addition to offering independence, has facilitated construction in stages.

The project allows for a variety of teaching possibilities. Of vital importance is the classroom, where students learn through group work, experimentation and independent research. The architect was sensitive to the direct influence of a room's physical qualities on the effectiveness of teaching such as its size, shape, height, lighting, colour and furniture. Each of the sixteen classrooms is rectangular with a capacity of 30 seats and a surface area of 1.4 m^2 per student. Furniture and equipment can be arranged for various purposes depending on the subject of study and the teaching method. Classroom layout for the social sciences, for instance, encourages conversation and interaction. For the natural sciences, the layout gives priority to working individually and in small groups. Five special study rooms (e.g. physics and chemistry laboratories) provide greater possibilities for experimental work.

Corridors, perceived by the architect as an indispensable means of communication, were designed with optimum dimensions for comfortable movement. A central staircase connects all of the floors, and each school cycle has its own staircase

The Paskuqan School nearing completion

which can also serve for emergency evacuation. The hydro-sanitary installations, electricity and central heating system were equally designed with the vital functioning of the school in mind.

The school's location in the community, the slope of the terrain, solar orientation and climate were taken into consideration in the planning. The construction reflects traditional Albanian architecture, and finishing emphasises the school's aesthetic values. The grounds harmonise naturally with the building. The quality of the project, the spatial division and solid building materials – reinforced concrete and brick – will contribute to a long life for the Paskuqan school.

Role in the community

The Paskuqan school is expected to create close ties with the community and the local government. The structure will be used for cultural, sports and municipal activities organised for the community. In addition, investment in a new school building is certain to have a positive influence on the community's perception of the worthiness of education.

Costs

Albania has undergone important demographic changes since 1990. The State is faced with the urgent task of reconstructing many existing educational buildings particularly in certain rural areas. At the same time, the State is constructing new schools, though funds for these are insufficient to meet the needs of the country.

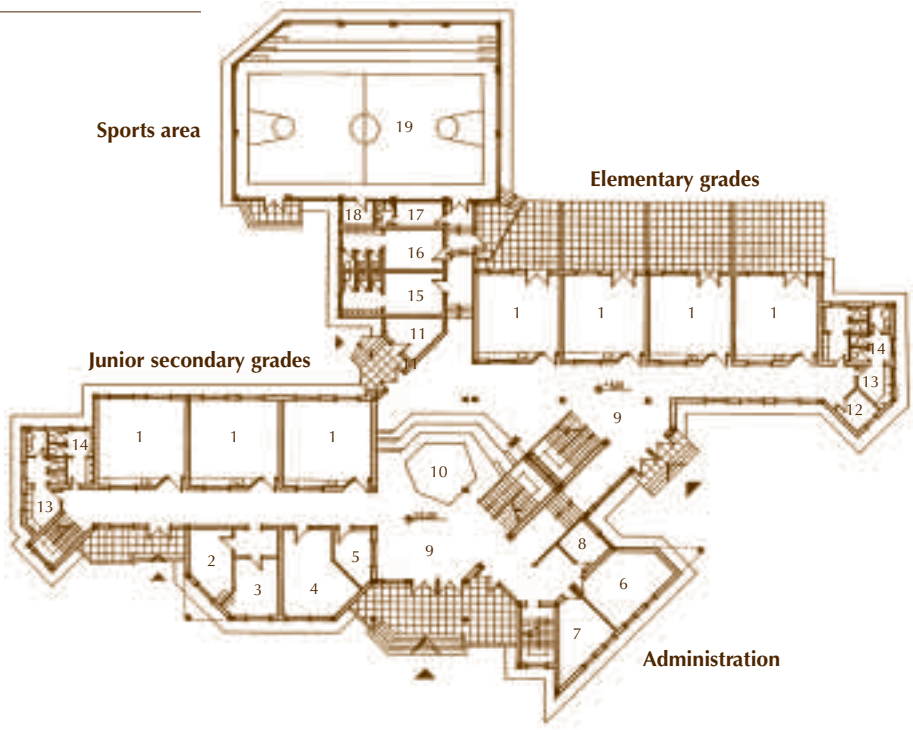
The Paskuqan school is being built at a cost of US$1 280 000 (of which US$360 000 is for the gymnasium), or US$300 per square metre. Though this is above the cost of most educational buildings in Albania, which range from US$230 to US$260/m^2, it is equivalent to the average cost of Albanian buildings on the whole.

