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## The Intelligent School

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*Buildings and facilities:* One eventual outcome of the scenario might be to move to an alternative – the market model, one of the re-schooling scenarios, the network society – each with its own set of implications for buildings and premises as discussed above. As the meltdown took hold, however, it would be likely that investments in physical capital would be very badly squeezed, as funds switch increasingly into salaries in an effort to attract more teachers. The detrimental effect of this on working conditions might be recognised as counter-productive, however, leading to some rectification of the neglect of educational plant.

*Issues arising:* There are many uncertainties in this scenario, but its value is perhaps less in its predictive power and more in sharpening awareness of the possibilities and their consequences. Some might judge it to be unlikely given the proven resilience and adaptability of school systems: they would argue that some matching of teacher supply and demand will always be achieved and “meltdown” avoided, though perhaps with costs to be paid in educational quality. Perhaps, indeed, the scenario is less plausible for affluent societies with burgeoning professional labour markets and more likely in societies where the highly qualified job market itself suffers wholesale collapse.

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## THE INTELLIGENT SCHOOL

On 14 and 15 December 2000 the Milan Centre for Educational Innovation and Experimentation (CISEM), a research institute reporting to the Province of Milan and the Union of Italian Provinces, held an international seminar sponsored by the province and entitled “Intelligent School – Towards the Scholastic Architecture of the Future”. It was attended by some 150 people from various professions – architects, local officials, researchers, teachers and education system administrators. Most of them were Italian but the topic also attracted speakers from other countries (Austria, Belgium, France and Mexico). François Louis was invited by the organisers to speak on behalf of the OECD in his capacity as chair of the Steering Committee of the Programme on Educational Building (PEB) since 1997. The present article is the contribution he made to the seminar.

Since its launch in 1972, PEB has been providing assistance to OECD Member and Associate Member countries participating in the Programme, the aim being to ensure optimal use of educational building resources at all levels. In liaison with various tiers of local government, it seeks to promote international exchanges on both policy issues and research and experimentation in the field of educational building, bearing in mind three main objectives:

- to improve the quality and suitability of educational buildings and thus contribute to the quality of education;
- to ensure the best use is made of the substantial sums of money which are spent on building, running, cleaning, heating and maintaining educational buildings;
- to give early warning of the implications for educational facilities policy of trends in education and in society as a whole.

The “intelligent school” approach developed in PEB’s work, particularly during the 1990s, ties in very closely with the vision emerging from the many other viewpoints expressed at the Milan seminar, particularly that of the CISEM. First, the “intelligent school” approach encourages the design of school architecture and environments that serve and foster learning. However, designing “intelligent schools” does not mean confining reflection to the role that new information and communication technologies and “smart” buildings should play in the school environment. It also means rethinking schools as “intelligently” as possible in terms of their mission and their environment.

## “Intelligent schools”: architecture and an educational environment conducive to learning

Thinking on “intelligent schools” is closely in line with work by PEB on “schools for tomorrow”, as well as the work by the OECD Centre for Educational Research and Innovation on the role of new information and communication technologies (ICT) in education systems, one recent outcome being an international conference on the subject in Rotterdam in November 2000.

### *Buildings and facilities to provide the easiest and broadest possible access to information and knowledge*

The “intelligent school” approach strongly emphasises the importance that can – and should – now be given to computers and multimedia in the design of school buildings and facilities, from a number of interrelated standpoints:

- ensuring these resources can be shared by all and are widely available by locating them throughout the school rather than in dedicated computer rooms;
- cabling and inter-school networking links;<sup>1</sup>
- locating and designing school resource centres and libraries. PEB held a seminar on this subject in Lisbon in June 1999.



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In this school for children aged 2-11, a series of interconnected multimedia workstations are linked to the Internet, including in the nursery school and in the library and documentation centre. Primary classes are encouraged to use word processing in written activities, and nursery classes use educational software.

Other factors, however, also enter into the equation:

- likely maintenance costs: lavish “showcase” facilities may be prohibitively expensive to maintain; the school of tomorrow is not necessarily futuristic;
- the pedagogical issue: the new ICT are not a panacea but a resource, an aid for students, especially those with learning difficulties;
- equal opportunities: new technology facilities for schools should not widen the gap between privileged and disadvantaged schools; a digital divide between schools must be prevented at all costs.

On the role of the new ICT, PEB published a report in 1992 entitled *New Technology and Its Impact on Educational Buildings*, followed by *Redefining the Place to Learn* in 1995; a report on the Lisbon seminar was published in 2001 (see page 24).

### *Functional, adaptable space to facilitate learning and foster academic attainment*

As well as buildings and facilities, the “intelligent school” approach means looking into spatial design. School architecture is not in fact neutral, although only one of many factors contributing to a smoothly run school and high student attainment.

Nevertheless, it is widely recognised by countries participating in the Programme on Educational Building that specific factors help to foster an atmosphere that is more conducive to learning. They include school size, the layout of buildings, leisure facilities or even corridors, and environmental factors such as lighting and wall colours.

By the same token, it is important to take the educational purpose of school buildings into consideration from the outset. Here, close dialogue with future users is a way of carefully integrating pedagogical requirements.

Another point worth stressing is the importance of adaptable, modular space, in particular to facilitate working in small groups and providing individual tutoring for some students; this will also encourage teamwork on the part of teaching staff. For while the new ICT will not “do away” with teaching, the challenge for the school is to go beyond infrastructure and facilities and seek to integrate these technologies fully into teaching practice. Emphasis on the flexibility of school buildings is not enough; there must be sufficient scope for innovation and for an effective appraisal of the impact of these technologies, the essential aim being quality.

1. A paper on the experiment “*Tutti in rete*” (“Everyone in Networks”) was presented at the Milan seminar.

It is this concern with enhancing the *quality* of education that underpins OECD work in the field. The same preoccupation has governed preparations for a second PEB compendium<sup>2</sup> of fifty-five exemplary educational facilities. Not only did the selection process look at the architectural quality of the newly built or renovated schools chosen in participating countries, it also studied the positive impact that architectural design and facilities (in particular new ICT) had had on the atmosphere in the school, on school life and on teaching conditions.

### **“Intelligent schools”: designing schools around their mission and environment**

Second, designing “intelligent schools” means giving full consideration to the school’s own mission and its environment, in other words reaching beyond the otherwise important issues of facilities, lay-out and “smart” buildings.

#### *An “intelligent” school should become a resource available for lifelong learning*

In January 1996 OECD ministers of education set lifelong learning as a priority in the Organisation’s work; schools were “a major social asset and should become ‘community learning centres’ offering a variety of programmes and learning methods to a diverse range of students, and remain open for long hours throughout the year.” PEB has successfully incorporated this broader mission for schools into its work, taking into account a whole range of elements relating to the provision of facilities for lifelong learning, including crèches and pre-school facilities, continuous adult training, and commercial and industrial vocational training. It has also focused on the needs of higher education. Several international seminars and publications have addressed these topics, including vocational training, (Quebec, 1994), making better use of school buildings (Lyon, 1995),<sup>3</sup> facilities management in higher education (Greece, 1995, and Quebec, 1999),<sup>4</sup> and the changing role and functions of university libraries.

So opening up to lifelong learning in this way, rather than just school-based education, is closely akin to the education and training approach promoted by the Organisation for Economic Co-operation and Development, a central concern of which is to optimise “educational investment”, given the considerable costs that spending on education and training represents in various countries. Educational facilities represent a very substantial investment in terms of both capital and recurrent expenditure for any society, and efficient management of educational assets remains a priority in OECD Member countries. Strategies for managing educational infrastructure are therefore aimed at optimising those assets and material resources. PEB held a conference

in Luxembourg in November 1998, with the European Investment Bank (EIB), on “The Appraisal of Investments in Educational Facilities”<sup>5</sup> and a seminar in Toledo in February 2000 on financing educational facilities.