Following the success of the Paskuqan project, the AEDP is constructing three larger model schools in Tirana. These improvements however come at a time when the situation in Albania creates an unfavourable atmosphere for teaching and learning.

For more information, contact Vera Kavaja, architect, AEDP, Open Society Foundation, Rr. Themistokli Gërmenji, Nr. 3/1, Tirana, Albania,
Tel.: 355 42 27731, Fax: 355 42 30506,
E-mail: vkavaja@aedp.soros.al

Ground floor plan

1. Classrooms
2. Doctor's office
3. Dentist's office
4. Library
5. Guard's office
6. Director's office
7. Secretary's office
8. Electrical room
9. Corridors
10. Multipurpose hall
11. Boiler room
12. Service room
13. Girls' restrooms
14. Boys' restrooms
15. Girls' locker room
16. Boys' locker room
17. Teachers' locker room
18. Storage
19. Gymnasium



AN INNOVATIVE SCHOOL IN TORCY, FRANCE

The Torcy Junior High School is located on the outskirts of the new town of Marne la Vallée in the Paris suburbs, between a motorway and a stretch of ordinary countryside on a site overlooking a small lake. The school has a capacity of 400 pupils and a surface area of 4 457 m^2. It was designed by *Avant-Travaux* and was completed in 1997. Special attention was paid to its geographic setting and to the various aspects of its environment, from its integration into the surrounding landscape to the design of its interior space. This awareness of the school's environment is matched by the high quality of the construction and careful attention to details.

An original architectural approach

The school is located in an evolving, partly urban, partly rural area in which contradictory elements abound. It responds to this setting by combining two conflicting styles, characteristic of the city and the countryside respectively. By juxtaposing these styles, the architecture stresses contrasts and plays on differences.

The building's design combines two quite distinct elements, a concrete base and a rectangular structure which appears to have been suspended over it. The base follows the contour of the ground, its sunken oval patio seeming almost to be a natural feature of the landscape. It resembles a cavern, an undulating space with a rough and irregular texture, the walls of which are unified by the same veined patterns in the concrete. Those entering the building see it as an open area that leads to all the school's activities.

On top of this concrete base, the architects have placed a rectangular structure, the sophistication and beauty of which derive from the materials chosen. The façade's lacquered steel walls, which contain copper and cobalt pigments, change colour in the shifting light, from indigo to mauve pink to a reddish-brown burnt sienna. The colours shimmer, and the glittering steel structure seems to be in perpetual movement whether it is seen in bright sunlight, in shadow, or lit from behind. It is a luxurious decoration that adds beauty to a simple form.

The school grounds and the landscape

The conception of the school grounds played a key role in the design of the project as a whole. The project originally included an orchard, but it was ultimately

Torcy Junior High School

not planted because of disagreements among the various local authorities. The ground floor seems to form part of the land itself, with its veined concrete walls that resemble strata in the earth. The patio slopes naturally downwards to the courtyard.

The classrooms are located in the upper part of the building. They are painted white and have been given as many windows as possible. Although the classrooms are quiet when the windows are closed, it can be very noisy when the wind is blowing from a certain direction because of the proximity of the motorway, which was an unavoidable planning constraint.

All the openings in the façade at ground floor level were carefully designed so that they would afford views of the countryside. The architects also gave special thought to recreational areas by designing a number of areas with no specific function. These are "free" areas, such as outdoor terraces, the patio and circulation routes in the upper part of the building, that pupils and staff members can occupy and use as they wish.

Space and light inside the building

There are no corridors in the building, which is brightly lit with natural light. Large picture windows and ceilings twice the normal height give circulation areas a spaciousness that is unusual for a school building. Windows are strategically placed so as to take full advantage of views of the countryside, woods and ponds. The circulation areas, which are much like galleries, are lit from above

or receive light from the central oval courtyard. For example, the documentation and information centre is located above the main entrance to the playground and opens onto the countryside through large windows shaded by metal sunscreens.

Conclusion: the cavern and the lorry

This dualistic project is based on a series of contrasts: earth, mineral, organic, heavy and opaque, on the one hand, and sky, metallic, technological, light and transparent on the other. It combines two environments, the town and the country, each represented by two elements that join and reconcile them, even though, suspended one above the other, they have little or nothing in common. The result is a harmony based on the contrast between the motorway and the rolling countryside, in which the upper part of the building is like a vehicle that has left the motorway and is in suspended motion over the cavern of the building's base.

The school is a most unusual structure but one which is integrated into its surroundings, between town and country and the motorway, and which tries to reconcile the aesthetics of clean lines, movement and tension with the more peaceful beauty of the landscape and its contours.

EDUCATIONAL FACILITIES IN KOREA

A programme is currently underway in Korea to modernise school buildings and equipment in order to better meet today's teaching needs. During the 1970s and 80s the Korean Government reformed its educational system, making fundamental changes in teaching methods, class time and curricula with a move toward open education in elementary schools and an individualised interactive learning approach in middle and high schools. In 1993, the Korean Institute of Educational Facilities was created to study building designs and equipment, such as computers, which would be suited for the new curricula. Composed of civil servants and experts in education and architecture, the Institute publishes its findings four times a year.

Most school facilities at the primary and secondary levels are not yet adapted to the reformed curricula and lack adequate conditions for a variety of teaching methods, but local authorities have made step-by-step plans to renovate their facilities.

A significant number of schools have introduced the concept of "open education" and every provincial authority is responsible for producing a model for open education. As new teaching programmes involve both individual and group work to respect differing ways of learning, school authorities are opting for classrooms with individual work tables that can be arranged for group discussion. The need remains for multi-purpose spaces, including learning resource centres with a library and video room. One example of flexibility common in Korean schools is classrooms which are open to the corridors, so the latter can be used for teaching if required.

Educational system

Korea's educational system is structured as follows:

- elementary school – compulsory: 6 years, for ages 6-11;
- middle school: 3 years, for ages 12-14;
- high school (general or vocational): 3 years, for ages 15-17;
- college/university: two-year junior college or four-year college/university.

After completing compulsory primary education, nearly all young people continue on to middle school. Students must pass an entrance examination to enter high school, and approximately 90 per cent are successful. High schools are generally divided into two categories, general or vocational schools.

Private institutions make up 35 per cent of secondary schools and 83 per cent of post-secondary institutions. State-owned facilities most often offer more space per student than private ones, and the Government recently laid out plans to expand non-curricular facilities such as dormitories and student cultural centres.

At the level of higher education, in addition to colleges, institutions called "open universities" provide instruction to the adult community and employed youth.

Numbers of Schools and Students in Korea; Available Space

	Elementary schools	Middle schools	High schools	Higher education institutions
Number of schools/ institutions	5 721	2 720	1 892	316
Number of students	3 783 000	2 180 000	2 336 000	2 112 000
Floor area per student	5.2 m^2	5.0 m^2	5.9 m^2	9.9 m^2
Site area per student	9.5 m^2	7.5 m^2	12.3 m^2	42.7 m^2

Source: Statistical Year Book of Education 1997, Ministry of Education, Korea.