#### *“A common good” that considers and serves its environment*

Finally, the “intelligent school” approach means viewing the school as a “common good”, a community centre, opening up interactively onto its environment and, in addition, providing support for and protecting that environment. The lifelong learning approach is an encouragement to go beyond strictly school-related needs. But school architecture is a “policy issue” in the noblest and etymological sense of the term, if we consider that a school is one of the few symbolic buildings in the “city”; it cannot therefore turn in on itself but should instead be a modern version of the forum, since the social concerns involved are very much in line with the economic concern for public resource optimisation. In this regard, PEB published *Schools for Cities* in 1995, and *The Educational Infrastructure in Rural Areas* in 1994, following a seminar in Belgium. Another seminar in Stockholm in 1996 addressed the subject of providing integrated schools and community services “under one roof”.<sup>6</sup>

As a resource structure that is an integral part of the environment it serves, an “intelligent school” should be clearly delineated, easily located and accessible to everyone, including people with disabilities, all year round. As such it will be open, yet protected where necessary if at risk from its surroundings; “Providing a Secure Environment for Learning” was in fact the subject of a seminar in Bologna and Florence in 1997.<sup>7</sup>

As well as relating to its close environment, a school can also play a decisive role in educating future citizens if it is in touch with the outside world, particularly via Internet, and if

2. *Designs for Learning: 55 Exemplary Educational Facilities*, 2001. The first compendium, entitled *Schools for Today and Tomorrow*, was published in 1996.

3. The report on the Lyon seminar was published in 1996 under the title *Making Better Use of School Buildings*.

4. *Facilities for Tertiary Education in the 21st Century* (“tertiary” meaning “higher education”), 1998.

5. A summary of this seminar and the main papers presented there were published by the OECD in February 2000 under the seminar title.

6. See *Under One Roof: The Integration of Schools and Community Services in OECD Countries*, 1998.

7. *Providing a Secure Environment for Learning*, 1998 (available in English, French, Italian and Spanish).



*Asqua – Centro di Educazione e Formazione Ambientale,  
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The Asqua Centre for Environmental Education, housed in a renovated forestry building, uses low-consumption electrical systems and promotes environmental awareness through hands-on projects.

it can raise their awareness of nature and the environment, in the broadest sense of the term. Its educational mission can be backed up by architecture and choice of materials and by running the school in such a way as to avoid wastage (*i.e.* heating, ventilation and plumbing systems designed to save energy and water), promote nature conservation and foster heritage awareness and enhancement. This concern is quite manifest in Italy, where some older, derelict buildings (factories, monasteries and even palaces) have been renovated with the dual aim of making them functional in terms of future use while respecting and developing their historic interest.<sup>8</sup> In this regard PEB's work definitely takes into account the "sustainable development" aspect promoted by the OECD in particular, and a seminar in the United Kingdom in 1998 addressed environmental conservation issues.

## Conclusions

Three main conclusions can therefore be drawn:

- For a number of years now, and more specifically over the past decade, PEB's work (seminars and publications) has been piecing together a picture or vision of schools for today and tomorrow.
- This vision – as pointed out in the introduction – is closely in line with the "intelligent school" approach described by the Italian speakers in Milan, particularly those from CISEM; here, there is an evident convergence of views.

- The approach of PEB is by no means a vision "imposed" from above; it builds upon contributions from the countries and institutions participating in the Programme, since PEB is a forum for discussion and exchange serving all the stakeholders, be they Member countries, local authorities or research institutions. The idea is to draw upon experiments and innovations by all concerned, if only to avoid making similar mistakes.

Financial contributions to the Programme are limited owing to its modest budget, but when it comes to schools for tomorrow – given what is at stake for our education system and society at large – this kind of programme is definitely worthwhile.

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8. See the first PEB compendium of exemplary educational facilities, *Schools for Today and Tomorrow*, 1996.