Administrative system

The Korean Government is the policy-maker for primary and secondary education, while local education authorities implement the policies. Within the Ministry of Education, building stock is the responsibility of the Education Facilities Division of the Education Environment Improvement Bureau. The Division finances facilities for schools as well as for institutions of higher education and provides technical support for building construction.

A large part of the educational administration system has been decentralised in an effort to better meet the diverse needs of local education. The Ministry of Education delegates much of its budget planning and major administrative decisions to local authorities regarding school buildings in their area. Korea counts 180 district offices of education along with seven metropolitan and nine provincial offices. Their work is evaluated by the Ministry.

Standardisation of educational facilities

Standards for educational facilities established by the Ministry of Education exist for each school level. They regulate the number of facilities – school buildings as well as classrooms, laboratories, libraries, etc. – according to student numbers. The standards serve to evaluate the capacity of existing schools and determine the need for new ones.

Trends in schooling

Local development planning requires securing adequate sites for city schools in anticipation of the projected rise in the urban student population, a task that is becoming increasingly difficult.

Rural areas on the other hand have suffered a decline in student population as people have migrated to urban areas, leaving behind a surplus of classrooms in primary and middle schools in continual need of maintenance. In response the Government is now replacing every three to five lower level schools with one combined elementary and middle school. The schools to be closed, many of them built 40 or more years ago, will be torn down or where possible converted into special classrooms or facilities.

Newly built or renovated schools in the country are designed with rooms for adult continuing education, thereby providing services for people of all ages in the community.

Facilities for higher education

The Ministry of Education supplies each national institution of higher education with a framework for detailed planning of campus development and reviews their individual development plans.

There is a growing tendency for universities located in dense metropolitan areas to move their campuses to the outskirts of town. Such a move can offer a more pleasant environment, allow for further expansion and in some cases permit the university to consolidate previously scattered campuses.

In the early 1980s rapid growth in student numbers at the tertiary level created high demand for facilities. As demand has reached a plateau, resources are now being directed toward building maintenance, equipment and generally improving the learning environment.

Information and technology developments

Korean local educational authorities furnish each elementary and middle school with one or two computer classrooms. There are plans to supply computer network systems as well as Pentium-level personal computers to those schools whose computers are out of date.

A number of universities are well equipped in the area of information technology. Some universities, in addition to having advanced computer programs, have computers in every laboratory and professor's office; they are connected to networks used for administrative and instructional purposes. These networks allow students on campus to communicate with people off campus and, via Internet, with others around the world.

For further information, contact Gi Nam Kim,
Director, Education Facilities Division,
Ministry of Education, Sejong-ro Chongro-ku,
Seoul 110-760, Korea,
Tel.: 82 2 720 3306, Fax: 82 2 730 6068.

A classroom for "open education" at the Shinchang Elementary School, in the Cheju Province.

USEFUL WEB SITES FOR EDUCATION AND BUILDING

Albania

Albania Education Development Project

http://soros.org/aedp.html

Belgium

ARGO (*Autonome Raad voor het Gemeenschapsonderwijs)*

http://www.argo.be

Canada

Province of Quebec, *Direction générale du financement et des équipements*

http://www.meq.gouv.qc.ca/dgfe/inter.htm

Czech Republic

Ministry of Education, Youth and Sports

http://www.msmt.cz/

Ministerstvo školství, mládeže a tělovýchovy

Iceland

Ministry of Education, Science and Culture

http://www.mrn.stjr.is

Italy

Emilia-Romagna Region

http://www.regione.emilia-romagna.it/

Tuscany Region, *Servizio Istruzione e Politiche per l'Educazione*

http://www.regione.toscana.it/ita/uff/poledu/educa/educazio.htm

Japan

Tokyo Institute of Technology

http://www.titech.ac.jp/

Korea

교육부

Ministry of Education

http://www.moe.go.kr/

Portugal

Ministry of Education, *Departamento de Gestão de Recursos Educativos*

http://www.min-edu.pt/degre/

Slovak Republic

MINISTERSTVO ŠKOLSTVA SR

Ministry of Education

http://www.education.gov.sk/

Switzerland

Republic and Canton of Geneva, *Département de l'Instruction Publique*

http://www.geneve.ch/dip/main_enseignement.htm

PEB & OECD PUBLICATIONS

Facilities for Tertiary Education in the 21st Century
June 1998, 92 pp., OECD code: 95 98 02 1P,
ISBN 92-64-16081-7
FF 70 US$ 12 DM 20 £ 7 ¥ 1 500

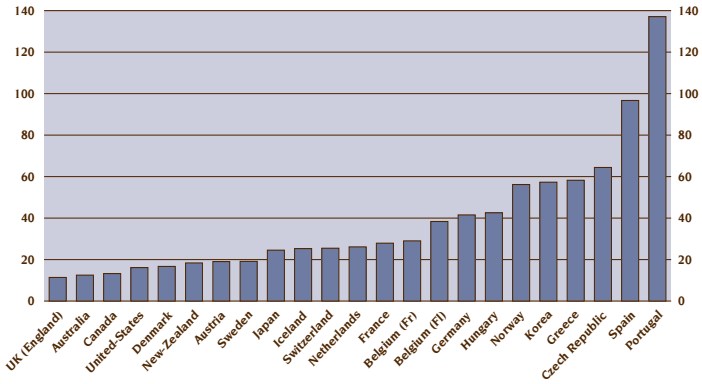
Under One Roof: The Integration of Schools and Community Services in OECD Countries
July 1998, 65 pp., OECD code: 95 98 03 1P,
ISBN 92-64-16110-4
FF 120 US$ 20 DM 36 £ 12 ¥ 2 550

Education Policy Analysis, 1998 Edition
September 1998, 84 pp., OECD code: 96 98 05 1P,
ISBN 92-64-16128-7
FF 120 US$ 20 DM 36 £ 12 ¥ 2 750

Education at a Glance - OECD Indicators, 1998 Edition
November 1998, 436 pp., OECD code: 96 98 04 1P,
ISBN 92-64-16127-9
FF 295 US$ 49 DM 88 £ 30 ¥ 6 700

The 1998 edition of *Education at a Glance - OECD Indicators* provides a richer, more comparable and up-to-date array of indicators than ever before. The indicators represent the consensus of professional thinking on how to measure the current state of education internationally. They provide information on the human and financial resources invested in education, on how education and learning systems operate and evolve and on the returns to educational investments. The thematic organisation of the volume and the background information accompanying the tables and charts make this publication a valuable resource for anyone interested in analysing education systems across countries.

Chart E6.1. **Average number of students per computer in schools where 8th-grade students are enrolled (1995)**



Source: International Association for the Evaluation of Educational Achievement (IEA)/TIMSS.

Indicators on the use of computers in schools is one example of data provided. The chart above is taken from the chapter devoted to "The Learning Environment and the Organisation of Schools".

OTHER PUBLICATIONS

***School Grounds: A Guide to Good Practice*, Building Bulletin 85,** Department for Education and Employment, Architects & Building Branch, September 1997
ISBN 0-11-270990-7, £19.95; The Publications Centre, PO Box 276, London SW8 5DT, UK.
Tel.: 44 171 873 9090, Fax: 44 171 873 8200.

***Guidelines for Environmental Design in Schools*, Building Bulletin 87** (Revision of Design Note 17), Department for Education and Employment, Architects & Building Branch, October 1997
ISBN 0-11-271013-1, £13.95; The Publications Centre, PO Box 276, London SW8 5DT, UK.

The School, the Community and Lifelong Learning by Judith D. Chapman and David N. Aspin, 1997
ISBN 0-304-33285-2; Cassell, Wellington House, 125 Strand, London WC2R 0BB, UK.

Provisional Guidance on Asset Management Plans, DfEE Consultation Paper, Department for Education and Employment, August 1998, free publication; DfEE Publications Centre, PO Box 5050, Sudbury, Suffolk CO10 6ZQ, UK.
Tel.: 44 845 602 2260, Fax: 44 845 603 3360.

L'état de l'École n° 8, Ministère de l'Éducation nationale, de la Recherche et de la Technologie, October 1998
ISBN 2-11-090825-4, FF 95; DP&D - BED, 58, boulevard du Lycée, 92170 Vanves, France.
Tel.: 33(0)1 55 55 72 04, Fax: 33(0)1 55 55 72 29.

New Environments for Working, The Re-design of Offices and Environmental Systems for New Ways of Working by Andrew Laing, Francis Duffy, Denice Jaunzens and Steve Willis, 1998
ISBN 0-419-209905; BRE, Construction Research Communications Ltd, 151 Rosebery Avenue, London, EC1R 4QX, UK.
Tel.: 44 171 505 6622, Fax: 44 171 505 6606.

"Pratiques corporelles et évolution du mobilier scolaire du XIXe siècle à nos jours" by J. Peyranne and J.F. d'Ivernois *Ann. Kinésithér.*, 1998, t. 25, n° 3, pp. 119-124, Masson, Paris
J. Peyranne, BP 12, 60260 Lamorlaye, France.

Ville, architecture, université, Ministère de l'Éducation nationale, de la Recherche et de la Technologie, 1998
270 FF; Éditions du Moniteur, 17, rue d'Uzès, 75018 Paris Cedex 02, France.
Tel.: 33 (0)1 40 13 30 05, Fax: 33 (0)1 40 41 08 87.

Since the early 1990s nearly 1000 construction or renovation projects, totalling 4 million m^2, have been completed in France as part of the Ministry of Education's University 2000 programme. A selection of 120 buildings, including several designed for student housing, are analysed here in detail with plans and photographs. The history and principles behind the U 2000 development scheme – including the return of universities to the city centre and the transition from teaching reserved for an elite to quality higher education for a larger number of students – are set out in this reference for a better understanding of today's challenges of campus planning.

ORDERING

If you do not already subscribe to ***PEB Exchange*** and would like to do so, please return the coupon below to one of the following addresses.

Australia
D.A. Information Services
648 Whitehorse Road, P.O.B. 163
Mitcham, Victoria 3132
Tel.: 61 (0)3 9210 7777
Fax: 61 (0)3 9210 7788
E-mail: service@dadirect.com.au

Germany
OECD Bonn Centre
August-Bebel-Allee 6
D-53175 Bonn
Tel.: 49 (0) 228 959 12 15
Fax: 49 (0) 228 959 12 18
E-mail: bonn.contact@oecd.org

Italy
Libreria Commissionaria Sansoni
Via Duca di Calabria, 1/1
50125 Florence
Tel.: 39 (0)55 64 54 15
Fax: 39 (0)55 64 12 57
E-mail: licosa@ftbcc.it

Japan
OECD Tokyo Centre
Landic Akasaka Building
2-3-4 Akasaka, Minato-ku, Tokyo 107
Tel.: 81 3 3586 2016
Fax: 81 3 3584 7929
E-mail: tokyo.contact@oecd.org

Korea
Kyobo Book Centre Co. Ltd.
P.O. Box 1658, Kwang Hwa Moon
Seoul
Tel.: 82 2 397 3479
Fax: 82 2 735 0030
E-mail: kyobo2.@uriel.net

Mexico
OECD Mexico Centre
Av. San Fernando 37
Ed. Infotec, Col. Toriello Guerra
Del. Tlalplan, Mexico, D.F., C.P. 14050
Tel.: 525 528 10 38
Fax: 525 606 13 07
E-mail: ocde@rtn.net.mx

United Kingdom
HMSO, PO Box 276, London SW8 5DT
Tel.: 44 (0) 171 873 00 11
Fax: 44 (0) 171 873 84 63

United States
OECD Washington Center
2001 L St. NW, Suite 650
Washington D.C. 20036-4922
Tel.: 1 202 785 6323
Fax: 1 202 785 03 50
E-mail: washcont@oecd.org

France and all other countries
OECD Publications
2, rue André-Pascal
75775 Paris Cedex 16, France
Fax: 33 (0)1 49 10 42 76
E-mail: sales@oecd.org
Web site: http://www.oecd.org

***PEB Exchange*, OECD Publications,** printed in France.

I would like to subscribe to PEB Exchange *(88 00 00 1)*
1999 annual subscription price (**3 issues**): FF 200, US$ 39, £ 22, DM 60, ¥ 4 500

Name: _____

Address: _____

❑ Cheque or money order enclosed.
❑ VISA No. _____
❑ Mastercard No. _____
❑ Eurocard No. _____

Expiry Date: _____

Signature: _____

PEB DIARY

March

24-26 – *Higher Education and Disability*, a conference organised jointly by the OECD Centre for Educational Research and Innovation and the French Ministry of Education, will be held in Grenoble, France.

Contact: Peter Evans, Fax: 33 (0)1 45 24 91 12, E-mail: peter.evans@oecd.org

May

2-5 – *A Framework for Quality: Evaluating Evaluation*. This conference organised by the International Network for Quality Assurance Agencies in Higher Education will take place in Santiago, Chile.

Contact: INQAAHE Secretariat, Tel.: 56 2 362 0823, Fax: 56 2 362 0826, E-mail: turevent@reuna.cl

June

16-18 – PEB will hold a seminar on designing schools for the information society, with special attention to libraries and resource centres. For more information, contact the PEB Secretariat.

20-24 – *The New Educational Frontier: Teaching and Learning in a Networked World* is the topic of the 19th World Conference on Open Learning and Distance Education. It will be held in Vienna, Austria.

For details see http://www.icde.org, or contact the International Council for Distance Education, Tel.: 47 22 95 06 30, Fax: 47 22 95 07 19, E-mail: icde@icde.no

23-26 – 20th UIA Congress: *Architecture of the 21st Century*. Sub-themes of this congress in Beijing, Peoples Republic of China, will cover architectural education, environment, urbanism, culture, professionalism and technology.

Contact: International Union of Architects, 51, rue Raynouard, 75016 Paris, France, Tel.: 33 (0)1 45 24 36 88, Fax: 33 (0)1 45 24 02 78.

July

24-28 – *Enterprising Education for the New Millennium*. The 34th annual international conference and exposition of the Society for College and University Planning will take place in Atlanta, Georgia, USA.

Visit http://www.scup.org/34.htm or contact SCUP, Tel.: 1 734 998 7832, Fax: 1 734 998 6532, E-mail: scup@umich.edu

October

24-29 – *The Changing Infrastructure of Tertiary Education*. This PEB/IMHE conference will include study visits to post-secondary educational facilities in Quebec and Montreal. Contact: PEB Secretariat.

30-31 – PEB will co-host an international symposium on the maintenance and renewal of building stock, security and information technology in Baltimore, Maryland, USA. Contact: PEB Secretariat.

PEB EXCHANGE

the journal of the OECD Programme on Educational Building

1999 subscription (**3 issues**):
FF 200 US$ 39 £ 22
DM 60 ¥ 4 500

(Single issue: FF 80)

P E B

OECD/PEB
2, rue André-Pascal
75775 Paris Cedex 16, France
Tel. : 33 (0)1 45 24 92 60
Fax: 33 (0)1 42 24 02 11

http://www.oecd.org/els/edu/peb/els_peb.htm

E-mail: richard.yelland@oecd.org

Richard Yelland
Head of the Programme

OECD
OCDE

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT