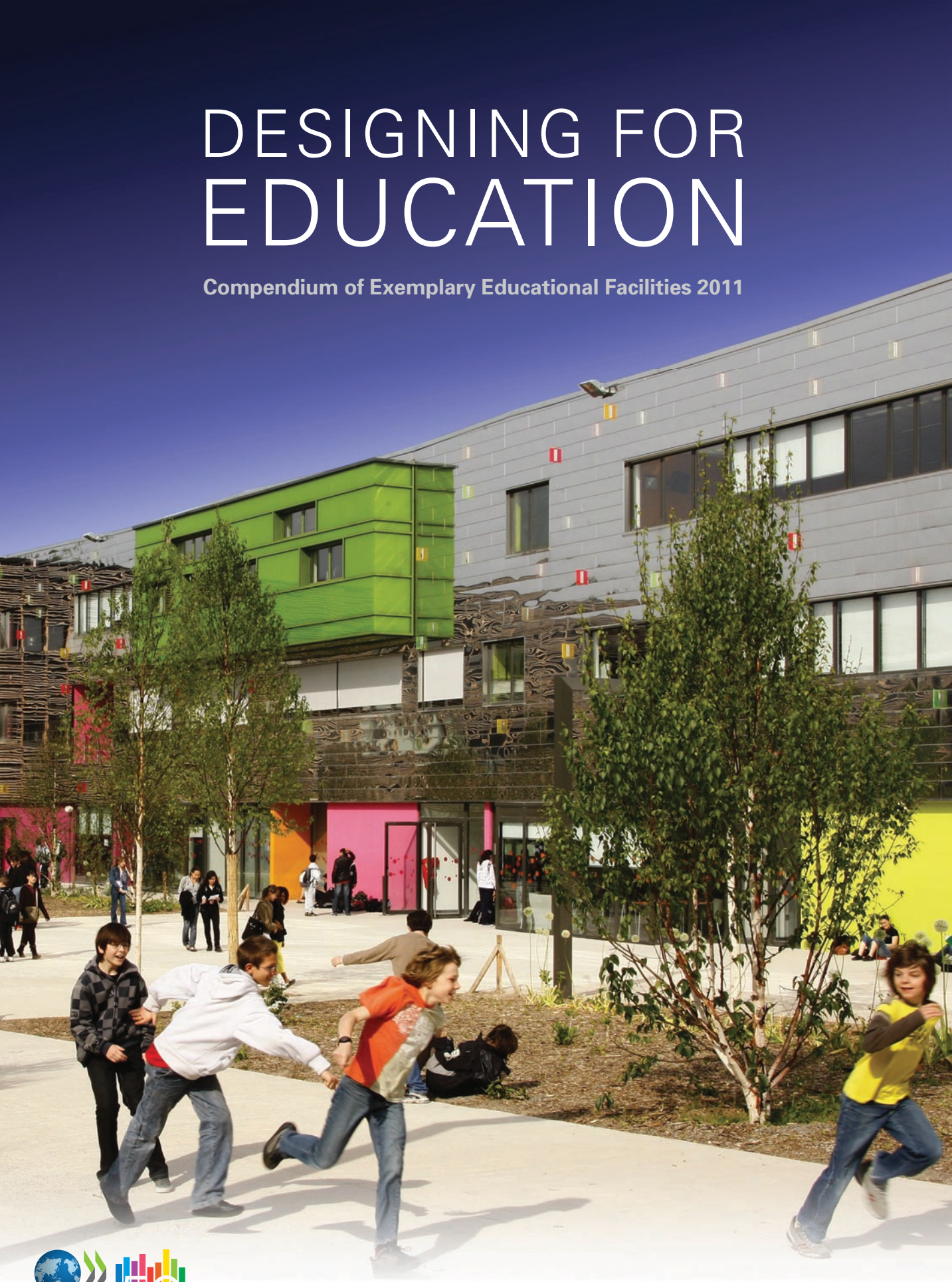
DESIGNING FOR EDUCATION

Compendium of Exemplary Educational Facilities 2011



OECD Centre for Effective Learning Environments

DESIGNING FOR EDUCATION

Compendium of Exemplary Educational Facilities 2011



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Designing for Education

COMPENDIUM OF EXEMPLARY EDUCATIONAL FACILITIES 2011

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Foreword

Education facilities are the theatre, the stage and the backdrop for learning at all levels from pre-primary to higher education and beyond. Educators everywhere are encouraging their students to explore more individualised learning and active engagement with learning within, and beyond, the classroom. As our approaches to teaching and learning evolve, so too must our learning environments.

High-quality education and skills development underpin innovation and economic growth. Schools, kindergartens and universities can also be an essential strand in a local urban regeneration policy. In times of budgetary rigour, investments in well-designed, multi-purpose local education facilities serve as a visible commitment to the community and a cost-effective way to revitalise local economies. CELE is leading the way in the international debate on the critical role of learning environments in supporting the needs of education and communities.

This fourth OECD *Compendium* showcases inspiring examples of how we can improve physical learning environments from around the world. It testifies to the commitment of many governments to creating more sustainable, manageable, effective and efficient educational facilities. As you will see, these buildings do not need to be technologically complex to be outstanding. They do need to be flexible and enable teachers to adapt their environments to suit their educational goals.

I would like to express my thanks to everyone who contributed to this fourth CELE *Compendium* – from the teams who prepared such high quality submissions to the jury members who had the challenge of reviewing them.

I hope that you will be inspired by these examples as we all strive to develop new ways of providing the effective learning and teaching environments that all students and teachers deserve.



Barbara Ischinger
OECD Director for Education

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The needs of education and communities must drive the design of educational buildings. A good building is one that supports its users and their activities. They do not need to be iconic pieces of architecture, but they do need to be fit-for-purpose and appropriate for their context. They should provide children with the best possible learning environments within which to grow and develop. With very significant capital investments in school infrastructure at present, it is critical not to waste the opportunity to develop a coherent vision of the type of school that will be relevant in the future. Within many communities, the school is seen as a special place of safety and happiness, as well as a beacon of hope for the next generation.

As education systems evolve – and our understanding grows about how for example pedagogy, new technologies and community engagement can impact on learning – the buildings in which these activities take place must allow for change. *Designing for Education* demonstrates how the design of learning spaces is evolving. It also shows how incorporating flexibility into the design brief can enable users to create different teaching and learning settings that cater for the wide variety of needs. Design can be a dynamic tool for creating spaces that can transform an innovative educational brief into truly magical learning places.

The work of the OECD's Centre for Effective Learning Environments (CELE) demonstrates how responsive learning environments come in all shapes and sizes. CELE is conducting research into pedagogical trends that may impact on future school design and the relationship between the physical environment and student outcomes. Sustainable educational facilities both minimise embedded and in-use energy and importantly, are able to adapt to meet the future needs.

Designing for Education illustrates what is possible by innovation. It provides all those engaged with creating and using learning spaces a rich range of examples from which to draw ideas and inspiration. I commend this *Compendium* as a reservoir of ideas and stimulation for creating the best learning environments that we possibly can.

I would like to thank everyone who made submissions, the high quality of which made the jury's task all the more difficult. I would like to thank members of the jury for tackling the task with such enthusiasm, giving generously of their valuable time and experience, and also the jury chair for leading the way with such commitment.

I hope that as readers you can draw inspiration and ideas from this publication: as educators and students looking for new or different ways of using your space and briefing architects; policy makers trying to set a framework in which educational facilities are constructed, managed and used; or as architects exploring better ways to meet the ever complex challenge of educational design.



Tony Sheppard,
Chair of the OECD Centre for Effective Learning Environments Board of Participants

Technical Manager, Planning & Building Unit,
Department of Education & Skills, Ireland

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The OECD Centre for Effective Learning Environments wishes to thank everyone who contributed to this publication, including the jury, those who made submissions and the production team, DSM.

Jury
The jury members generously gave of their time to go through a larger number of submissions compared to previous years. After much discussion, it agreed on the projects to be included – this was not an easy decision given the high quality of submissions – and offered ideas and reflections on the compilation of this publication itself. The chair of the jury not only guided the jury towards a final decision, but also provided CELE with encouragement and support, as well as practical advice throughout the process.

Those who made submissions
CELE gratefully acknowledges the assistance of the education authorities, institutions and architects featured in this publication. CELE also wishes to thank all those who made submissions, but who were not chosen to appear in the publication.

Authors
CELE would like to thank the authors of the perspectives in Part One, who provided insightful and stimulating reflections on learning environments, and helped develop the themes to be covered.

Production team
DSM Partnership designed the publication, and prepared and edited the text of the case studies. CELE thanks DSM for its support and for helpful advice on the production and development of the book.

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School Buildings Organisation of Greece
Junckers Ireland
National Institute for Educational Policy Research, Japan
Forbo Flooring Systems, Ireland

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Introduction

The objective of the *Compendium* – since its inception in 1996 – is to record the latest developments in educational facility design as well as to present exemplars from which policy makers, educators and architects can draw to inform and inspire decision-making.

CELE's fourth *Compendium, Designing for Education* not only does this. It also presents an opportunity to celebrate the advances made in educational facilities since the last edition five years ago and to look at how the development of educational facilities has led us to this point.

The publication of *Designing for Education* coincides with the 50th anniversary of the OECD and the 40th anniversary of the Centre for Effective Learning Environments (CELE). Much has changed in educational facilities over that time, both in how they are designed and what is expected from them.

Part 1, entitled **Meeting the needs of education**, includes a retrospective that looks back at the development in education during the life of CELE and its predecessor, the Programme on Educational Building (PEB). It reaches back even further to include the period immediately before PEB. This retrospective is seen through the eyes of PEB and latterly CELE, and so records the preoccupations of its members – largely national and subnational authorities – as well as experts involved in CELE/PEB. The context and the drivers of educational facility planning largely stem from the perspective of how governments can meet the changing needs of education, such as demographic shifts, individualised learning approaches, greater community use of facilities, and integration of ICTs.

Following the retrospective, three experts advance different viewpoints, providing thought-provoking reflections for all those who have a stake in creating effective 21st century learning spaces.

The first perspective by Christian Kühn explores the evolution of the classroom and argues for creating an infrastructure that will enable tomorrow's learning environments to develop over time.

The second, by Julia Atkin, explores how the learning space can be better designed to support teaching and learning, identifying the essential qualities of that space. Two case studies illustrate the application of these ideas.

The third perspective, written by Teresa Heitor – who works for Parque Escolar which is responsible for Portugal's secondary school building modernisation programme – explores the challenges of remodelling existing buildings to meet the needs of education.

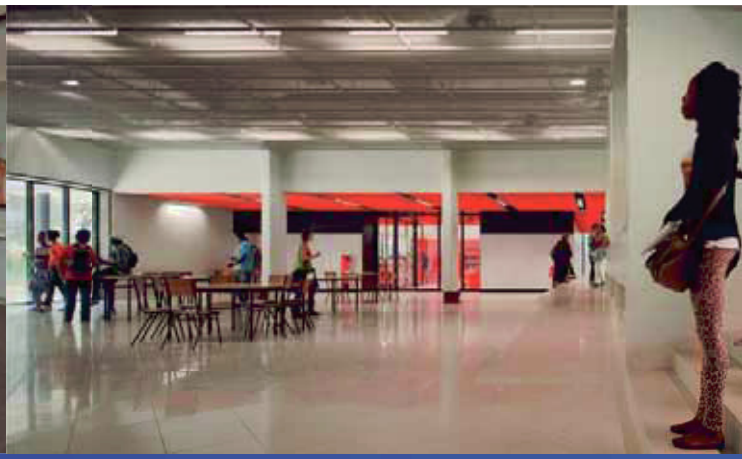
Part 2 showcases 60 **exemplary educational facilities**. The contribution of the physical environment towards improving the quality of education is the focus of the exemplars selected for the *Compendium* by an international jury. There are projects from 28 countries including both OECD member countries and non-member economies; together they illustrate a wide variety of solutions and provide a range of ideas for reflection.

The needs that an educational facility must satisfy are complex. Ultimately, the facility must provide an effective learning environment in a given context. To create such environments requires the participation of all involved from those setting policy, to those managing, using and designing the environment. A publication such as this provides a language for communication between these different stakeholders. In doing so, it aims to assist them in meeting both the demanding needs of the present and the uncertainties of the future.

This *Compendium* follows a first edition entitled *Schools for Today and Tomorrow* (1996), a second entitled *Designs for Learning: 55 Exemplary Educational Facilities* (2001) and a third entitled *PEB Compendium of Exemplary Educational Facilities* (2006).

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Meeting the needs of education

PART ONE



Chapter 1: **OECD looking back over 50 years of educational buildings**

BY | **ALASTAIR BLYTH, ANALYST, OECD CENTRE FOR EFFECTIVE LEARNING ENVIRONMENTS**

In March 2011, the Centre for Effective Learning Environments (CELE) held its first web-based seminar. The subject was standardised design. Representatives from nine countries took part across an 18-hour time difference – Edmonton, Alberta to Wellington, New Zealand (OECD, 2011). The participants could see each other, share presentations and discuss the relevance of standardised design for today's facilities. Not quite the same as physically being in the same room, but almost.

This seminar is significant for two reasons. First is the impact of technology on communication. When CELE's predecessor, the Programme on Educational building (PEB) was born on 1 January 1972, holding a meeting like this was inconceivable. Yet now, not only can an organisation whose remit is to facilitate international exchange do this, but so too can schools and universities, thus enabling them to exchange ideas from a classroom in one part of the world to that in another. The second reason is that standardised design was high on the agenda in PEB's first work programme in 1972 (Figure 1). In the 1960s and 1970s, the main concern was how to meet the demands of education expansion, when counties lacked capacity to construct enough buildings quickly. Today, once again, the main concern is minimising the cost and increasing the efficiency of the construction process through prefabrication and cutting the time for construction.



Figure 1. Tuxford School, Nottinghamshire. The Consortium of Local Authorities Special Programme (CLASP) formed in 1957 was one of a number of industrialised building systems developed in the 1950s, 60s and 70s to meet the pressures of cost and time of constructing schools. The OECD PEB study *Industrialised Building for Schools* noted that as diversity of need increases so does the diversity of environments which a standard system must be able to provide.

Early days of the Programme on Educational Building

The first mandate for the Programme on Educational Building was granted in June 1971 and work began on 1 January 1972. The focus on the programme was on improving the quality, speed and cost effectiveness of school construction. This reflected the pressure at the time faced by most countries to meet an increased demand in school places. The programme was concerned with the "effective utilisation of school building resources combining improved management of educational building investment and technical innovation in the construction process with the requirements of educational innovation". Today, there is almost no focus on innovation in the construction process but the other two concerns remain, with an emphasis on evaluating quality.

The programme's origins can be traced back to the Development and Economy in Educational Building (DEEB) project that involved Greece, Portugal, Spain, Turkey and the former Republic of Yugoslavia. DEEB dated back to 1962 when under the auspices of its Committee for Scientific and Technical Personnel it set up its Mediterranean Regional Project (Oddie, 1966). The OECD set up this project to identify how to get the most efficient use out of school building resources and to help countries establish national targets for educational expansion. The development of pilot school projects, for example at Mem Martins in Portugal (OECD, 1968) as part of the DEEB investigation is credited with playing a major role in developing Portugal's school architecture (Martinho *et al.*, 2008, Figure 2).

The importance of the DEEB project was stressed in the 5th session of the Standing Conference of European Ministers of Education held in October 1965. The

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Figure 2. Mem Martins School, Portugal, inaugurated in 1966, was a pilot project in the Development and Economy in Educational Building Project (OECD, 1968) played an important role in developing Portugal's school architecture. It was designed with four classrooms articulated around a central patio and showed a new concern for flexibility, especially in the use of the working areas. Although the gross floor area had decreased compared to traditional design solutions, the educational floor area per student had increased. © Rights Reserved.

conference recommended that the OECD and Council of Europe should hold a meeting of "high level" officials in governments responsible for school building programmes to exchange information and experience, and that the OECD should make available a report from its DEEB programme.

Marking change in education

A main concern of PEB since its beginning has been the impact of change in the educational context on both education itself and its buildings. In many OECD countries during the early 1970s, not only was there an increasing demand for school places as birth rates climbed and countries raised the school leaving age, but new pedagogical concepts were being developed and the curriculum was becoming increasingly complex.

These factors led to the development of new approaches to solving what was seen as the "problem of school building". The buildings needed to change, as this observation from one of PEB's first reports suggests: "Accommodation no longer consists of uniform classrooms, each equipped with thirty desks, a teacher's dais and a blackboard. Standard classrooms give way to a great variety of space. There are still areas for formal instruction, lectures or demonstrations, but these are replaced in part by: space for work in small groups, for discussions, for seminars; space for independent study and investigation…" (OECD, 1973). However, these developments were not universal. This current *Compendium* shows the extent to which uniform classrooms in their traditional form are still evident - in a way which might have dismayed the authors of that early report - and that one of the current debates concerns how to create a variety of spaces to meet different education needs (Figure 3).

However, during the early life of PEB (and OECD), the focus of the response to change was on the adoption of standardised design, particularly in the form of industrialised buildings and finding ways of meeting the substantial need for school places, quickly, efficiently and relatively economically. Hence the focus on the construction process.

By the end of the 1970s the context had changed. In 1979 at a major school building conference co-organised by PEB and held in Lochem in the Netherlands, it was evident that educational policies were shifting from the need to meet increasing school populations to the use of existing infrastructure and its adaptation to meet changes in pedagogy and technology. However, localised demographic movements and fluctuating enrolments would remain an issue, with the associated "school building problem" being resolved using relocatable classroom units.

The change in emphasis meant that countries began to focus on "rationalising" their school facilities estates.



Figure 3. Over the last fifty years there has been a gradual shift in focus from creating schools that support in general formal, classroom based teaching with uniform delivery to facilitating individualised learning. **Left**, A class in 1961 in Tahuna Normal Intermediate School, Dunedin, New Zealand. **Right**, A science class in 2010 at Senior Albany High School, Albany, New Zealand.

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Figure 4. In 1989, PEB showcased the early development phase of the Shared Secondary Education Campus, which is part of the innovative Golden Grove Community Development Project in South Australia (Mayfield and Trimper, 1989). An international model for quality integrated service provision, today, Golden Grove's unique shared campus facility – which includes three high schools and a state-of-the-art recreation and arts centre – serves more than 3 000 secondary school students within a vibrant community of more than 30 000 residents. **Left**, Golden Grove as it was when newly completed in **1991**. **Right**, today with the arts centre.

PEB's discussion paper (OECD, 1982) *Educational Building Policies: positive approaches to rationalisation* noted that rationalisation is too often perceived as "cutting back the estate". In some ways, this perception may have reflected the general political climate of the early 1980s as countries looked for ways of tackling national debts and how to cut expenditure. Today, governments are looking to the private sector to help them rationalise planning through forms of procurement such as public-private partnerships.

Attention became focused on how school facilities could be used by the communities they serve for services other than education. A series of volumes on *Building for School and Community* was published in the late 1970s (OECD, 1978). Although published 30 years ago, the series gives insights that are as relevant today as they were then. The reports note that if a real link between school buildings and the community was to be established, there has to be recognition that the co-ordination of community facilities is vital (Figure 4). But this demands "co-ordination both at the point of use as well as at the level of governance". In the 1970s it seemed difficult to meet the vision of integrated services for larger projects, some of which got bogged down by difficulties in co-ordinating across different agencies. However, smaller scale, neighbourhood projects seemed to be more successful. There was also a suggestion that integrated facilities are not necessarily a solution for revitalising urban and social life. Educational and socio-educational facilities were not thought to be stimulating in the same sense of say a cinema or café. Would this be true today?

Safety and security

Integration with the community raises the question of security. If children and teachers do not feel safe, learning will suffer, and making education facilities safe remains an integral part of the design of the buildings. Greater focus on lifelong learning and integrated services – for example, the OECD publication *Co-operation between the school and family* (OECD, 1996) – meant that security had to be considered in the broader context of compulsory and post-compulsory education. It had to include all facilities and activities shared with other partners, looking at the interaction between the architectural, socio-cultural, school leadership and management issues. Attacks within school campuses, as well as within the communities, saw school safety remain high on the agenda. In 2002 PEB co-organised an experts meeting with the US Department of Education on helping schools prepare for, and respond to, terrorist attacks (OECD, 2005). However, PEB's focus



Figure 5. Vergilio Ferreira School, Lisbon, Portugal, before modernisation (**left**) and after (**right**). Portugal's Secondary School Building Modernisation programme reflected the concern in many countries about modernising schools that had been poorly maintained during their lifetime.

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on safety was not confined to safety and security from human conduct, or structural integrity of the buildings, but also from the impact of natural disasters, and in particular earthquakes. An *ad hoc* experts meeting in February 2004 led to the *OECD Recommendation Concerning Guidelines on Earthquake Safety in Schools* (2005).

Maintaining large portfolios of buildings

Politically unglamorous, but nonetheless essential, the maintenance of the building stock has been an ever-present concern. Having tackled the demands of expansion and created significant stocks of school buildings in the 1960s and 1970s, it was managers who understood the need for timely maintenance of the stock. This was, and remains, an important policy issue since the cost of maintaining large portfolios of buildings inevitably ate into national and local budgets, and delay always leads to greater cost in the long term. Already, a lack of funding and a "marked" deterioration of the building stock was a concern for many PEB members. Delegates at a PEB seminar in Belgium in 1985 drew up an action plan for tackling the maintenance crisis (Bobbett, 1985). This included establishing realistic and dedicated budgets, establishing a condition survey and convincing policy-makers of the need to dedicate funds for maintenance. However, the recent school building modernisation programmes, for example in Portugal (Figure 5) and the United Kingdom (Figure 6), suggest that the maintenance "problem" was never entirely resolved. CELE's 2009 review of Portugal's secondary school modernisation programme shows the extent of effort needed to upgrade an existing stock of buildings (OECD, 2009).

The impact of technology on teaching and learning

During the 1980s the potential impact of the rapid development of information and communication technology (IT) was just becoming evident on the horizon and this would prove to be a constant theme of PEB work.



Figure 6. Kingsdale School, London, UK was a "sink" school that's only hope of survival included a renovation of the buildings in 2006. Involving the users during the project development was key to unlocking its potential to create a stimulating educational environment. The once external courtyard was covered with a transparent roof that gave a heart to the school and a space that could be used in a number of different ways. Special Mention in the 3rd *PEB Compendium of Exemplary Educational Facilities*, 2006. Architect: dRMM Architects.

During the lifetime of PEB and CELE, technology for education has always had a place. Earlier concerns about creating buildings with enough space for cabling have given way to making provision for technologies that give students and teachers almost limitless access to information beyond the school walls (Figure 7).

Whilst flexibility and adaptability of educational buildings have been constant themes from the beginning of PEB, with the adoption of industrialised building systems in the 1960s and 1970s, the emphasis on flexibility seemed to be geared towards technological solutions for example, installing partitions that were relocatable. Today, there is greater emphasis on creating a variety of spaces in a range of different sizes in which users can rearrange the furniture to suit different needs. However, the solutions



Figure 7. In 1976, the PEB report on "Providing for Future Change" (OECD, 1976) noted that the use of technology such as audio-visual equipment enabled temporary specialised workplaces in a general teaching are (**left**). Today, laptops and mobile devices enable students to learn anywhere at any time. **Right**, Scotch Oakburn College Middle School, Architect: Fielding Nair International.

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Figure 8. **Harmony Primary School, Perth Australia**. Completed in 2004 it was designed to integrate the principles of ecologically sustainable design into everyday school life. The roof was shaped to enhance natural ventilation and capture natural light. Published in the 3rd *PEB Compendium of Exemplary Educational Facilities*, 2006. Architect: Taylor Robinson Architects.

for adaptability, enabling more significant changes to be made to a building, were far from satisfactory. The report of the PEB seminar in 1989 on adaptability and flexibility in educational facilities listed several reasons why adaptability provided within the building was not made use of (Clynes, 1990). Often it was because the systems were too difficult to operate, it was too expensive to make changes, the users were unaware of the building's potential, and because administrative procedures inhibited such action. This stands as a reminder that the users should be engaged in the design process. Today, there is a growing concern about training teachers how they can use teaching spaces in a variety of ways. (OECD, 2009) This theme of usability underlies the issue of the sustainability of educational facilities, both in the green building sense as governments look to reduce carbon emissions, but also in the broader sense of providing physical environments capable of sustaining an educational use (Figure 8).

Usability is also at the heart of CELE's current project "Evaluating Quality of Educational Spaces" (EQES). Whilst quality has always been an implicit issue in many of the work activities of the programme with an increasingly explicit focus on it during the 1990s, the development of the EQES project from 2007 onwards was the first international attempt at evaluating school buildings.

Higher education spaces and places

Although much of the programme's early work focused on school facilities, higher education facilities became a concern as a university level education became almost universal and problems developed in relation to managing large university estates, catering for increasing student numbers and managing greater varieties of courses on offer. Many of the issues explored in the context of school buildings have been important to university facilities too: sustainability, flexibility, maintenance and technology are among these. A series of conferences titled "Higher Education Spaces and Places: for Learning, Innovation and Knowledge Exchange" developed from similar themes that ran in previous PEB higher education facilities conferences. The series title underlines the importance of knowledge exchange. Whilst primary, secondary and higher education are seen as distinctly separate, the closer engagement between universities and upper secondary schools, for example, and their use of shared teaching spaces, raises intriguing questions about how university facilities for the future will need to accommodate increasingly mixed populations.

Architecture at the service of education

The metamorphosis of PEB into the Centre for Effective Learning Environments in 2009 was a natural consequence of the shift in emphasis that had taken place during the first 37 years of PEB's life (Figure 9). It moved from an



Figure 9. **Left**, First published in March 1986, PEB Exchange (now CELE Exchange) has become an important communication tool for the programme. It offers members and readers the opportunity to exchange ideas and information. **Centre**, The cover of PEB Exchange February 1998 shows Futuroscope, Poitiers, France and **right**, the October 2001 issue focuses on the School of the Future, charting what was to become the dominant theme for the next ten years.

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emphasis on searching for technological solutions for mass education to developing a better understanding between the interaction of the educational users and their physical environment, and how to create and manage facilities that better meet the needs of users.

PEB was, first and foremost, a network of officials responsible in ministries of education (and elsewhere) for the provision of educational facilities. PEB was, and CELE continues to be, a forum for discussion and analysis of policy in the field of educational building. Today, much of the discussion is as likely to be between local authorities as between central governments. Although the responsibility for educational facilities design and management is increasingly being decentralised, central governments are more than ever focusing on the quality of education. Even where they are not directly responsible for delivering educational facilities, they still create the policy environment in which local authorities must act. There is more attention on learning outcomes and teacher training but also on providing quality educational facilities.

Educational buildings remain an important policy issue for national and local governments. Three reasons articulated in the *OECD Observer* in August 1990 are as true today as they were then: "The quality and suitability of the buildings in which children are educated is not irrelevant to the quality and effectiveness of the educational process as a whole … . The cost of building, running, cleaning, heating and maintaining schools – in round figures – accounts for 1% of GDP. If educational buildings do not reflect and, indeed, anticipate those changes [pedagogical and administrative], the capacity of the system to adapt itself will be impaired" (Yelland, 1990).

The role of the Centre for Effective Learning Environments is as important as it ever was in providing an international forum for governments, local authorities, educationalists and many more who are involved in creating policy, providing, designing and managing educational facilities to create useful and effective environments which support the needs of learning.

Footnote:

Many people have been involved in PEB and CELE as representatives of countries, experts and the secretariat. Their contributions to its success must be acknowledged. However, two key people deserve a special mention. One is Lizzie Gibson who led the PEB secretariat from its creation until 1989, the other is Guy Oddie an expert involved in and leading much of the early work, including the work of the DEEB. It was because of their hard work and determination that OECD Council saw fit to award PEB a mandate. It is also for this that we must both remember and thank them.

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Chapter 2: **Learning environments for the 21st century**

BY | **CHRISTIAN KÜHN, TECHNICAL UNIVERSITY, VIENNA, AUSTRIA**

What are the options for new learning environments beyond the traditional classroom? This chapter explores the evolution of the classroom over the last 350 years. It recounts attempts and failures to challenge norms and pleads in favour of infrastructure which will enable tomorrow's learning environments to develop over time.

When Eric Hobsbawm coined the phrase "the short 20th century", lasting – in his view – only from 1914 to 1989 (Hobsbawm, 1994) this implied some hope that the following decades might rather resemble the "long 19th century" in respect to its strong belief in rationality and science. It seems that the new millennium has proved this hope wrong: it has experienced its share of geopolitical, ecological and financial crises that few people could have expected after the fall of the iron curtain and the air of optimism that followed. At that time, education and training seemed to have one clear objective: to manage the transition to a globalised knowledge society on its way to unprecedented economic growth and social stability. Today, things have turned out to be more complicated. Education – being even more important than before – does not simply have to prepare for a specific, well-defined transition but also for global changes that challenge the imagination.

A study published in 2003 may be regarded as a reaction to this insight. *Key Qualifications for a Successful Life and a Well-Functioning Society* (Rychen and Salganik, 2003) identifies a set of three key competencies that, collectively, would equip an individual for life: "act autonomously", "interact in heterogeneous groups" and "use tools interactively". From the perspective of education, these qualifications go beyond knowledge and skills. "Acting autonomously" requires students to set their own goals, take their own decisions and assume responsibility for the results. "Interacting in heterogeneous groups" relates to a society that requires cross-cultural understanding and co-operation, both on the local level (due to migration) and on the global level (due to globalisation), but also across different age groups in an ageing society with changing patterns of employment. "Use tools interactively" relates to the importance of information technology as a driving force of both culture and the economy and to the fact that it requires responsible users who are able to tailor this technology according to their needs.

Today's students are engaging in a life-long endeavour to develop these qualifications and adapt them to the changes to come. It is most likely that the spaces supporting this effort will differ significantly from the learning environments we have come to know over the past two centuries years. The primary scenario these environments were designed for was that of a teacher instructing a group of students who would listen or watch and then be called upon to repeat the facts they had been exposed to. It is obvious that this setting is neither conducive to acting autonomously nor to interacting in heterogeneous groups. Furthermore, the use of digital whiteboards, for example, in class can make students even more passive than before. No "interactive use" of the medium is called for, as the students usually are watching, not acting. And as these whiteboards are costly, teachers feel a certain pressure to use them as much as possible.

Before exploring the options for new learning environments beyond the traditional classroom, take note that the classroom as we know it today has not been around forever. A famous painting by the Dutch artist Jan Steen dating from 1670 illustrates a surprising scene from a village school (Figure 1). Some of the children are sleeping, others are standing on the table addressing a group, and only a few seem engaged in studying as we know it. As for the teacher, he is passively watching the chaos. One might argue that this painting is a sarcastic comment on certain teaching practices of the times. But it is probably quite realistic, as what it portrays – a large space with tables and a teacher's desk in the centre of the room – can also be found in other paintings of classrooms of the same era, most notably in Jan Comenius' "Orbis Sensualium Pictus" dated 1658.

A completely different atmosphere is portrayed in Albert Ankers' German village school, painted in 1848, which shows a classroom scene 200 years on (Figure 2). There are rows of benches; boys and girls are separated, with

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Figure 1. Jan Steen, A School for Boys and Girls, National Gallery of Scotland about 1670. National Gallery of Scotland, purchased by Private Treaty with the aid of the National Heritage Memorial Fund 1984.



Figure 2. Albert Anker, Dorfschule von 1848 (Village School in 1848) Reproduced courtesy of Novartis AG, Basel.

the boys occupying the pole position and the girls placed on the sidelines. The teacher is armed with a cane, which helps him to at least impress the first two rows of pupils. To a large extent, this classroom is a by-product of the industrial revolution that had fundamentally transformed European societies by the mid-19th century. The school had become an institution designed to drill people for the economy of the machine age which depended on a reliable and productive workforce, *i.e.* people who could efficiently operate within a system without questioning it.

In terms of the basic setting, modern learning spaces are not so very different from their predecessors, at least as far as mainstream education is concerned. As modern as they look from the outside (take, for example, Jan Duiker's famous open air school in Amsterdam built in 1927, Figure 3) the classroom itself has hardly changed. Of course it has become spacious and light, and girls and boys are once again treated as equals. But it is still a highly controlled space, symbolising the idea of a functionally homogenous society. It is worth noting that not only the cane has vanished as an instrument of power, but that the photograph does not show a teacher at all. It suggests that the spatial setting is, by itself, sufficient to control the students. The image symbolises another stage in the industrial revolution, *i.e.* the rise of the service sector and a growing need for people working in administration.

It is obvious that this standard model has its advantages from a planner's point of view. It gives structure to the school building and enables the space to be divided into functional units: conventional classrooms, classrooms with special equipment and spaces for physical exercise, spaces for administration and support and circulation spaces. This structure and even the size of the classroom – the international average is approximately nine by seven metres – have survived in spite of major developments in the school system itself. While the 63m^2 were determined in the late 19th century by the simple formula "one square metre per child, one-and-a-half square meters for the teacher and one-and-a-half square metres for the stove", the same space that was regarded as adequate for 60 students at that time accommodates 25 today. This shift actually "made space" for new forms of teaching such as group work within the standard classroom, but only to a certain extent. More advanced concepts are definitely not supported. These include moving from teacher-directed to self-directed learning which reduces instruction time and increases project work; dividing up the social unit of a class into subgroups according to individualised learning

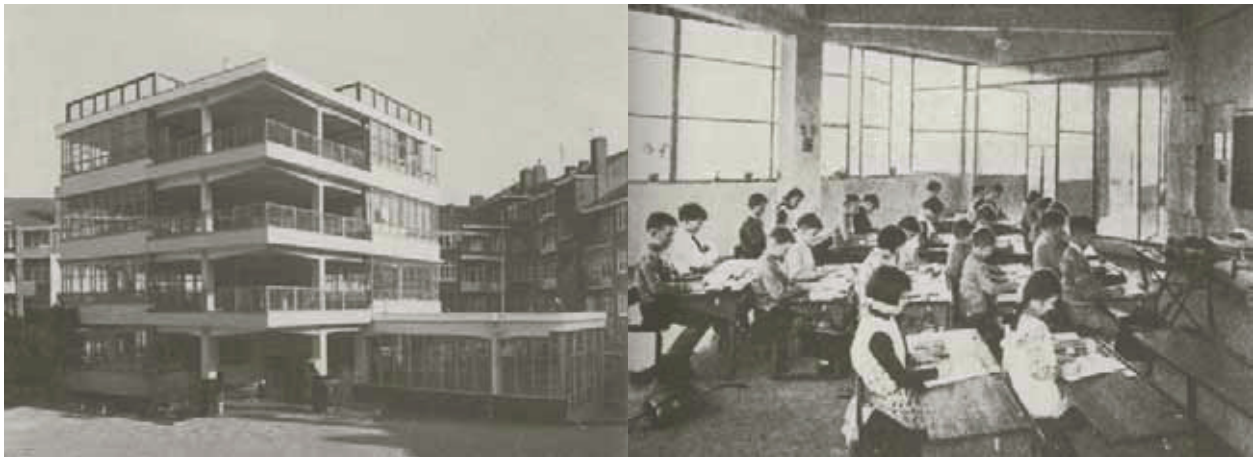


Figure 3. Jan Duiker, Open-Air School, Amsterdam, the Netherlands. Rights Reserved.

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outcomes; creating new forms of learning partnerships; teaching in teams and across disciplines; and opening up the school to the network of learning that surrounds it physically and virtually.

These ideas are by no means new: they have been around for decades in the reform-oriented sector of the school system, as embodied by Montessori and Helen Parkhurst's Dalton Plan schools, for example. What has changed is that today there is evidence from educational psychology that supports these reformers' basic ideas, which would all profit from a more diverse environment: different spaces for small and large groups; flexible learning spaces that can provide various settings with minimal effort; a social area that, rather than compartmentalising teachers and students, provides for intermediate spaces; and a better relationship between the school and the urban environment.

Although these requirements challenge conventional planning standards, they are not overly complex. But the classroom-based school has not yet been replaced by a new globally accepted model that together would constitute *the* 21st century school. This is all the more surprising given that practically all of today's "new" ideas were discussed, and to some extent implemented, 40 years ago. It is worthwhile to recall that these are, in fact, old ideas as they may hold the key for a more successful approach today.

Back to the future

In spite of some differences in development levels, in the late 1950s industrial countries experienced a sharp rise in demand for a better educated workforce. While for some years this was regarded by planners mainly as a problem of school intakes, the 1960s can be regarded as a turning point: the search for a new quality of education had begun. The post-industrialised, knowledge-based society, as it liked to see itself at the time, called for a complete overhaul of educational systems. Architects quickly reacted by proposing models of highly flexible infrastructures that could be adapted to practically any model of education (OECD, 1976; Clynes, 1990).

To quote but one example of 1960s thinking, in 1968, the Council of Europe held an international symposium in Ottenstein, Lower Austria, which aimed to set a new agenda for school design along the lines indicated above:

> "Replace the conventional class organisation by different groups according to age, performance and interest; augment the flexibility of school space and ensure that it can be adapted to different conditions and allow for different educational settings; allow the concept of the school to evolve from being a set of classrooms of equal size to one that regards the whole surface area of the school as a continuum of related educational spaces." (Pfromm *et al.*, 1969)

A survey of texts published in architectural journals between 1965 and 1975 shows that the ideas presented at this symposium, far from being marginal, were in fact widespread at the time (Kühn, 2009). The discussion among planners questioned the established typologies and pointed out that new schools would have to offer suitable spaces for a variety of learning activities: "self-learning, coaching and individual training; dialogue, discussion, group work; demonstration, lecture, event." This, it was thought, would lead to a new organisation of both space and time and signal the end of the standard classroom as well as the 45-minute units the school day is usually composed of.

The School Construction Systems Development project (SCSD), experimented in the 1960s in the United States, was a practical way to test methods for building better schools rapidly and economically. SCSD was conceived by the architect Ezra Ehrenkrantz for the Educational Facilities Laboratories (EFL), a non-profit corporation established by the Ford Foundation, as a specification for a modular system for educational facilities (Marks, 2009). By 1967, 22 schools had been built in conformity with the SCSD system proper; by the mid-1970s about 2 000 schools had been built following similar principles (Figure 4).

Based on earlier British examples, these schools provided large open spaces that could be subdivided by sliding elements. The schools were single-storey pavilions, with essentially artificial lighting and ventilation integrated in the roof structure (Educational Facilities Laboratories, 1967). The spaces inside were flexible, provided for different group sizes and team teaching, and allowed teachers to quickly rearrange the learning environment. Similar solutions can be found in many countries at that time, often in relation to efforts to establish prefabricated building systems.

In spite of some initial positive results, none of these schools was a lasting success. In the mid 1970s, when the last exemplars were still under construction, partition walls were being reinstalled in open-plan prototype school buildings in the United States. The spaces' sound proofing was insufficient. Artificial lighting and ventilation contributed to making users feel uncomfortable in spite of the control planners thought they had given to teachers over their environment through technical equipment and sliding elements. The main problem, however, is that staff had not been adequately trained to teach in these spaces, and as they were rarely involved in the planning process, they did not feel much incentive to live up to a concept that might have been promising in theory, but did not perform in everyday life.

From object to process

The failure of these attempts to radically innovate school design in the 1960s and 1970s should not be taken lightly. From a typological viewpoint, the solutions of this period

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Figure 4. SCSD Prototype: interiors. Educational Facilities Laboratories (EFL) (1967), *SCSD: The Project and the Schools. A Report from Educational Facilities Laboratories*, EFL, New York. Rights Reserved.

are actually very similar to the ones proposed today by architects and educationalists. But floor plan layouts are just one aspect of innovation: as in other areas, this has to be distinguished from idea and invention. Both of these are but two stages in a wider process that includes a change in attitude on behalf of many stakeholders. An innovative concept such as open plan can take years to be actually accepted, just as in industry decades can pass between a patented idea and its actual wide-spread implementation.

Some of the architects who wanted to innovate school design in the 1960s were obviously aware of the need to focus on the process. They called for new design strategies such as "permanent dialogue between educational experts, administration, politicians, architects and engineers and other stakeholders; continuous exchange of experiences about the schools that have already been built considering the above mentioned ideas" (Werk 7, 1969). Public authorities were far from ready to execute a planning process along such principles. Feedback loops that include users were regarded as an unnecessary distraction, and in many cases any direct contact between the architects and the actual users was explicitly forbidden. However, the importance of briefing was being discussed in international forums such as a seminar organised by the OECD Programme on Educational Building in which the briefing process was described as the whole flow of consultation and decision-making between establishing the need to build a school and its ultimate occupation (Pearson, 1975)

If there is any hope that today's attempts to radically innovate school design will be more successful than their predecessors it lies in different and significantly more inclusive design processes. It is not by chance that one of the most radical, as well as successful, examples of the past decade is the result of such a process. Hellerup School is situated in Gentofte, a suburb of Copenhagen, and was opened in 2002. It is a school without classrooms, organised on three levels around a large central space with natural lighting and a staircase that can be used as an auditorium. The school is home to 750 children aged 5 to 14 years old and their teachers. Three groups of 25 children share a common open-plan area that includes a kitchen and a staff room. Instruction takes place mostly in so-called "home bases", which are hexagonal elements with a side length of two metres and which are exclusively used by one group. Individual and group learning takes place during "construction phases" in the open space.

The important point here is not the innovative design result, but the design process behind it. The municipality of Gentofte invested in a two-year long dialogue with the future users who developed the concept in co-operation with the architects and engineers. The hexagonal home bases that are one of the distinctive features of the school were not a "design idea", but the result of discussions and experiments which included a 1:1 mock-up in a workshop where teachers tested and fine-tuned the design. Hellerup School may resemble the open-plan schools of the 1960s, but it is definitely not a universal, homogeneous space. It offers various well-articulated settings for teaching and learning that are the fruit of an inclusive and experimental design process rather than the creativity of its designers. Interacting and learning in heterogeneous groups takes place naturally in an open space like this, where teams can easily be re-arranged according to needs. Given its even more radical use of open space, the Fuji Kindergarten in Tokyo was selected as the most outstanding educational facility by the jury of this compendium.

Spaces for teams

Regarding learning environments as "spaces for teams" may well turn out to be the major paradigm shift in the design of educational facilities today. In numerous innovative companies in the business sector the open-plan office serves as a playing field for teams. The advantages of better communication and flexible arrangements have proved to compensate by far for problems relating to noise levels and distraction. If we expect schools to be innovative places that propel young people into the knowledge society with its potentials and difficulties, it seems natural to follow a similar path.

This will doubtless not be an easy transition. Replacing the hierarchical teacher-learner relationship by one which is team based requires major changes in attitude. Personalisation – a term that is currently replacing "individualisation" in pedagogical discourse – goes beyond maximising individual learning outcomes. In the

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Figure 5. Floor plan of Hellerup School, Gentofte, Copenhagen, Denmark, 2002, courtesy of LOOP.bz. Architects: arkitema.

21st century school each student's talents should be developed as far as possible, and this goal should be shared by the whole institution, *i.e.* the community of teachers and students.

To achieve this goal, both students and teachers need to interact in a variety of teams, work on different projects and also monitor and discuss each other's learning progress. It would be naïve to expect this model to be more easily manageable than the standard one and the spatial arrangements best suited for this purpose have yet to be found. Innovative examples exist, but we are still in the middle of a process that needs further experimentation.

For the time being, architects should refrain from the impulse to design the perfect learning environment but rather try to envision the infrastructure that enables effective learning environments to develop over time. This may seem to be a step back to times when the OECD ran a programme for educational buildings designed to promote standards for safe, secure and cost-efficient schools. But this is not the case. Infrastructures, in this context, should be regarded as open systems, well connected to existing networks of learning, both virtual and physical, memorable spaces in their own right that are not derived from any one model of teaching and learning. They should offer options to create micro-environments which are easily appropriated and controlled by their users, while at the same time give a feeling of connectedness to a greater whole. By leaving as much space as possible open for negotiation between function and form, architecture could once again become a social art.

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Chapter 3: **Transforming spaces for learning**

BY | **JULIA ATKIN, EDUCATION AND LEARNING CONSULTANT**

In the context of educational spaces, the word "transforming" implies that these can have a transforming effect on learning, but it can also mean making a thorough or dramatic change in the form, appearance, or character of something. Given that form follows function, intent "to make a thorough or dramatic change in form" suggests that there is a need for a radical change in the function of learning spaces.

Educational rationale for transforming spaces for learning

The clarity of the educational rationale for the function of learning environments and spaces is paramount if one is to both navigate through the complexity of transformation as well as make considered judgments on the merit of the emerging designs in terms of their potential to have a transforming effect on learning.

The design of education and the environments to support 21st century learning must be driven by a response to the 21st century context, clarity of educative purpose and contemporary pedagogy (the art and science of helping young people to learn).

The nature of the 21st century world, characterised by globalisation, post-industrialisation and unpredictable economic and social events, determines that a key aspect of our educative purpose must be to prepare young people for uncertainty and changes that are yet to come, and to prepare young people for a society that is in a state of rapid transformation. 21st century education is thus increasingly driven by a desire to develop young people's ability to be more adaptable, creative, collaborative, responsive, self directed and capable of being self managing in networks and less hierarchical settings and communities than their parents or teachers were at the same age.

These attributes and competencies are not developed by transmission of information. We do not learn to be collaborative or self-directed and self-managing by learning about being collaborative, by learning about being self-directed. We learn these skills rather through participatory, experiential learning: learning as an "apprentice" collaborator and self-manager, guided by a "master learner", the teacher, in settings that inspire creativity, active investigation and self expression, *i.e.* settings that are the antithesis of the standard industrial era classroom.

In parallel to the societal changes that have accompanied globalisation and the transition to the knowledge era, the last 20 to 30 years have seen an explosion in our understanding of learning and the development of refined pedagogical practices due to several factors. These range from a maturing of learning theory and educational psychology (Skunk, 2011), insights derived from neuroscience (OECD, 2007) and a societal drive not simply to give access to education for all but a drive to educate all members of society effectively. These developments, simply stated, have led us back to timeless principles of effective learning (Atkin, 1994; 1996). At its most powerful, learning is:

- **intrinsically motivated and lifelong:** learner driven learning is transformative and generative;
- **personal:** making personal meaning and building personal capacity in a safe, supportive but challenging environment;
- **relational:** gaining support and inspiration from learning in relation to others, deriving a sense of challenge and expectation from significant others;
- **holistic and experiential:** the whole person learns through participating in authentic, purposeful, experiential activities;
- **complex and non-linear:** holistic growth through active engagement and integration rather than simply accretion or accumulation of layers.

The clarity and simplicity of these five fundamental principles of effective learning, combined with 21st century needs, have significant ramifications for educational design and learning space design. Before looking at these ramifications in detail, it is helpful to envision the possibilities for 21st century education by comparing pre-industrial, industrial and post-industrial eras and to note the

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Table 1. Changing contexts for education and learning

LEARNING	Pre-industrial	Industrial	Post-industrial knowledge era
Style	Informal, personal	Formal, impersonal	Informal, formal AND personal
Place in community	Family, local community	School separate from community	Re-integration with community, integral part of community.
Location	Around the village pump	Confined, separate	Local- beyond local- global- virtual
Time	Anytime	Set times, set ages	Anytime throughout life
Form	Nature, environment, "apprenticeship", with people cross section of ages, in community	Mass production, uniform experience based on age bands, detached from community	Personalised in nature, learning in "apprenticeship", in community, single age and cross age
Source and resources	Experience, elders, life, people, family, community	Books, experts, teacher "who knows", 1:many	Anytime, anywhere, anyhow with anyone – both experts and fellow travellers
Context	Learning *through* life	Learning *about* life	Learning through AND about life through real life and virtual life

different forms education and learning have taken across these eras (Table 1).

Traditional industrial era education focused on ensuring that all young people develop fundamental competencies and knowledge that enabled them to take their place as adults who could participate and contribute to society as it was then. Given the requirements of work in the industrial era and the nature of society, education at that time emphasised uniformity and conformity. The teacher was considered to be the "knower" and the teacher's role was to transmit information to students. Thus, education in the industrial era emphasised the same experience for all in a given age group, at the same time, in the same place. The result was that there was a time and a place for learning and this was at school; school was detached from the community and the classroom was detached both visually and physically from its external environment; hence the standard industrial era classroom design and the transmission model of teaching.

A skim down the third column of Table 1 indicates that the post-industrial era presents the possibility of enhancing learning through information and communication technologies that give instant access to an extraordinary wealth of information while also transcending boundaries of time, geography and culture. However, even more striking is the fact that the post-industrial era both demands and makes it possible to emphasise the personalisation of learning and to nurture the capabilities of the individual within the community. There is a confluence between the principles of effective learning and the nature of learning required to survive and thrive in the complexity of the 21st century world. This shift in emphasis for learning in the 21st century involves more than building "a faster caterpillar". It requires a transformation that demands careful and thoughtful re-design of all aspects of a school: leadership, pedagogy, learning spaces, organisational structures and the place of a school in communities.

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Responding to the challenge of transformation
Integrating the five fundamental principles of effective learning with the emerging form of education for the 21st century leads to a set of guiding criteria for design:

Communities within community
Self-sameness at every scale. Develop groupings of learners and teachers in which each person is known, feels safe, has a sense of belonging and is prepared to help others learn. This means learning communities of students and learners within a house or sub-school, nested within a school community that in turn is nested within the wider community. It means ensuring that the school has a strong presence in the wider community both in terms of physical placement and structure as well as connections with the community.

Cross-sector collaboration, co-ordination and integration
Maximise integration and shared use of educational, wider community and recreational services and facilities through co-location and collaborative approaches to management and shared use agreements.

Innovative learning environments
Embrace pedagogical approaches and create innovative, contemporary learning environments that:

i Promote learning for students, professionals and the wider community through active investigation, social interaction and collaboration.

ii Support a full range of learning and teaching strategies from direct explicit instruction to facilitation of inquiry to virtual connection and communication.

iii Support disciplinary and interdisciplinary learning.

iv Move beyond the simplicity of flexible open spaces to integrate resource rich, special purpose spaces with flexible, adaptable multipurpose spaces to provide a dynamic workshop environment for learning.

v Support individual, 1 to 1, small group and larger group learning.

vi Are age-stage appropriate.

vii Facilitate learning anywhere, anytime, by any means, through seamless access to ICT, distribution of learning resources for ease of access in learning spaces and accessibility beyond the traditionally defined school day.

viii Activate and invigorate learning spaces – indoor and outdoor.

ix Inspire participation in, and responsibility for the learner's community.

x Enable all aspects of the buildings, building design and outdoor spaces to be learning tools in themselves.

Holistic
Ensure that education experiences contribute to a holistic lifestyle: learning, living, working, re-creating. Emphasise personalisation over institutionalisation; integration over segregation.

Integration with the environment
Integrate educational facilities into, and maximise their use of the natural, built, social, civic and cultural environments.

Ecological sustainability
Model ecological sustainability principles in all facets of the indoor and outdoor environments, buildings and landscape design.

Economic sustainability
Model commercial sustainability principles by embedding the potential for re-configurability, both in the present for multi-purpose use, and for changing needs over time.

Case studies of transformation
In this section some of the criteria for 21st century schools listed above, particularly those pertaining to the learning space design are illustrated in relation to two innovative Australian schools within the state education department of Victoria: Epping Views Primary School and Dandenong High School. In both of these cases an inclusive, collaborative, iterative design and development process was employed.

Epping Views Primary School

ARCHITECT: **Gray Pucksand**
CLIENT: **Department of Education and Early Childhood Development, Victoria**
TYPE OF SCHOOL: **Primary school**
NUMBER OF STUDENTS: **199**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **3 500m²**
YEAR OF COMPLETION: **2007**
CONTEXT: **New community**



Figure 1. A key driver of the design was integrating the school into its environment giving access to the nature reserve with significant native species such as red gum trees.

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Figure 2. Each learning neighbourhood incorporates external spaces including courtyards and covered walkways.

The site for Epping Views Primary School was disused farmland north of Melbourne. Unique to this project was the lack of a pre-existing residential community.

In the absence of an established user group, the development team adopted a surrogate user/stakeholder group to ensure that an iterative, collaborative process guided the design. This team included local council officers, parents of students at nearby schools, principals and leading teachers from adjacent primary and secondary schools, regional education leaders, sustainability co-ordinators and the estate developer.

Originally, the client provided a traditional education facilities schedule based on long-term student enrolment numbers and standard area entitlements for the different spaces. During the early stages of briefing, it became evident to the team that the modes of learning represented by these more traditional spaces were becoming increasingly irrelevant.

This led to a re-evaluation of the brief so that the new school could accommodate the emerging modes of learning, and achieve enhanced student learning outcomes and staff engagement. Workshops were used to test and explore the opportunities for creating a rich variety of learning settings whilst keeping within the area entitlement.

Integration with the environment and community

A driving force in the design was the integration of the school into its environment. The adjacent nature reserve represented an opportunity to anchor the built form into the site and establish a sense of place and environmental connectedness for the school community.

The site is laid out so that there are two learning neighbourhoods (Figure 3), and separate multi-purpose and administration buildings. The materials used in the composition of the buildings drew inspiration from the surrounding landscapes. Each learning neighbourhood wraps around an external courtyard, protecting it from the prevailing winds. These courtyards were located to take advantage of the views over the nature reserve, visually absorbing it into the school site. Glazing is strategically placed to ensure a strong sense of connection between each building, the spaces between them and views beyond. As a result, the inside and outside spaces merge with the natural environment to form external spaces to internal neighbourhoods and provides a sense of transparency and accessibility to activities both inside and out.

Opportunities for shared community use were also essential and the school's facilities are sufficiently flexible to be used for out-of-school activities such as meetings and performances.

Creating innovative learning environments

Internally, each building has a unique colour and palette of finishes to help personalise and establish a specific identity within the broader school community. What would



Figure 3. Site plan. The school is structured in two main complexes or learning neighbourhoods linked by all-weather walkways.

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Figure 4. Plan of learning neighbourhood.

have been standard sized classrooms of 63m^2 along travel corridors have instead become a set of varied, integrated learning spaces using the same area. The studios provide home base areas within each of the learning neighbourhoods and create small learning communities. Small group presentation spaces, quiet spaces, project spaces and seamless access to ICT all support a variety of learning activities and student-led inquiry (Figures 5 and 6). By redistributing the area entitlement for art space each neighbourhood has two separate, creative investigative spaces that interface with external learning spaces, as well as a clear-floor, multi-use space. All studio and project spaces are connected to larger internal activity spaces as well as sheltered external breakout areas resulting in spaces with high levels of permeability.

A shared central agora, located north of the multipurpose building, provides a focus for whole school community building and allows for more formal gatherings, performances and recreational activities.



Figure 5. Creative investigative space.



Figure 6. Large multipurpose space.

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Dandenong High School

ARCHITECT: **Hayball**
INTERIOR DESIGN: **Mary Featherston**
EDUCATION CONSULTANT: **Dr Julia Atkin**
CLIENT: **Department of Education and Early Childhood Development, Victoria**
TYPE OF SCHOOL: **Lower and upper secondary**
NUMBER OF STUDENTS: **2100**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **21226m²**
YEAR OF COMPLETION: **2010**
CONTEXT: **Town**



Figure 7. Entry to one of the seven houses.

Three high schools were amalgamated to create the current Dandenong High School. A large proportion of the students are from non-English speaking backgrounds and many are new immigrants. Merging three schools provided considerable challenges to an inclusive, collaborative process, not only in terms of honouring the traditions and cultures of each of the schools whilst creating a new school and new culture, but in dealing with the sense of loss experienced by each of the school communities. Absolutely crucial to the Dandenong High School success is the synergy achieved through collaboration between effective school leaders, responsive architects, imaginative designers, flexible DEECD facilities planners, teachers who were willing to learn, enthusiastic and appreciative students and a committed wider community. The driving force throughout has been a focus on ensuring that the vision and values established by the whole school community is realised. Every aspect of the educational design has been redeveloped including leadership (staff and student), organisational structure, curriculum, pedagogy and facilities.

Currently, the school is focusing on embedding its approaches and refining them through processes of ongoing critical reflection and provision of support for professional learning.

Communities within communities

It was vital to establish a sense of belonging and community. It is easy for individuals to be overlooked in a large school so, given the size of the student population, it was key that both the physical and organisational design be based on a smaller learning community size. As a result, the school was designed around the concept of schools within schools (SWIS). Each of these SWIS, or houses as they are known at Dandenong, are home to 300 students from Year 7 (age 12–13 years) to Year 12 (age 17–19 years).

A House Leadership Team leads each house. In addition, a student leadership team composed of senior students acts as mentors for groups of 12 students in Years 7–12. The student house leaders also work as a whole school team. The staff house leaders are responsible for the internal leadership of the house, and for ensuring that their house pedagogy and culture are congruent with the school's values and vision while being free to support the house in developing its own unique character. This creates a strong whole-school approach and a robust house spirit.

Innovative learning environments

Each house has a staff team of 25 teaching and support staff. Teachers work in collaborative teams of 3:50 across many of the curriculum learning areas. Most of the learning time for Years 7–10 students is house-based with learning in some areas occurring in specialist facilities. Years 11–12 students mix more across houses in learning groups to access the courses that suit the pathway they have chosen. Along with the school vision and educational rationale, Dandenong has developed four principles of effective learning: community of learners; transformative learning; enlarging experience and enriching futures; and the spirit of learning. Teachers have a strong commitment to collaborative learning and teaching as a means to achieve their vision.

The clarity the school now has about its leadership and organisational structures, its way of being and working and the learning that it values has emerged in a dynamic way throughout the process of development and is continually being refined and elaborated. Herein lay the challenge for the design of the learning spaces and facilities. At the stage when the school vision was still being translated into practice there was a need to finalise the internal design of the seven houses. The danger was that an old model, or an old model slightly adapted would be adopted for expediency's sake. This was avoided due to the courage of the leader and the responsiveness of the architect. Thus, the structure and form of the "shell" of the houses was agreed upon early on: the development team explored and generated ideas, after which the design of the internal learning spaces emerged and a prototype was tested.

A key process, in which the interior designer facilitated the emergence of the learning space design, involved the team imagining all the different types of learning activities

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Figure 8. Dandenong High School is divided into seven houses.

they would want to engage the students in, the types of learning settings that would support those activities, the number of students involved, and the number and type of spaces that needed to be available simultaneously. This process generated many ideas for the designer to work with and served to transform the teachers' vision of what learning spaces could be. The school's principles of learning rather than the designs of the past had become their reference points.

It was not until the teachers began to work in collaborative teams and in the new spaces that the real transformation began. It remains an ongoing journey, but there is no doubt that the learning spaces are contributing to transform the way that both teachers and students learn.

Conclusion: transforming spaces for learning

The biggest challenge in transforming spaces for learning lies in transforming the industrial era concept of schools, and this represented a paradigm shift. These shifts are notoriously difficult. However, developing clarity about the purpose behind transforming spaces and the commensurate guiding criteria for design is only the first step. The plethora of current attempts to transform spaces for learning do not signify the beginning of attempts to redesign schools, rather they represent another cycle in the process – a cycle, nonetheless, that shows signs of a critical mass of the educational community worldwide developing shared understandings and aspirations.

There are several differences between this current cycle and the open classroom attempts of the 70s. There is a more sophisticated understanding of learning, information and communication technologies that lend themselves to enhancing and enriching learning and supporting personalised learning. Also, there are signs of increased collaboration between the various professional groups that together are the agents for educational facilities design and implementation, for example, the educators, architects, interior designers, landscape designers, urban designers, facilities managers and government agencies. It takes genuine collaboration to achieve a common purpose for learning and an inter-disciplinary and inter-agency approach that leads to an architecture that supports the needs of learners and has an impact on learning.

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Figure 9. Learning spaces have been designed to enable a variety of individual and group learninig settings.



Figure 10. External spaces can become an extension of internal spaces.

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Notes

1. See, for example, the Melbourne Declaration on Educational Goals for Young Australians, www.mceecdya.edu.au/mceecdya/melbourne_declaration,25979.html, accessed 10 June 2011; the vision of the New Zealand Curriculum http://nzcurriculum.tki.org.nz/Curriculum-documents/The-New-Zealand-Curriculum/Vision, accessed 10 June 2011.

Dr Julia Atkin is an independent education and learning consultant who assists schools in Australia and internationally in basing their design of all aspects of education on a deep understanding of how people learn. She has received a number of prestigious awards for her work including being named one of Australia's Smart 100 – a list of 10 people in 10 fields making a difference to Australian society through innovation.



Figure 11. Different learning zones are created with minimal physical intervention.

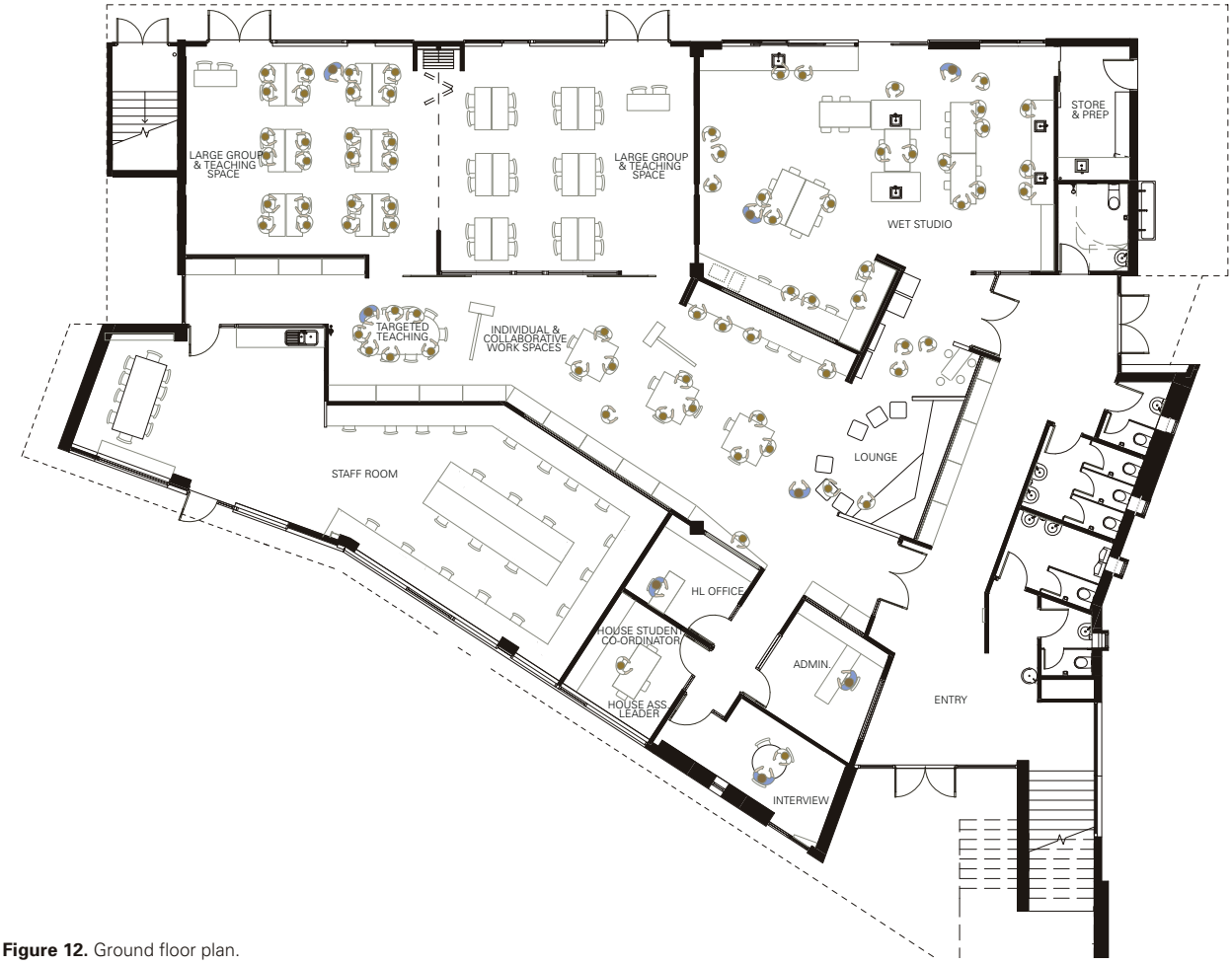


Figure 12. Ground floor plan.

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SBO shares responsibility with local administration for the planning and construction of school buildings in Greece while it is solely competent to supply schools' equipment (desks, boards etc.) all over the country.

Core values and vision of **SBO** is to provide the Greek students and teachers with contemporary ecological learning environments that help enhance national education.



Primary school in Athens

Situated in a challenged area of the city of Athens, the land intended for the 150th Primary School had in place a deserted listed house of the 19th century.

The listed building had to undergo a series of transformations in order to suit the needs of a modern school infrastructure for pupils coming from a widely multi-cultural environment.

The architects refurbished the old residence and added a new modern one adjacent to it. The complex is an excellent example of harmony between traditional and modern architecture.

At the same time, the school complex provides energy-efficient solutions, access for pupils with disabilities and security for those youngsters going to school in a difficult Athens' neighbourhood.



Bioclimatic kindergarten in Peristeri
(wider Athens region)







A model of an energy-saving building,
the 26th kindergarten in Peristeri was a great dare for architects and engineers who conceived and materialised a modern bioclimatic school on a multiple-angle bizarre shaped land.

Despite the constraints, the final design exploits the Athens' climatic advantages at the utmost. It features elements such as a green roof-top, natural lighting and ventilation systems from skylights and natural shading and cooling systems from southern oriented blinds.

The school was constructed in 2007; testimonials from teachers and children show that it is a very satisfactory learning environment.

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Chapter 4: **School building rehabilitation: thinking strategically towards excellence**

BY I **TERESA V. HEITOR, DEPUTY DIRECTOR, PARQUE ESCOLAR, PORTUGAL**

By the end of the 20th century, school building rehabilitation was attracting considerable attention: in some countries, an increased focus on improving student outcomes, coupled with a significant increase in capital funding for school buildings, led to a comprehensive modernisation of school facilities.

This chapter aims to increase understanding of both the design process and strategies that might contribute to accommodating the 21st century educational agenda and its organisational implications, while making the most of available resources.

Introduction

The global "democratisation" of education in the 20th century led to a dramatic increase in access to education, putting pressure on school provision. It is recognised that a successful education policy depends on the quality of the school assets and the capacity of these assets to support specific geographic and demographic needs, as well as to meet curriculum requirements.

However, the way in which learning occurs in many classrooms has put pressure on existing facilities built for a "one size fits all" model of teaching and learning. Developments in educational research suggest that a paradigm shift is required to ensure that the school environment in the 21st century will be radically different from that of the 20th century (Fisher, 2005; Gaffney *et al.*, 2008; Oblinger, 2006; Scott-Webber, 2004). Research indicates that learning spaces must be reconfigured to better support different teaching and learning practices, as well as to facilitate a more decentralised learning process, which is no longer confined to classroom space and time.

Studies consistently show that high quality school facilities have a measurable positive impact on student outcomes and attendance rates: they are crucial to improve the quality and effectiveness of education, know-how, lifelong learning, social participation and well being. Similarly, teachers cite the physical condition of their schools as a critical factor for effective teaching (Schneider, 2004).



Figure 1. Rodrigues de Freitas, Porto, Portugal.

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Figure 2. Sá de Miranda School, Braga, Portugal.
The library after renovation.



Figure 3. Ruy Luis Gomes School, Laranjeiro, Portugal.

Having taken into account variables such as socioeconomic status, research also reveals that schools with poor environmental and functional conditions, such as inadequate acoustics, heat, light and air quality, critically affect student achievement and behaviour and can inhibit the effectiveness of learning strategies. Furthermore, school buildings with damaged and aging systems can be a threat to students' and school staff's health and safety (Higgins *et al.*, 2005; Rudd *et al.*, 2008; Schneider, 2002).

School rehabilitation also offers both direct and indirect benefits to the overall community. Schools can shape the appearance and atmosphere of the urban environment, providing an anchor for social revitalisation and economic development. (Figure 1) Besides sending the message that education is valued, a commitment to improving school infrastructure will help to make a more efficient allocation of resources in the educational sector, combat social exclusion of more vulnerable groups, and promote equal opportunities in the widest sense.

Moreover, the reuse of school buildings – as opposed to the decision to demolish and build new ones – will contribute to support healthy living and promote environmental awareness and social responsibility, as part of a comprehensive and lifelong approach. The demolition and replacement of existing school buildings has a higher carbon impact.

The challenges facing school rehabilitation

In some countries, despite the inherent advantages of school building rehabilitation, there are several barriers to adaptive reuse. These barriers are associated with a changing educational paradigm that may call into question conventional architectural design approaches and normative construction guidance.

The programmatic complexity of the contemporary curriculum is reflected in the spatial organisation of the school premises. The introduction of expanded curriculum and educational programmes, which go beyond what a traditional school offers – such as multi-age groupings, team teaching, project areas, vocational training and community use – are resulting in a growing need for flexible learning spaces and updated technology as well as informal learning and social areas. In particular, the increased use of digital technologies and the portability of technological devices have a clear impact on learning habits. Students are now permanently connected to the world wide web and are able to choose where and when to study. Catering areas, such as cafeterias and dining halls, lobbies and circulation spaces, common rooms, stairwells and other outdoor areas, are examples of spaces where learning can occur, and where students and teachers are working together, sharing ideas and experiences.

In many existing school facilities, the design approach follows a "stationary" model, meaning that each space and group of spaces was designed with its own specific functional requirements and technical features. No extra investment was made to facilitate *future* functional or



Figure 4. Emilio Navaro School, Almada, Portugal. The sports hall after renovation.

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Figure 5. Sá da Bandeira School, Santarem, Portugal, before renovation.



Figure 6. Passos Manuel School, Lisbon, Portugal. Science laboratory after renovation.

technical adaptability, thus limiting the building's life expectancy. The school layout was organised according to a formal teacher-centred learning model, where the classroom was the core unit of the school's spatial programming. Complementary learning spaces allowing other pedagogical practices and learning models were absent, and support spaces were reduced to the minimum. Such school buildings are ill equipped to meet today's educational needs. For example, their reconfiguration is less likely to respond to larger capacity requirements for learning areas such as science laboratories, computer rooms and arts rooms, vocational workshops and libraries.

However, when the design approach follows a more neutral non-specific layout type, school buildings can be easily adapted to changing requirements over time. Further investments in flexibility, both in design and construction, namely in the provision of extra spaces and ease of dismantlement, can extend the overall life expectancy of buildings and enable better compliance with new curriculum demands.

In addition, due to the age and condition of many school buildings, ensuring compliance with new or revised building codes and legislation, as well as with environmental and structural concerns, can add significant costs to a project and become a real impediment to reuse. Age may also have led to the obsolescence or deterioration of existing building systems and materials, which need to be replaced or repaired. Urban zoning permissions have often changed since most school buildings were constructed, in addition to comfort and indoor air quality standards, structural and mechanical systems, and accessibility and fire safety requirements. Code compliance usually implies the need to reorganise the school's internal spaces, reinforce the structural system and install new services ducts and lifts, especially where wheelchair ramps are impractical.

Existing school buildings and grounds often bring environmental concerns. Structures built between the mid-1920s and the mid-1970s may contain asbestos or lead paint that must be replaced as part of rehabilitation. Moreover, these buildings often do not address the need to reduce energy efficiency and maintenance costs. To operate as a low energy building, energy performance would need to be optimised and new systems installed, which would extend beyond the footprint of the existing buildings.

But the chronological age of a school is not necessarily an indicator of its construction quality. Most schools built in the first half of the 20th century, for example, are masonry-bearing structures that rely on massive walls to provide structural stability. Many were overdesigned in load-bearing capacity by today's structural standards. Most older schools are easier and less costly to rehabilitate than schools built in the second half of the 20th century, when low-cost materials and less durable construction techniques were common. Many durability issues are due to low-quality job execution, not to the age of the building.

School building rehabilitation also introduces additional difficulties in terms of construction management. In almost all cases, it takes longer to rehabilitate an occupied building than to vacate it. And once works start on a site, unforeseen problems can affect the programme completion date and lead to increased costs.

The impact of rehabilitation on an occupied school building depends on the extent and scale of the work, as well as on school precinct capacity and building typologies. Usually works are carried out in parallel with school activities, according to a multi-phasing programming. Apart from requiring temporary relocation of classes and other school activities, restricted access areas and provisional circulation routes, it calls for careful planning and professional execution to prevent noise, vibration, dust and other momentary disruption of services. Care also has to be taken to avoid increased risks to health and safety from construction.

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Guiding principles for school building rehabilitation programmes

School building rehabilitation is always the final result of an extended and complex decision-making process, which involves translating the educational goals and the organisational implications of these goals to the existing school building, taking into consideration constraints imposed by design guidance and master specifications. This is a complex and responsive design process that calls for non-conventional responses.

Design guidance and master specifications are usually prepared by government bodies responsible for funding rehabilitation projects and are often based on lessons learned from previous developments. Providing rules and communication procedures to be followed over the course of the design process helps to guarantee the coherence of operations and facilitate the design process. This also ensures the quality of facilities, while controlling construction and operating costs and taking into account code compliance and time constraints.

Issues such as comparative construction costs and schedules are critical components of the school building rehabilitation process. Guidelines and rules-of-thumb for these issues are well researched and documented in the literature. On the other hand, the design process is still considered problematic.

Often, the conventional design process does not address issues in relation to the school's vision, technical documentation and, ultimately, the school's physical improvement. Traditionally, programming is seen as the first step of an essentially linear process of six sequential phases – programme development, preliminary design, design production, tenders and bid management, construction and evaluation – despite the internal feedback loops at each stage (Sanoff, 1977). Once completed, the programme is only revisited during the evaluation phase, typically in the form of post-occupancy evaluations (POEs). Accordingly, the design process follows a "solution-focused strategy", which means that the problem is approached by attempting to create solutions rather than by analysing the problem itself.

An interactive briefing process

It is therefore important to recognise the limitations of a linear approach to school building rehabilitation when developing a complete and accurate design solution that meets specified targets. A better approach would be to integrate programming with design, and include evaluation processes in a holistic and inclusive way as a cycle of interrelated stages, with direct communication between designers and the user-clients. This way, it would become an interactive briefing process allowing regular feedback throughout the project, contributing to progressive decision making with "milestones" acting as gateways (CIB, 1997).

The advantage of an interactive briefing process is that more players are involved early and more options are considered. As a result, it clarifies in a timely manner which design decisions should be referred back to the client to be tested against their anticipated needs and which can be tested internally as part of the design process (Blyth and Worthington, 2010). At the centre of this process, from the programming through design stages, is the search for synergies, *i.e.* strategies with resultant benefits greater than the sum of individual design decisions. It is recognised that such a process is the most cost-effective way to achieve a high-performing building. It addresses issues early on, avoiding missed opportunities related to performance and economy. In times of tightly controlled budgets, it optimises investment in keeping with the school community's goals.

Recent work on briefing also suggests that developing an understanding of the social context of a project is an essential part of the design process (Blyth and Worthington,



Figure 7. Pedro Nunes School before and after renovation.

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2010; Kumlin, 1995; Leaman, 2002). In the specific case of school rehabilitation, this implies the (re)interpretation of the form-function relationship, in which "function" relates to educational vision and attitudes as well as practical needs related to school organisational issues.

The educational brief should be clearly defined and prioritised independently of considerations regarding the physical facilities. Rather than setting out specific built solutions, it sets a clear framework for the design team's work by identifying the general principles to be adhered to in the reorganisation of the school spatial layout, with a view to accommodating the educational agenda and its organisational implications. For that reason, the educational brief works as a conceptual matrix, which can be supported by diagrams that explain how this is translated into the building itself.

In view of this approach, the programming stage represents the start of a critical phase in the school building rehabilitation process. Consequently it must be regarded as a flexible group of decisions and actions towards the school's future, projected in a limited timescale: medium- to long-term. It must involve an evaluation of the school's educational vision, organisation and functioning, together with a comprehensive assessment of current suitability and operational issues (both short- and long-term), expansion needs and opportunities, historical and community significance, and the financial resources to be allocated to rehabilitation works.

Consultation with school boards, staff, students and parents is critical to foresee and understand the future use of school buildings. These groups can not only articulate how they regard their educational environment, but it can also be useful to help them understand how the buildings and their use can be improved and made more effective. However, these groups are often not consciously aware of the distinctive ways in which they use space: their usual patterns of space use may only be brought into the realm of conscious thought when they are disrupted. Moreover, as advocated by Lichfield (2003), the impact of a building rehabilitation may also be perceived as negative. Although it can be an obvious advantage for school communities and education authorities in general due to the improvement of teaching and learning conditions, there may also be internal tensions within the school community. These tensions may occur, for instance, between teachers who are frequently disappointed or not convinced by the proposal of a new type of classroom or laboratory configuration with the new workspace conditions, or in general when old conventions and habits are challenged.

Other local actors may also feel disadvantaged, for instance, due to the perception of loss of community spaces or neighbourhood invasion resulting from more movement, car traffic or less parking in the vicinity of the school. These conflicts may affect the project, as approval is required on final decisions. Early negotiations with the school community as well as the relevant local authorities can reduce the cost of subsequent changes made in meeting their interests and requests. When all users' needs and project requirements are defined at the start, there are fewer changes at later stages of the project, thereby saving time and resources.

Engaging all parties involved in the school project in order to define and solve design problems is vital to creating positive and collaborative working relationships. Nevertheless it implies investing additional efforts in implementing an effective communication system. The participatory review is a useful tool as it provides an opportunity for the parties involved to review the design as it develops. For school users, the review is a good opportunity to check that the design solutions meet users' needs and that the architect's assumptions about how they will use the building are correct. It also provides a useful opportunity to discuss how new problems might be resolved, after relevant information has been gathered, thus creating a simultaneous planning and learning cycle.

Commitment in the participatory review process and the programme manager's expertise and experience are important elements for ensuring the success of the school building intervention and the general quality of the final product. Programme managers, acting as agents for the educational authorities and responding to the needs of the school community, should also combine collaborative multidisciplinary work and problem solving with fulfilling requirements and addressing to complaints. As a mediator, their role is to resolve conflicts and recommend alternatives so as to keep within education specifications and budgets. As a facilitator, they should ensure that each of the parties involved understands the intended goals of the project and the steps in place to achieve them. They should also have the opportunity to be heard and carry through what has been planned on time.

With the increasing autonomy of the various disciplines involved in the rehabilitation process, technical drawings and specifications have become an essential means of communication, as well as a tool for solving problematic design issues. However the lack of skills and know-how among the school users' groups, especially their lack of experience in working closely with designers and other construction professionals, poses additional problems. Few of them have the appropriate training to grasp designers' terminology and semantics, understand technical drawings and specifications and translate these appropriately to support decision making.

As such, programme managers become privileged knowledge translators, who are able to interact with all parties and interpret different types of data in terms that can be understood by designers and integrated into the

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design process. Besides preparing the master planning and programme budgets, including design schedules, they oversee the design team and work closely with procurement staff to assist with contracts, as well as co-ordinate arrangements with the school throughout the construction work and the move-in stages. If the programme manager's team role is weak, decision-making may be slow and delays can be expected.

Conclusion

Even in times of financial crisis and uncertainty, school building rehabilitation programmes around the world represent a significant investment in relation to governments' financial resources. Many schools and universities featured in this Compendium are part of highly successful school building rehabilitation experiences worldwide, which demonstrate an effective use of resources and cost control. Although very different in terms of urban and social context, building typologies, architectural features and building components, design approaches and adaptive strategies, these examples pose similar questions and contain certain common elements and responses concerning school building rehabilitation.

A decision to rehabilitate a school building is only justified when educational, technical and economic resources are jointly identified and the intended change can be carried out with the approval and support of the whole school community. In addition, it would be pointless to rehabilitate a school building if the intervention does not take into account progress in the field of education and the importance of providing high quality teaching and learning environments.

The challenge is showing the value of re-usage by making an adaptive project feasible and better value for money, thus encouraging creative responses from both designers and the building sector. Learning will continue to evolve and school buildings will need to reshape themselves in response to the paradigm shifts accompanying education in the 21st century.

As Louis Khan said in his essay *Form and Design* originally published in 1960:

"*I think of school as an environment of spaces where it is good to learn. Schools began with a man under a tree, who did not know he was a teacher, discussing his realisation with a few who did not know they were students ... the existence-will of school was there even before the circumstances of a man under a tree. That is why it is good for the mind to go back to the beginning, because the beginning of any established activity is its most wonderful moment.*" (Khan, 2005)

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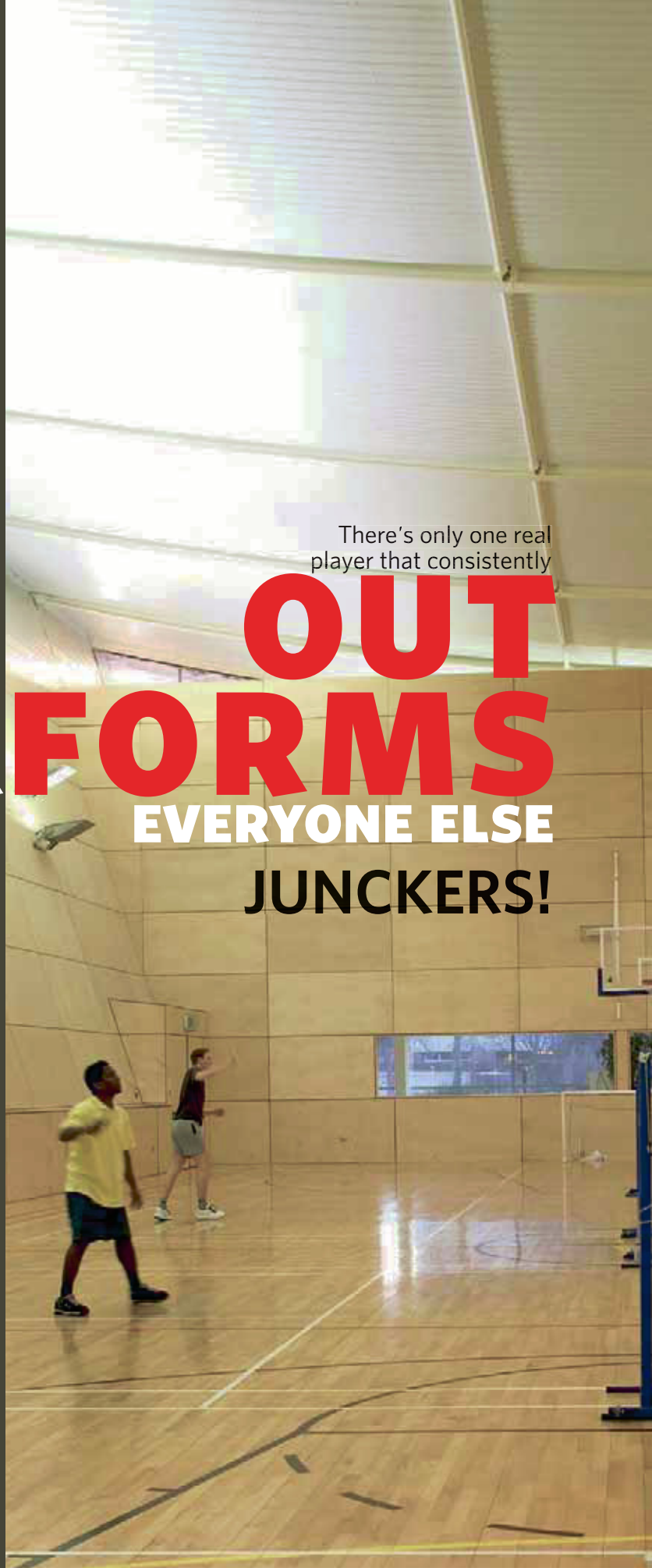
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PART TWO



Chapter 5: **Introduction**

BY I **RODOLFO ALMEIDA, CHAIR OF THE JURY**

Designing for Education: Compendium of Exemplary Educational Facilities 2011, along with its three predecessors, represent CELE's key publications. This edition abounds with state-of-the-art design in educational buildings, seen from a worldwide perspective. It will therefore become an indispensable reference for policy makers, institutions, architects, educators, communities and individuals involved at national, regional or individual level, for the planning, design, construction, maintenance and management of architecture for education buildings.

Designing for Education has made a timely appearance: it not only coincides with the 40th anniversary of the Centre for Effective Learning Environments (CELE) next year, but that of the 50th anniversary of the OECD itself this year.

In order to select the successful entries, CELE appointed a jury composed of six distinguished architects from several continents, one of them representing the International Union of Architects (UIA). The jury reviewed 166 architectural projects from 33 countries which were submitted online to the OECD. Selecting the 60 exemplars presented here was no easy feat. Of these, six particularly remarkable projects received a commendation, and they are presented first. The selection was based on four criteria: innovative design, fitness for purpose, sustainability and safety. These criteria were not to be treated in isolation but embedded in the architectural project, and buildings were not expected to be exemplary from all points of view.

On behalf of the jury, I would like to express our thanks to every architect and institution that submitted a project for this *Compendium*.

All levels of education are present here. But why are these 60 projects exemplary? This is a difficult question, as their excellence not only relates to the process whereby the designs were developed, or the pedagogical innovations they boast, or the use of information technology. They were selected for more than this: these facilities illustrate an architecture that is "owned" by its community, spaces that permit and encourage individual and group learning, a variety of spaces and volumes and that inspire educators, students and parents alike and enable users to enjoy learning and living together.

Each architectural project is meticulously presented with a short text describing its characteristics. It is accompanied with clear architectural drawings and photographs; these elements clearly illustrate just why the jury found these 60 facilities to be "exemplary". Readers of this *Compendium* will find that it offers a rich source of information and innovative solutions and that each facility is well anchored to its environment, locality and context. We are already looking forward to the 5th *Compendium*.

Jury members (left to right in photo below)
Sally Brooks, former Deputy Director, Department for Children, Schools and Families; United Kingdom

Barbara Nehring, architect, ACC (architecture, construction, consulting); Austria

Chair: Rodolfo Almeida, architect, former Director of the Architecture for Education Unit at UNESCO, Paris; Mexico

José Freire da Silva, architect, Vice-Chair of the CELE Board of Participants; Portugal

Yvonne Farrell, architect, Grafton Architects; Ireland

Sungjung Chough, architect, UIA Representative; Korea



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Structure of Part Two

The six facilities that the jury considered particularly outstanding are presented in Chapter 6. Chapters 7–10 are each devoted to a different level of education. Chapter 7 presents institutions that cover multiple levels, and Chapters 8–10 present pre-primary and primary levels, lower and upper secondary levels, and tertiary respectively. Within each of these chapters, generally the facilities are arranged in alphabetical order. The levels of education are defined in Annex 1.

The case studies serve as an introduction to a project and are written to present readers with a brief description and basic information. However, at the end of the publication (Annexes 2 and 3) there is a list of contact details for schools and architects. These will enable readers to follow up in more detail those projects that are of specific interest to them.

Criteria for selection

Innovative designs

Facilities whose design serves the educational process, inspires learning and improves the quality of the learning environment; facilities that bind schools and universities into their local communities; facilities that are responsive to developments in information and communication technologies; and facilities that will meet future needs and expectations.

Fitness for purpose

Facilities that support today's education needs; facilities that serve as a learning tool for students and are responsive to curriculum changes; facilities that are flexible, inclusive and provide a comfortable environment for learning; and facilities built to optimise investments and that are operated and maintained efficiently.

Sustainability ("green growth")

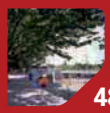
Facilities that make use of choice materials, energy-saving/sustainable systems, siting or management in an environmentally friendly way, or whose design reduces their environmental impact; facilities whose use is extended beyond the traditional learning hours; and grounds which promote environmental education.

Safety

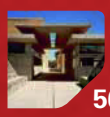
Facilities that provide for safety from natural disasters or accidental or deliberate acts of man, through the use of particular construction materials and attention to standards, design, building management and risk assessment. Areas of concern include fire prevention, earthquake and disaster management, the quality of the indoor environment, traffic management, controlling hazardous substances, dealing with terrorism, preventing school bullying, and other ways of promoting personal and material security.

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Chapter 6: **Commendations**

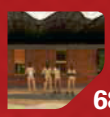

48 Fuji Kindergarten
Japan


52 Bertha von Suttner Schule
Austria


56 Instituto Technológico de Iztapalapa
Mexico


60 Liceo Técnico Profesional La Florida
Chile


64 Art Building West, School of Art and Art History, University of Iowa
USA


68 Secondary school in Dano
Burkina Faso

Fuji Kindergarten

LOCATION | **TACHIKAWA, JAPAN**



A

> *This design is striking, in many ways spectacular, and also playful. It succeeds in combining a clear and legible form while integrating the mature trees into the building. It is a building where play and learning are intelligently nurtured, where the building is grounded in the earth and linked to the sky.*
>
> **CELE jury**

ARCHITECTS: **Tezuka Architects**
CLIENT: **Educational Foundation Minnanohiroba Fuji Kindergarten**
TYPE OF SCHOOL: **Kindergarten**
NUMBER OF STUDENTS: **620**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **1 304m²**
YEAR OF COMPLETION: **2007**
CONTEXT: **City**

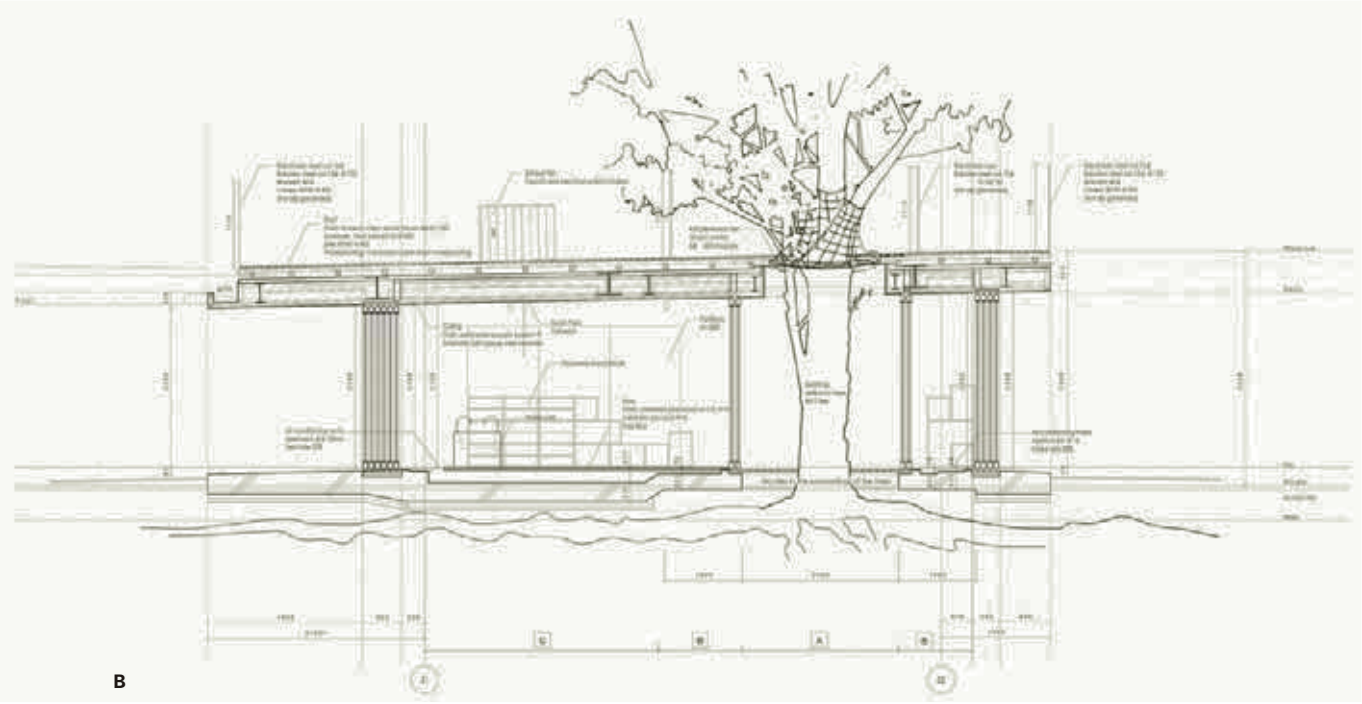
Designed to facilitate play and child development based around Montessori principles, Fuji Kindergarten is an elegant new school. One of the largest pre-primary facilities in Japan, the kindergarten can accommodate more than 600 children, providing welcome capacity in a city that has a long waiting list for nursery places.

The oval-shaped building makes full use of the tight urban site. The design maximises the space available for secure but unconstrained play, with a roof deck running around the entire single-storey structure and a large enclosed central courtyard. Three mature zelkova trees have been incorporated into the building, protruding through the roof to form a green canopy that provides welcome shade for part of the roof deck in summer.

The roof deck

The roof deck is an innovative play resource. It slopes towards the inner circumference, which at a height of only 2.1m allows staff at ground level to keep an eye on children playing up above. Railings have been placed at each edge to keep children safe, and the spaces between the balustrades are sufficient to allow children to sit on the roof and swing their legs over the eaves of the roof.

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B

With no obvious start and end, children need no encouragement to run about on the roof. Staff calculate that some of the older children cover as much as 5km over the course of a day. Skylights allow children to look down into the rooms below. The three trees embedded in the building also form a play feature. Children can clamber in the branches or play in the nets that are placed around the trunks to prevent anybody falling through to the rooms below.

In keeping with the school's educational ethos of non-directed play and discovery, there is no fixed play equipment on the roof or in the courtyard, with the exception of a slide linking the roof to the ground.

Open interiors

The school has been designed to allow children to mix and move around at will. There are no fixed walls between the classrooms, and children can move between class groups. When they have a problem, they can ask any of the staff for help, and they can join a group or play alone as their mood and curiosity dictates.

All furniture can be easily rearranged to accommodate different group sizes and different activities. As well as chairs and desks for the children, there are many wooden



C

A: Aerial view showing the distinctive oval structure.

B: Cross section where the school has been built around one of the trees.

C: The trees become an organic part of the school.

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D



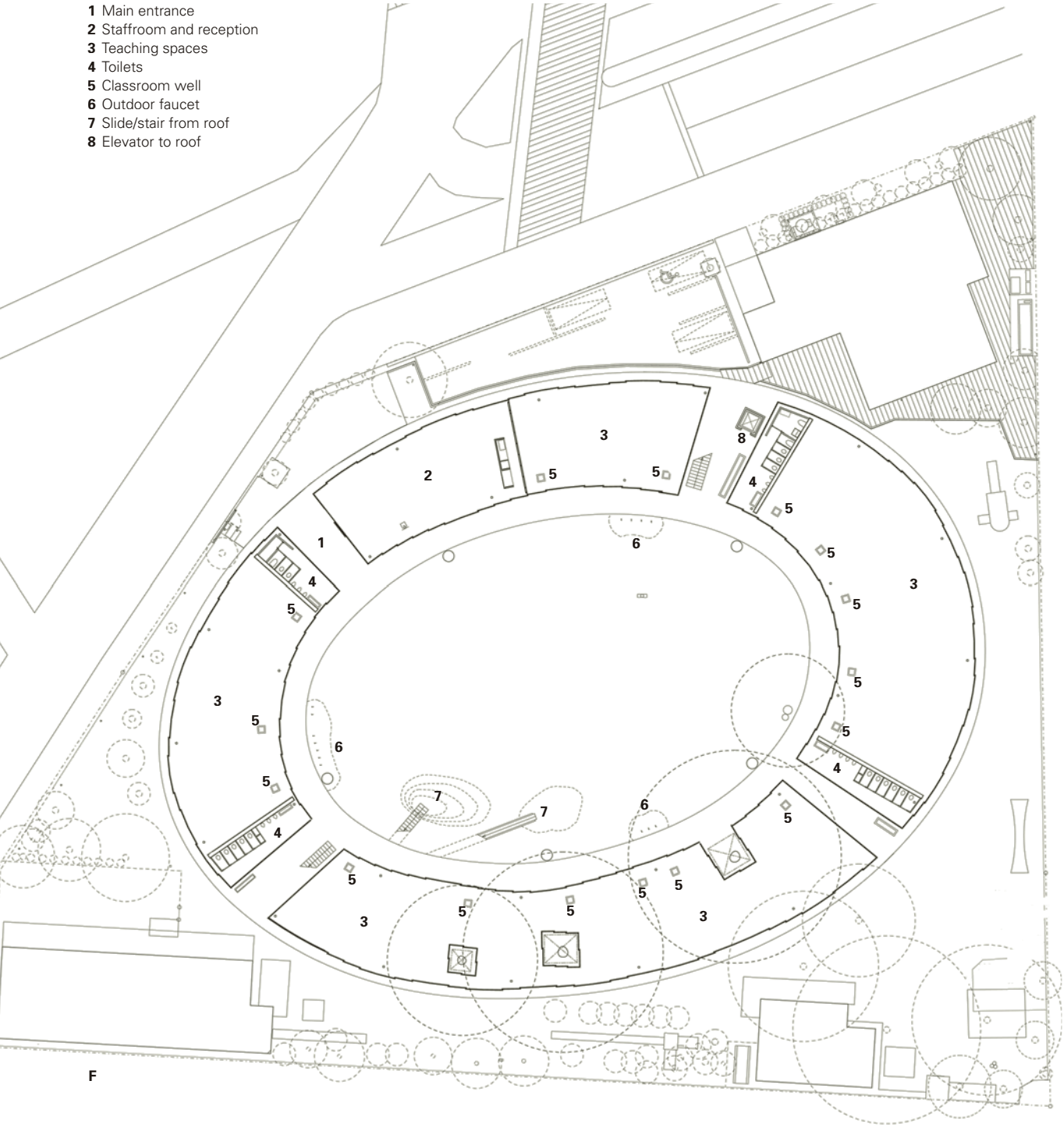
E

D: Teaching spaces open out onto the courtyard.

E: Children playing on the roof deck.

F: Site plan.

© OECD 2011



F

boxes that are used to partition smaller areas or to provide additional benches for seating. These boxes are also used to store play items, learning materials and children's coats and shoes. This provides great flexibility, and the interior space is frequently reconfigured through the year.

For most of the year, the large sliding screens that form the inner wall of the building are pushed back, opening up the interior spaces to the sheltered courtyard in the centre of the school. This provides unobstructed views throughout the kindergarten. It ensures that the rooms are always well ventilated and, as a consequence, there is no need for an air conditioning system.

Other systems have been carefully designed to work in the open interior space. In the winter, when the sliding wall screens remain closed, the rooms are kept warm using a Korean underfloor heating system. Lighting can be adjusted using ceiling-mounted pull chords, allowing teachers and children to control the level of lighting in their part of the building.

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Bertha von Suttner Schule

LOCATION | **SCHWECHAT, AUSTRIA**



A

ARCHITECTS: **fasch&fuchs.zt-gmbh**
CLIENT: **Sonderschulgemeinde Schwechat, Kommunalleasing gmbh**
TYPE OF SCHOOL: **Primary and lower secondary**
NUMBER OF STUDENTS: **150**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **3 287m²**
YEAR OF COMPLETION: **2006**
CONTEXT: **Town**



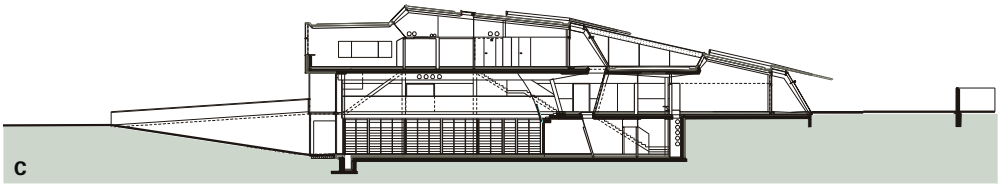
B

This well-designed school meets the needs of children with a range of physical disabilities and psychological and behavioural disorders. Encased in glass, all rooms are bathed in natural light, yet the design ensures that occupants are undisturbed by traffic noise from the adjacent busy roads and from aircraft approaching Vienna International Airport.

School layout

On the southern side of the building, classrooms, workshops and staff rooms are accommodated under a sloping roof. This has been engineered to provide an effective buffer against the noise from outside and insulation against the cold in winter. The amount of sunlight entering the building is regulated by sliding panels in this roof. The floor plan in this part of the building is extended by

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C

covered patios on both levels. To provide easy wheelchair access, all the classrooms for students with severe physical disabilities are on the ground floor. These rooms open directly into a conservatory where students can relax and play.

In the centre of the building is the gymnasium. This large sunken open hall is surrounded on three sides by a tribune on the ground floor. This arrangement is deliberate: it is designed to reinforce positive attitudes towards those with physical disabilities and to encourage students to feel accepted and more confident when exercising or moving their bodies. Netting prevents balls flying out of the gym. Acoustic panels have been placed in and around the gymnasium to absorb noise. The gym looks out onto a gentle grass embankment. Stairs built into the slope at each side allow this space to be used as a central meeting place, and for drama performances or school parties. The embankment leads up to a school garden where students are encouraged to plant and look after flowers and vegetables.

Seven activity rooms are located directly above the gymnasium on the northern side of the building. All floor levels are reached by glass-paned cascade staircases alongside the building's eastern and western façades.

Fitness for purpose

Throughout the school there are features to support the development of children with special needs. There is a soothing and stimulating multisensory environment for students with mental disabilities, a therapy pool and padded time-out areas, where students can go to unwind or retreat.



D

A: View of the northern façade and main entrance.

B: Brightly-lit staircases are at either end of the school.

C: North-south cross section.

D: The tribune surrounding the gymnasium.

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The school has been designed to allow maximum freedom of movement. Children experience openness rather than exclusion and restriction. They can move around safely, without placing themselves at risk.

All parts of the building are well lit. Corridors and rooms are illuminated not only by sunlight entering through the vast glass-paned façades, but also from skylights in the roof.

This building contrasts favourably with the school's previous accommodation, an old and poorly lit building. According to Ingeborg Schramm, the headmistress, the move to the new building has had a beneficial impact on students. The atmosphere is much more calm and relaxed. Students appreciate the peaceful environment, to the extent that some are reluctant to leave at the end of the day and want to come in on weekends.

E: Skylights bring light into the upper floor corridor.

F: The conservatory on the south side of the school.

G: Ground floor plan.

H: Adjustable panels on the roof regulate the light entering the school.

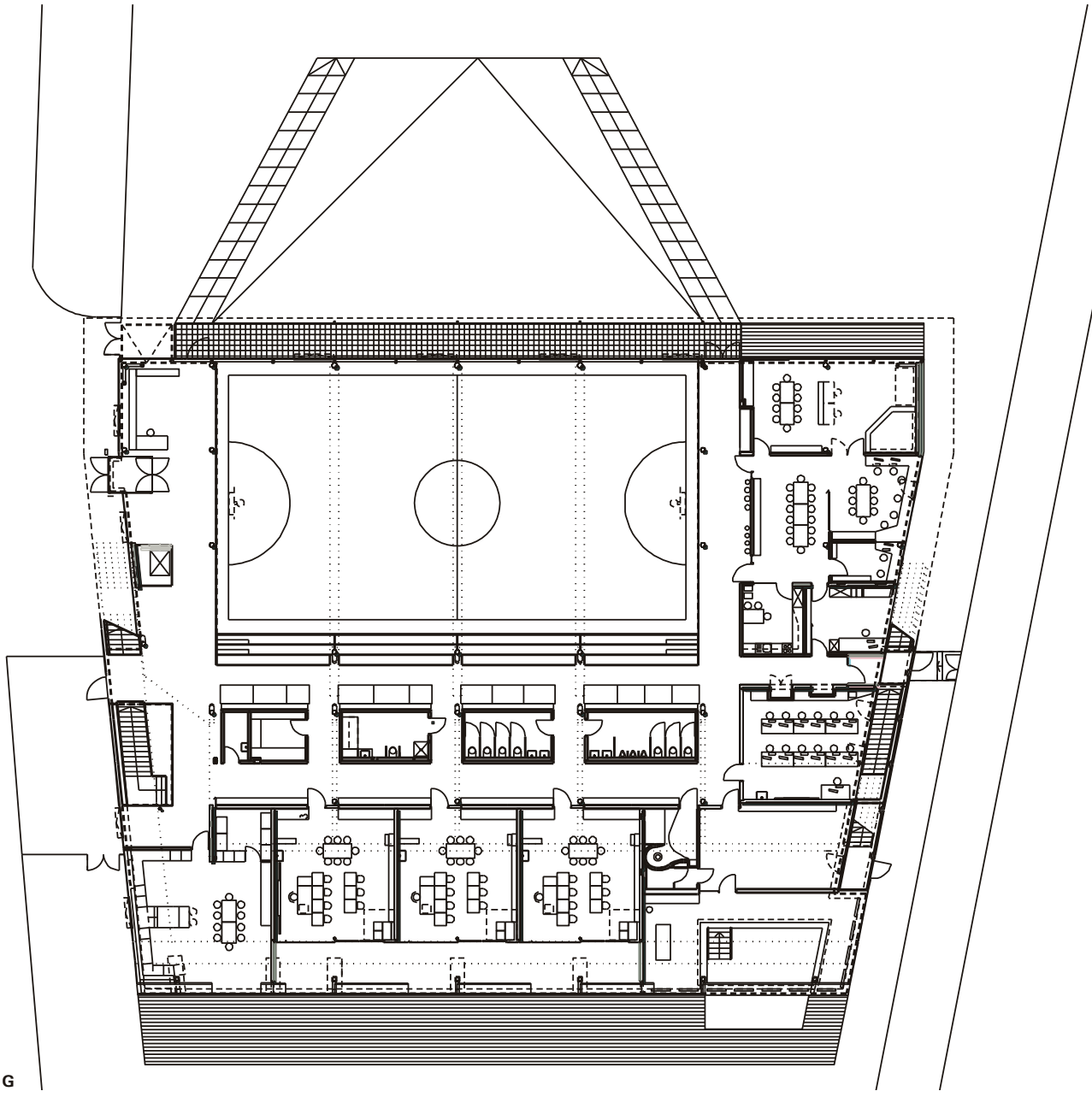


E



F

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G



H

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Instituto Technológico de Iztapalapa

LOCATION | **IZTAPALAPA, MEXICO**



A



B

This further education college is an elegantly designed project. Based on a neat and simple plan, rich in scale and with harmonious relationships between internal and external spaces, it is a valuable resource for students and the local community.

Originally built as a centre for the education of people with impaired vision, the college has been remodelled and adapted to deliver a technological education.

A sense of the college's original function is retained in the architecture. The site was designed so that students would be able to navigate around the campus using smell, touch and hearing. It was therefore planted with trees and plants that have aromatic flowers. A variety of textures were placed on walls and surfaces, and a watercourse was added down the central plaza.

Campus layout

Located in a fast growing and densely populated borough on the eastern side of Mexico City, the college has been designed as an oasis in the middle of a chaotic urban environment. Thick walls built up from volcanic rocks surround the campus. These provide some insulation against external

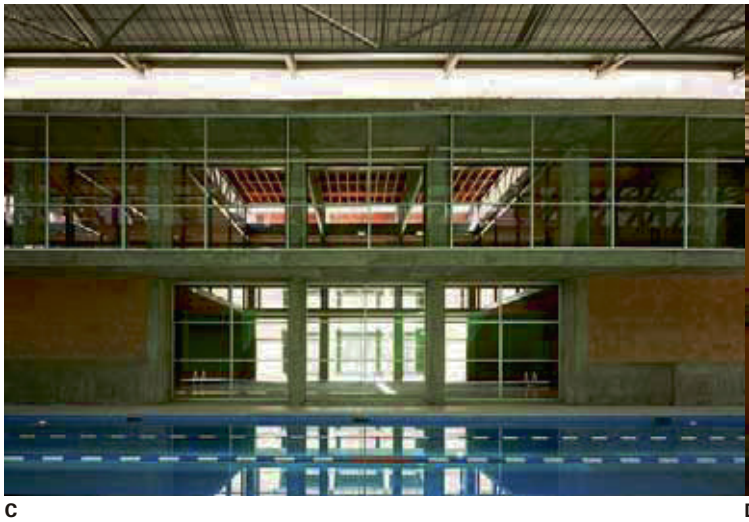
A: One of the workshops.

B: Sloping walls flank the main access to the central patio.

C: The swimming pool.

D: Corridors between the classrooms are covered to provide shade.

ARCHITECT: **Taller de Arquitectura (Mauricio Rocha)**
CLIENT: **Tecnológico de Iztapalapa**
TYPE OF SCHOOL: **Further education**
NUMBER OF STUDENTS: **600**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **14 000m²**
YEAR OF COMPLETION: **2001**
CONTEXT: **City**



C



D

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E

E: View down one of the teaching blocks.

F: Section along the central patio looking to the north.

G: Section along the classrooms.

H: The library (before fitting out).



F



G



H

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I



J

noise and a measure of security in an area of high crime.

Within the campus, the school is organised around a series of one- and two-storey blocks built using local materials. The organisation of the buildings creates attractive contrasts of shadow and light. External spaces enrich and enliven the complex. There are open patios between the blocks, and outdoor benches for students meeting outside class.

The classrooms, laboratories and workshops are accommodated in linear blocks. One runs along the southern boundary of the site above the car pack. In the centre of the campus, three single-storey teaching blocks are aligned in parallel rows. The internal spaces in these blocks are sufficiently flexible to accommodate a variety of class sizes, with rooms for small group work as well as space for classes of 30 to 40 students. Variations in the internal heights of rooms provide a mix of spaces.

Communal facilities

At the western end of the site, there is a cluster of buildings that accommodates some of the core facilities of the college. As well as the cafeteria, there is the college library, a sports hall, an open-air swimming pool and a theatre situated around a small square.

The library has an 648m^2 free-plan ground floor, while the upper floor is split into small group study rooms organised around an atrium. The two-storey theatre is a flexible space that can be used for lectures, theatre and music performances, and meetings.

Facilities such as swimming pools and theatres are relatively rare in publicly funded schools in Mexico, and not only add to college life but also provide an important community resource. The college also provides community development courses for local people.

I: Water and stone features provide sound and texture down the central patio.

J: View down the central patio to the library block.

K: Thick walls isolate the college from the neighbourhood.

L: An external view of the college.

M: Ground (top) and first floor plans.

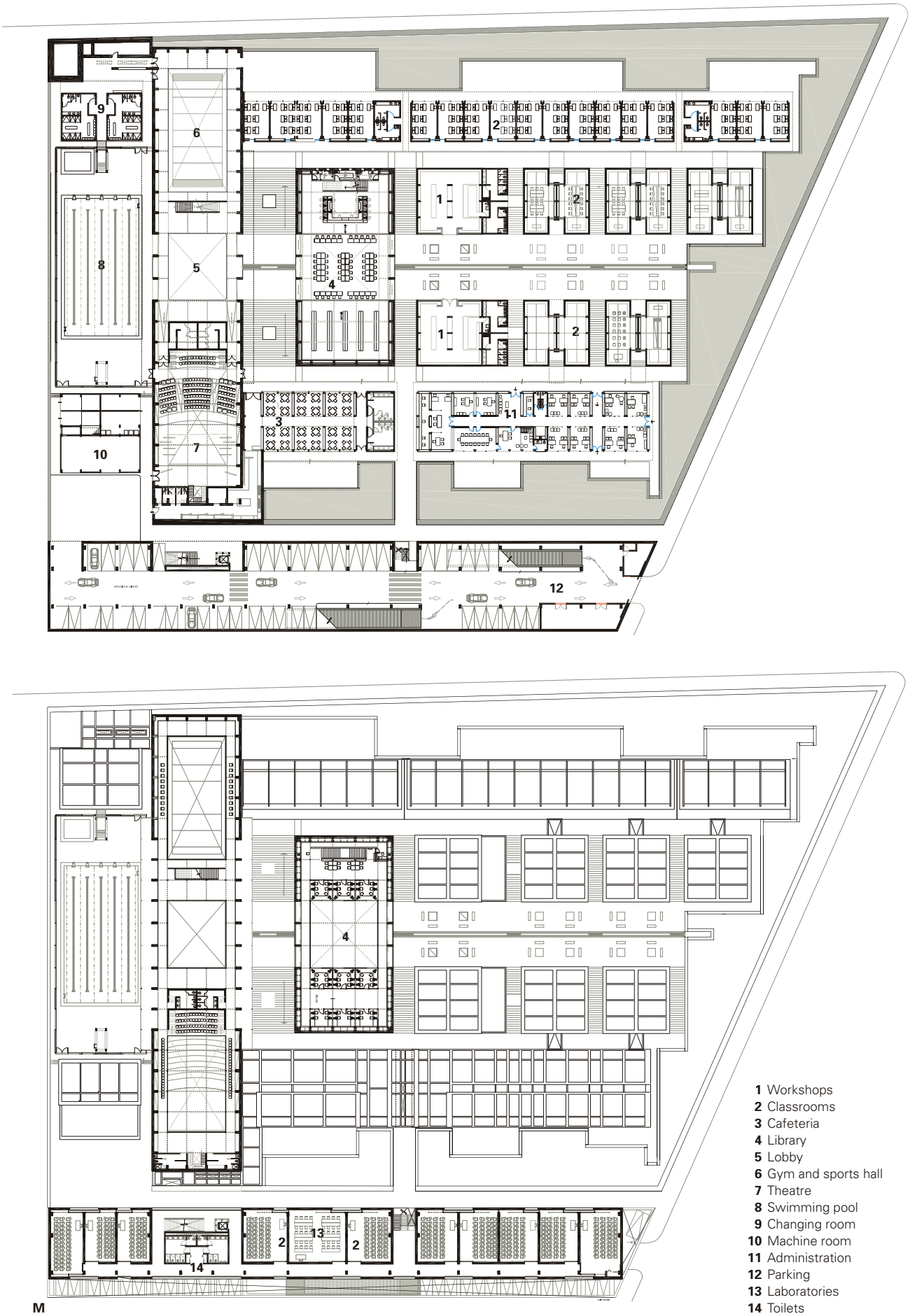


K



L

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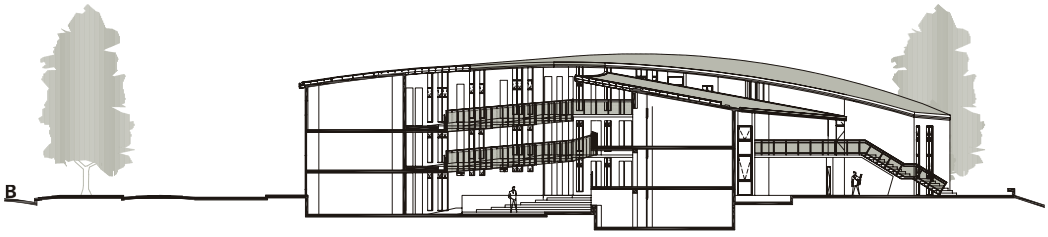
1 Workshops
2 Classrooms
3 Cafeteria
4 Library
5 Lobby
6 Gym and sports hall
7 Theatre
8 Swimming pool
9 Changing room
10 Machine room
11 Administration
12 Parking
13 Laboratories
14 Toilets

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A

ARCHITECTS: **Marsino Arquitectos Asociados (Jorge Marsino and Maria Inês Buzzoni)**
CLIENT: **Municipality of La Florida**
TYPE OF SCHOOL: **Lower and upper secondary, vocational education and training**
NUMBER OF STUDENTS: **900**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **7 860m²**
YEAR OF COMPLETION: **2007**
CONTEXT: **Large city**



Liceo Técnico Profesional La Florida

LOCATION | **SANTIAGO, CHILE**

This new school is in La Florida, a commune on the south-eastern periphery of Santiago. Located in a relatively poor area, this publicly funded project is an excellent example of how a school development can become the nucleus of an urban regeneration initiative. The school, which focuses on secondary education and vocational training, is intended to be a beacon for education in the area.

Design features

Built on a brownfield site previously used for gas storage, the school was designed and built on a tight budget. Despite these constraints, it has an innovative and striking design. Set in a neighbourhood of fairly drab three-storey apartment blocks, the quality of the building succeeds in making a strong statement about the high value of public education in Chile.

The school complex is enveloped by a large fluid timber roof that encloses a sports court and the three-storey classroom block. At the heart of the school, there is an opening in the roof envelope above a central courtyard. This central open space gives the school a strong focus and is the heart of the complex. It can be used for games, socialising and meetings, and it is open to the community.

The building has multiple entrances, and a beautifully designed system of ramps that run around the interior of the school in an elongated spiral connecting the three floors. These open circulation spaces provide easy access to all rooms and obviate the need to install an elevator for disabled students. They serve as a coherent outdoor space within the school, and visually underscore the flexibility and fluidity that is an important part of the ethos of the school.

Within the classrooms, there are the facilities to deliver a vocational curriculum as well as a more mainstream education. One focus of the curriculum is the tourist and hospitality industries, as there are good short-term employment prospects for young people with relevant skills. The school has a working kitchen to teach catering and a hotel-style reception area to allow students to practise customer care skills.

A: The courtyard at the heart of the complex.

B: Cross section (north east-south west).

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C

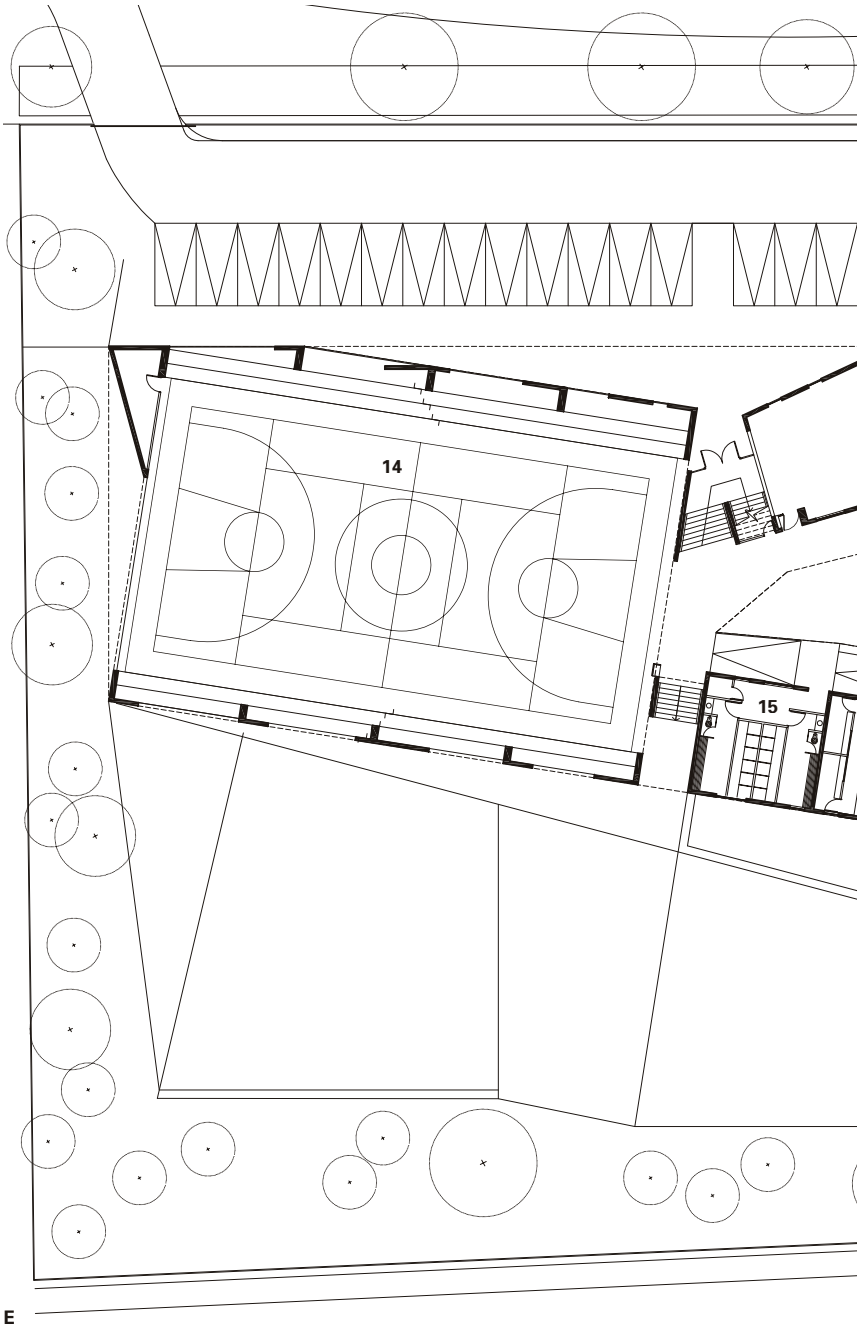
Community involvement

The local community was involved in the project from the outset, having a strong input into the type of school needed in the area and helping to choose the architect following an architectural competition. Local people also participated in consultations during the design phase.

This strong involvement continues now that the school has been opened. There is a genuine sense of community ownership. Parents are involved in aspects of the administration and the building is used by the community for a range of events outside of school hours.

The building is popular with students and teachers alike. It is perceived as fun, airy and full of movement. Some students have likened the school to a ship, with the administration at the head of the structure to guide the route. Others have characterised the oval gap in the roof as a big eye, watching from above.

The whole project exemplifies how educational buildings can act as a focal point for a community and bring a much-needed resource to underprivileged neighbourhoods.



E

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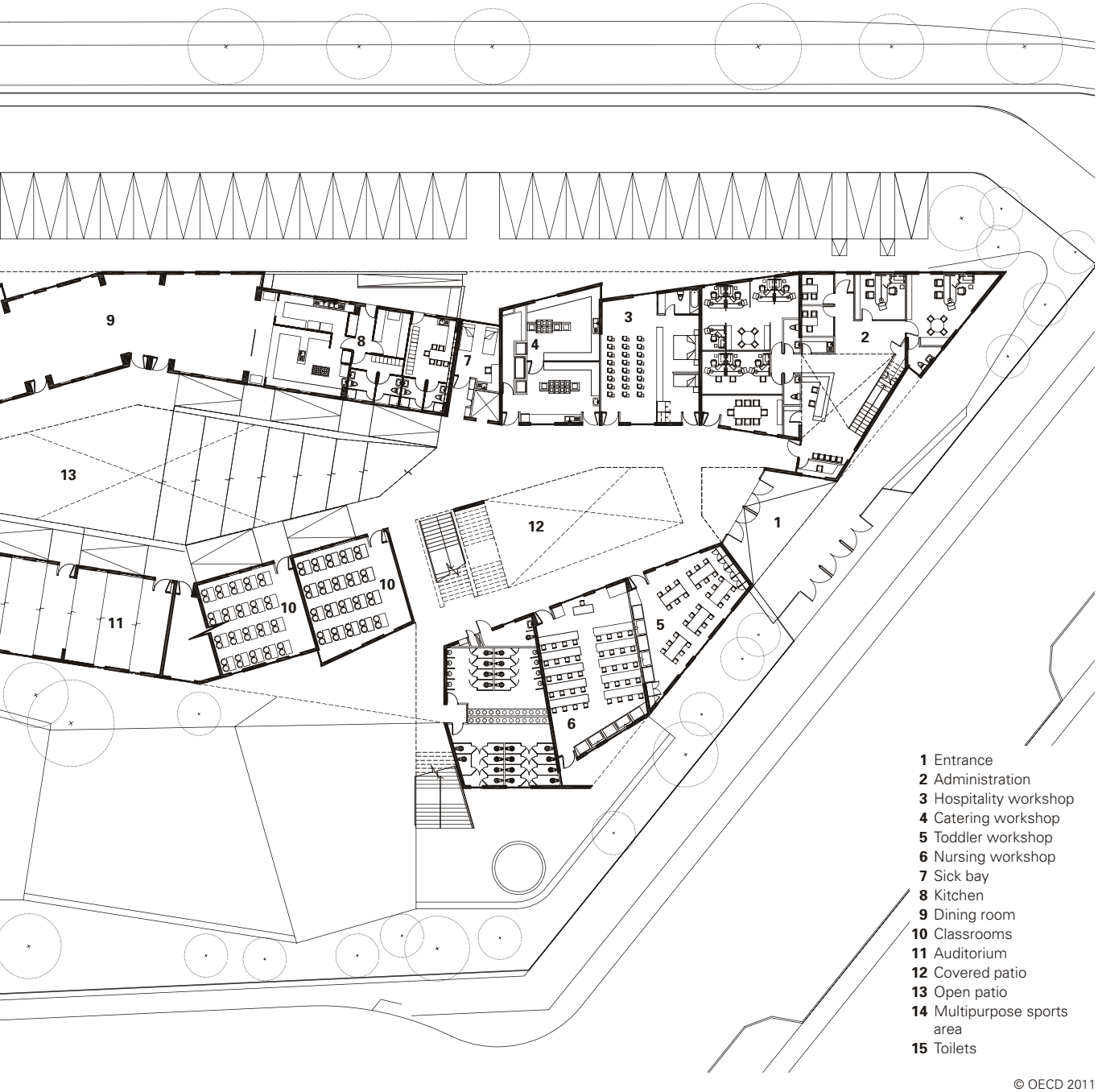


D

C: Ramps flow around the courtyard linking all rooms.

D: The striking design is a focal point in the area.

E: Site and ground floor plan.



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Art Building West, School of Art and Art History, University of Iowa

LOCATION | **IOWA CITY, USA**

> *This building connects educational spaces with their surroundings. The interior spaces flow into one another and overlap in social areas. It uses movement as a socialising device for connecting students to one another, while controlled skylights and framed views create an inspiring world for research.*
>
> **CELE jury**



A

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ARCHITECTS: **Steven Holl Architects**
CLIENT: **University of Iowa**
TYPE OF SCHOOL: **University**
NUMBER OF STUDENTS: **30 500 (University of Iowa)**
TYPE OF PROJECT: **New building on existing campus**
GROSS SURFACE AREA: **6 503m²**
YEAR OF COMPLETION: **2006**
CONTEXT: **Town**

A: View of the cantilevered wing across the pond.

B: Longitudinal section (west).

C: Skylights bring light into the interior studios.



B



C

This new building on the University of Iowa campus effectively expresses the ethos of the art school. It supports the interaction of studio practice and academic learning. It has an open and welcoming relationship with the surrounding city, responding to the immediate urban and natural environment with beautiful and strong volumes.

The context

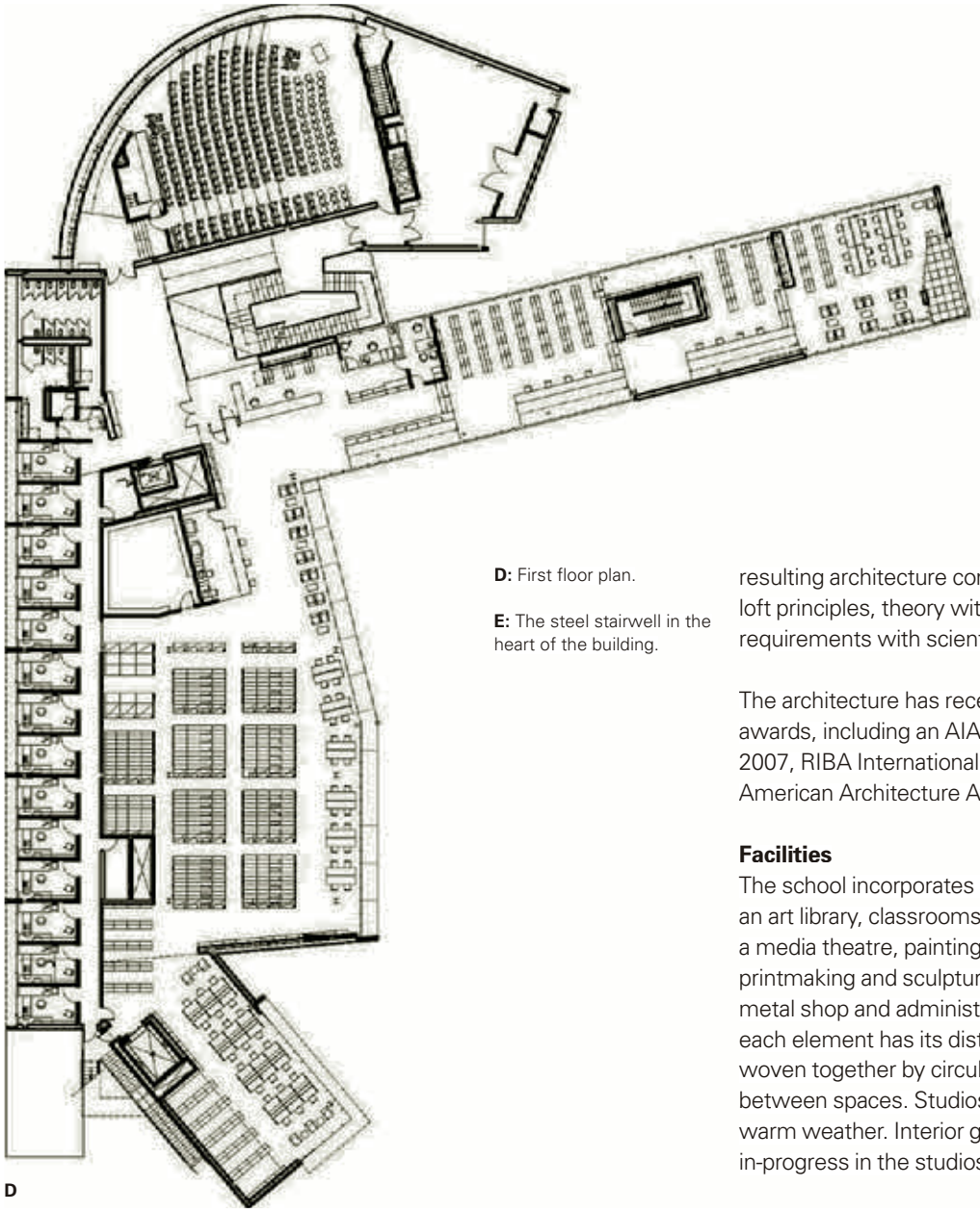
In the 1930s, the University of Iowa was one of the first schools to integrate art history and art practice in one department. This approach demanded an innovative design strategy for the School of Art and Art History's new building. The central challenge was to integrate the two uses, as well as to provide a welcoming space for all students and faculty to gather.

The building also needed to respond to both the urban grid of Iowa City and the natural landscape abutting the Iowa River. In addition, as a public project, the design needed to meet restrictive budget constraints.

Design concept

The interdisciplinary nature of the school has been central to the design concept for the building. As a space for arts education, the building deliberately presents an innovative and original approach to design. Conceived to encourage maximum interaction between students and disciplines, it is a "formless" instrument with open edges and an open centre. Implied volumes are outlined in the disposition of spaces.

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D

D: First floor plan.

E: The steel stairwell in the heart of the building.

One source of inspiration for the initial design was Picasso's 1912 work *Guitar*. The neck of the guitar is referenced in a cantilevered wing that extends over a pond towards the school's old building. In bridging the past and the present in this way, the new building seems to spring from the original 1938 building.

Made of glass and weathered steel, flat or curved planes are slotted together or assembled with hinged sections. The exposed tension rods of the partial bridge section contribute to the linear and planar architecture. In the interior, floors are framed in exposed steel and concrete planks. The interplay of light is controlled through shading created by the overlapping planar exterior. The resulting architecture combines bridge and loft principles, theory with practice and human requirements with scientific principles.

The architecture has received numerous awards, including an AIA Institute Honor Award 2007, RIBA International Award 2007 and The American Architecture Award 2008.

Facilities

The school incorporates a variety of elements: an art library, classrooms, an exhibition gallery, a media theatre, painting and design studios, printmaking and sculpture workshops, a metal shop and administrative offices. While each element has its distinct space, they are woven together by circulation areas and views between spaces. Studios can be opened out in warm weather. Interior glass walls reveal work-in-progress in the studios.

The interiors flow into one another and overlap in public areas that act as social condensers for people and activities. The various activities are informally distributed around a central atrium and the dramatic suspended stair of folded steel plates.

Open and responsive to its surroundings – the limestone bluffs, the pond and neighbouring buildings – the new building acts as a campus gateway and provides new pathways through the campus and new locations for student gatherings.

Footnote

This building was one of several damaged in the devastating Iowa floods of June 2008. It was temporarily closed and is due to reopen in 2012 when reconstruction is complete.

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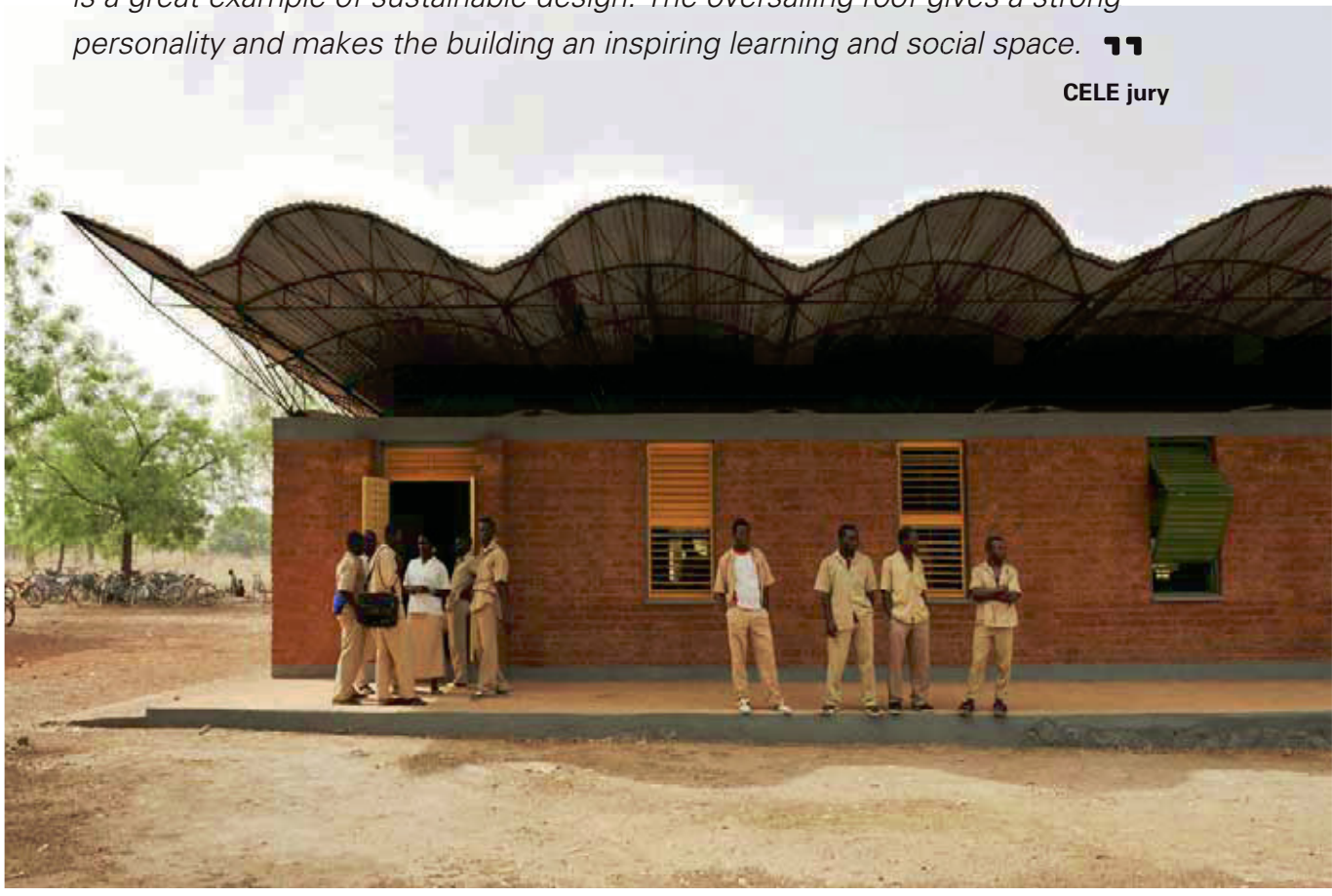
E

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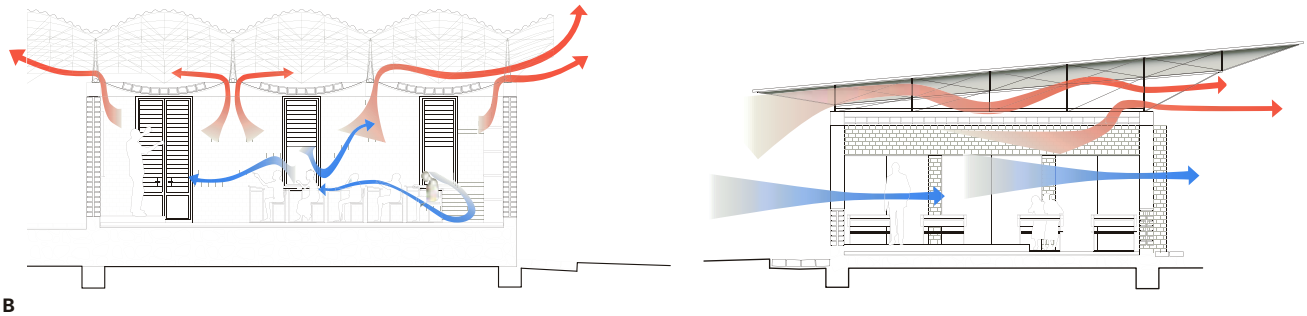
Secondary school in Dano

LOCATION I **DANO, BURKINA FASO**

> *Designed as a pilot project to address how countries as poor as Burkina Faso can develop appropriate low technology responses to their building needs, this is a great example of sustainable design. The oversailing roof gives a strong personality and makes the building an inspiring learning and social space.*
>
> **CELE jury**



A



B

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ARCHITECT: **Diébédo Francis Kéré**
CLIENT: **Dreyer Foundation, Munich**
TYPE OF SCHOOL: **Upper secondary**
NUMBER OF STUDENTS: **350**
TYPE OF PROJECT: **Extension to existing school**
GROSS SURFACE AREA: **370m²**
YEAR OF COMPLETION: **2007**
CONTEXT: **Small town**



C

A: The undulating roof provides shade outside the classrooms.

B: Passive techniques are used to create an airflow through the building.

C: View of the new extension from the school courtyard.

Situated at the edge of a small town in Burkina Faso, this project comprises an L-shaped addition to an existing school complex. The extension accommodates three classrooms, offices for teachers and the school's director, and a computer room. There is an oval amphitheatre in the middle of the building, which is open to the exterior and provides students with seating and a place to relax during breaks.

This new building closes the southern angle of the compound. It is oriented to reduce the amount of direct sunlight on the walls, which are themselves protected from the sun by the roof canopy. The ensemble is covered by a tilted, cantilevering roof structure, whose undulating bays create a rhythm which contrasts with the orthogonal enclosure below.

Sustainable design

The building is a model of sustainable design. It is built from locally available materials using non-industrial construction techniques. The walls are built from laterite, a clay rich in iron that hardens when exposed to air. This material is a good cooling insulator. It has been laminated with thin layers of cement to form 30cm thick, load-bearing partitions that sit on a granite stone bed.

The roof consists of 3m wide, modular elements. These were assembled from 14mm and 16mm thick iron bars, which were welded

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together on the ground before being manually lifted into position. This allowed the roof to be constructed without using a crane, as this type of large-scale mechanical equipment is rarely available in rural Africa.

Corrugated roofing has been fixed to this assemblage to protect the interior from the elements. Within the classrooms, a wave-like suspended ceiling, defined into 3m bays, recalls the exterior structure. Comprised of concrete and brick, the ceiling hangs from the thin, flat-rolled steel structure.

The interior floors are made of earth that has been beaten flat with mallets and then polished with stones to create a strong and durable finish.

Passive cooling

Temperatures can regularly reach 40°C in this area. However, air conditioning is not a practical or sustainable option. Burkina Faso has to import all its energy. Electricity is expensive and the supply can be unreliable. Passive techniques have therefore been used to keep the building cool and comfortable.

There are regularly spaced, tall windows in each room. These are unglazed, drawing air into the building. The windows are covered with lamella shutters that can be adjusted to control the level of natural light in each room. Painted in bright tones, the shutters add some colour to the exterior façades.

Inside, the ceiling is painted in reflective white to distribute light within the classrooms. Slits in the ceiling allow the rising warm air to escape into the void between the ceiling and roof. In this way, natural convection is used to generate a draught through the rooms, helping to keep the building ventilated.

Capacity building

Local people were employed throughout the construction process. Some had contributed to previous building projects sponsored by Schulbausteine für Gando, an association that tries to promote innovative development projects in Burkina Faso. The workers all received further training in the building techniques that were employed in the project.

D: All windows are fitted with adjustable shutters.

E: Vents in the ceiling help to generate an airflow through the rooms.

F: Floor plan.

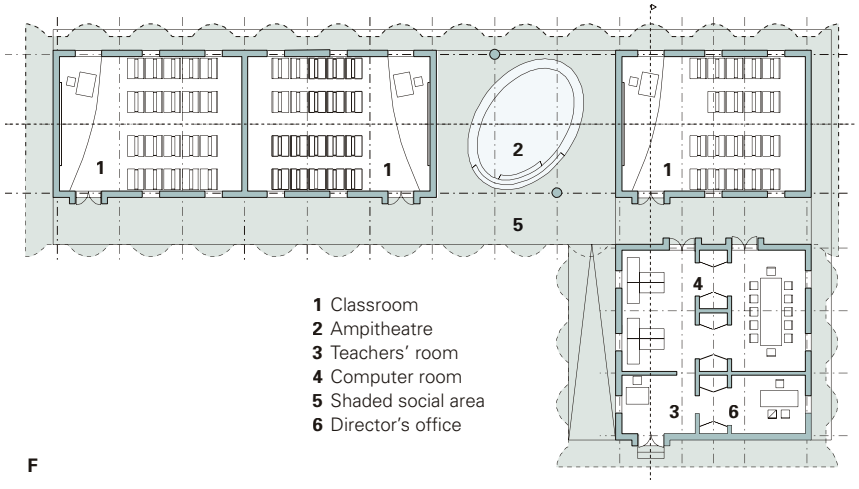
G: North-south section.



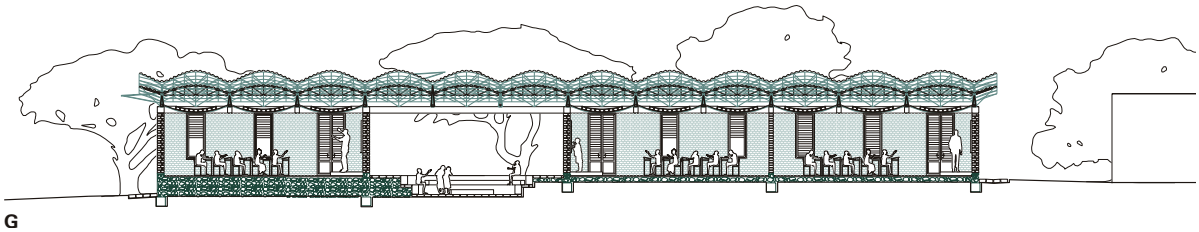
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E



F



G

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Japan Will Overcome Crisis

The sakura (Cherry blossom) is the flower which is considered to be symbolic of Japan

Photo credit: http://www.eliy.com/agreement.html

The National Institute for Educational Policy Research, a national research body focusing on comprehensive educational policy, operates within the Ministry of Education, Culture, Sports, Science and Technology in Japan.
NIER has been an OECD/CELE associate participant since 2006. The Educational Facilities Research Center in NIER conducts surveys and research on earthquake resistance, disaster reduction and environmental measures for school facilities.
In January 2011, CELE and NIER held a joint seminar on 'Educational Facilities: An overview of international trends and state-of-the-art designs'.
For further information on our activities, please see: www.nier.go.jp/English/departments/menu_11.html
We will contribute to reconstruction of schools in Japan through our research activities.

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Solar Cell System



CELE's 4th Compendium

Educational Facilities Research Center, National Institute for Educational Policy Research (NIER)
3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo, 100-8951, Japan

Chapter 7: **Multiple levels**


74 Complexo Escolar dos Arcos
Portugal

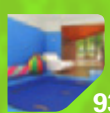

77 METI School of Rudrapur
Bangladesh


80 New Roundhouse
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90 École Internationale de Manosque
France


93 Hazelwood School
United Kingdom


96 Holzkirchen Realschule und Grundschule
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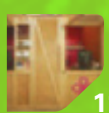

99 Sint-Gerardusscholen and Dienstencentrum Sint-Gerardus Belgium


102 Tervaväylän koulu, Lohipadon yksikkö
Finland


105 Liceo Aldea Educativa Rapa Nui
Easter Island


108 Escola Secundária Gabriel Pereira
Portugal


111 Ekonomska šola Murska Sobota
Slovenia


114 Red de Innovación y Aprendizaje
Mexico

Complexo Escolar dos Arcos

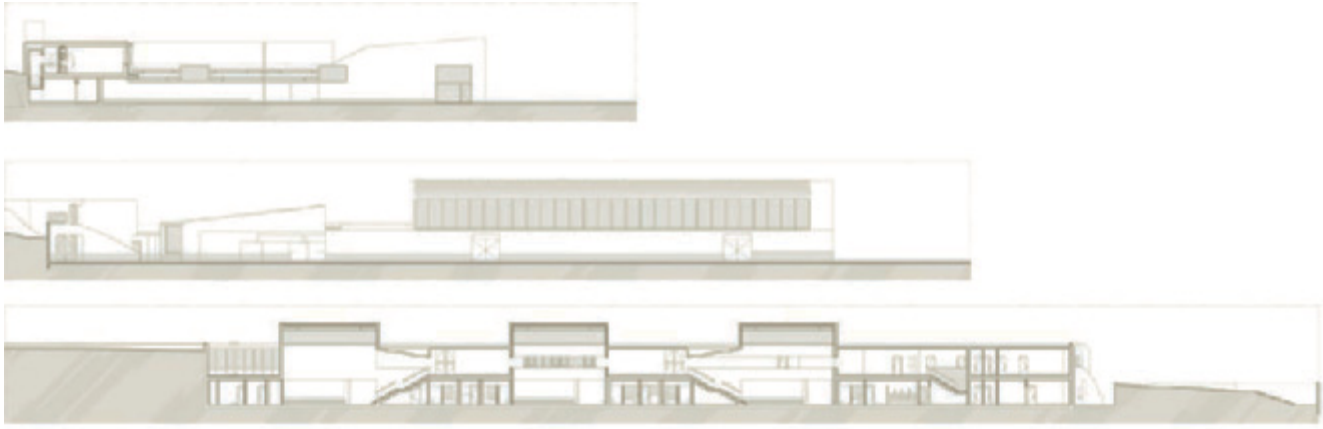
LOCATION | **ÓBIDOS, PORTUGAL**



A



B



C



D

ARCHITECT: **Claudio Sat**
CLIENT: **Câmara Municipal de Óbidos**
TYPE OF SCHOOL: **Primary and lower secondary**
NUMBER OF STUDENTS: **415**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **7 854m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **Small town**

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E

A: The gymnasium and the extremities of the three classroom blocks.

B: The complex from the municipal sports stadium.

C: Cross sections, through a courtyard between the classroom block (top), the north façade and the gymnasium (middle), and through the main spine of the building (bottom).

D and E: Partially shaded courtyards outside the classrooms provide areas for play and relaxation.

Complexo Escolar dos Arcos is an educational, sporting and leisure complex. Situated on the outskirts of Óbidos, a short distance away from the well-preserved historical centre with its maze of narrow streets, this facility includes a primary and lower secondary school and a sports complex. A swimming pool and a leisure centre will be added at a later stage.

Open school

In commissioning this complex, the local authority wanted structures that embodied the concept of an "open school". To achieve this, the physical and visual possibilities of the site were used to maximum advantage, with the use of clean lines and pure white façades for the low-rise structures. These basic architectural elements have been replicated in two further educational facilities in the vicinity.

The school is built on a terrace between the municipal sports stadium and a wooded embankment that isolates the complex from the Lisbon–Leiria motorway. The main spine of the complex is a long two-storey building that runs parallel to the embankment. Three classroom blocks run off this spine, opening out the space and creating a series of courtyards and patios with views over the sports stadium.

The spacial distribution of the complex has given rise to two distinct areas: one social and the other pedagogical. The gymnasium, kitchen and cafeteria occupy one wing of the complex. This wing is located near the main entrance and can be accessed from further entrances in the grounds. This area is separate from the classrooms and the facilities can be easily used by the local community.

Meeting curriculum needs

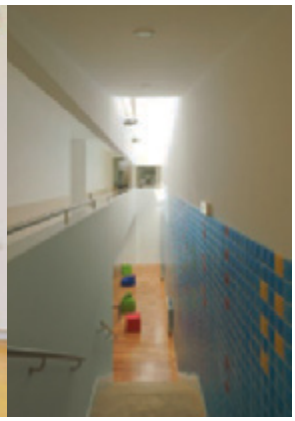
Providing education for children aged from 5 to 14 years old, the school is designed to deliver a modern curriculum and to exploit new educational technologies. There are 16 standard classrooms. Each has wireless internet access and is equipped with interactive tables and laptops. There are also specialised facilities, including a science laboratory, a computer room, an audiovisual and multimedia centre, and a music room. These facilities, together with the library, are located at the end of each classroom block.

Several spaces enable the school to deliver its creative education programme. It has a "discover your talent" initiative to help children explore and develop their creativity. Students can practise music, arts, theatre, creative writing, circus arts, ballet, hip hop, judo and

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F



G

audiovisual arts. They can also explore aspects of science as part of an "environment and entrepreneurship" strand.

Community relations

The school design enables it to foster a strong relationship with the community, and its architecture and layout seeks to differentiate it from schools that only have tenuous physical and social connections with the communities that they serve. Several entry points allow different areas to function autonomously. After hours, local residents can use the gymnasium, the library, and the music and computer rooms.

F: Several spaces can be used for creative activities, such as dance.

G: The circulation space is the backbone of the school.

H: Ground floor plan.



1 Lobby
2 Administration
3 Dining area
4 Cafeteria
5 Gymnasium
6 Activity spaces
7 Classrooms
8 Library and multimedia room
9 Science laboratory
10 Music room
11 Courtyard

H

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METI School of Rudrapur

LOCATION I **RUDRAPUR, BANGLADESH**



A

ARCHITECTS: **Anna Heringer (design and concept) and Eike Roswag (technical planning)**
CLIENT: **Dipshikha, Non-Formal Education, Training and Research Society for Village Development**
TYPE OF SCHOOL: **Primary and lower secondary**
NUMBER OF STUDENTS: **220**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **1 200m²**
YEAR OF COMPLETION: **2006**
CONTEXT: **Village**

Developed by Dipshikha, a Bangladeshi non-governmental organisation, the Modern Education and Training Institute (METI) is an initiative that promotes a free and open form of learning. Building on Dipshikha's involvement in children's education and integrated rural development, METI seeks to develop children's individual abilities and interests by taking into account their different learning speeds.

Learning with joy

The new school in Rudrapur, a village in northern Bangladesh, is the first to put METI's ideas into practice. Consisting of classrooms, a school garden, a playground and a meeting hall, the architecture of the school provides different kinds of spaces to support its approach to teaching and learning.

One of the elements of METI's philosophy is learning with joy. This is reflected in the liberal

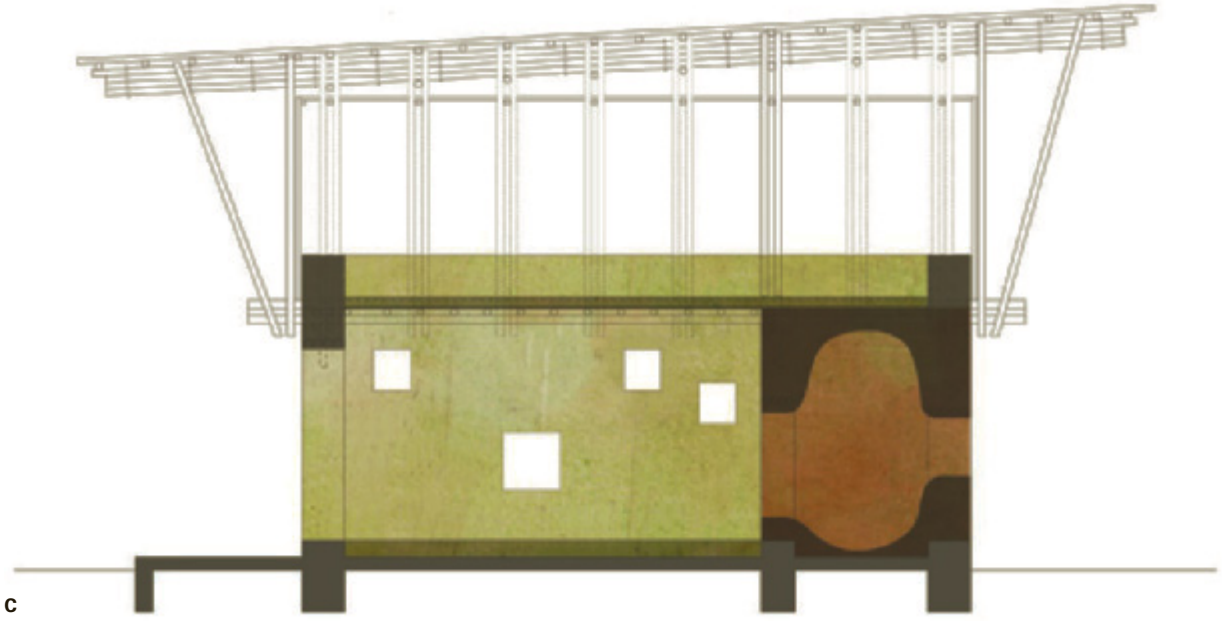


B

A: Construction was based on traditional techniques. Readily available materials, such as loam, straw and bamboo, were used.

B: Schoolchildren posing in the doors and entrances of the east façade.

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C

> *This joyous and elegant school in rural Bangladesh has emerged from a deep understanding of local materials and a heart-felt connection to the community. Its innovation lies in the adaptation of traditional methods and materials to create light-filled celebratory spaces as well as informal spaces for children.*
>
> **Jury citation, The Aga Khan Award for Architecture**



D

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use of colour and warm and sensual materials. It is designed to make the children feel comfortable. The dug-out "cave" rooms allow students to study in small teams or alone, to play during the breaks, and to read and reflect. There is minimal furniture in the main spaces, and this encourages informality. Children tend to group around the teachers rather than sit in ranks facing the front of the class.

Sustainable development

The project is a model of sustainable and affordable development. The entire budget for the school construction was €25 000. This budget was spent within the immediate area. Construction materials, mainly earth and bamboo, were sourced locally and day labourers were hired from the nearby village.

The volunteer architects from Germany ensured that the project was a collaborative effort and a mutual learning process. Detailed planning was done on site with local craftsmen. The construction was often very experimental but respected the practical limitations imposed in the area. The electricity supply was very intermittent, so most of the power was supplied by human labour and water buffalo. The finished school functions well without electricity; it remains cool and gets plenty of light during the day.

The architects opted for traditional construction techniques that could be easily replicated so that they could be used to improve the local housing stock. The project sought to develop these methods where practical. During the project, many people were trained in new earth and bamboo construction methods.

Children were also involved in the building process. Not only did this give them a greater sense of ownership of their new school, it allowed them to learn and reflect on the value of sustainable construction. Their participation also produced other benefits, such as the self-confidence that comes from working together on a significant project and taking an active part in the creative process.

Cultural performances

One of the aims of Dipshikha's interventions is to improve the quality of life in the rural areas of Bangladesh in order to counteract population migration to the cities. The school is now the major cultural facility in the area. It is developing a strong cultural programme, and dance, theatre and music performances by students attract hundreds of spectators.

The school encourages children to become responsible, creative and socially engaged. It organises trips for them to surrounding villages so that they can interview local people and get a deeper understanding of the needs of their own society. The children draw on these contacts and their own reflections to write and perform plays for the villagers.

C: Cross section of the two-storey building.

D: One of the classrooms on the first floor.

E: The cave rooms are spaces for retreat, study and recreation.



E

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B

New Roundhouse

LOCATION I **MANCHESTER, UNITED KINGDOM**



A

ARCHITECT: **Walker Simpson Architects (John Holroyd, Rob James and John Walker)**
CLIENTS: **Manchester Settlement, The Manchester College and Mosscare Housing Ltd**
TYPE OF SCHOOL: **Primary and lower secondary**
NUMBER OF STUDENTS: **160**
TYPE OF PROJECT: **New institution and community centre**
GROSS SURFACE AREA: **1 125m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **Large city**

A: Glazed slots puncture the first and second floor façades of the building.

B: A first-floor seminar room, with a view through the atrium to the café below.

The New Roundhouse is a purpose-built educational and community resource that serves several different user and client groups. Manchester Settlement, a registered charity, runs educational programmes at the building for young people who have been excluded from secondary education, offering progression routes to further education and training or back to mainstream education. There are also students on education projects run by The Prince's Trust and The Manchester College.

Other users include younger children attending play schemes, out-of-school clubs and holiday childcare programmes, staff and service users from Mosscare Housing, and local residents taking part in workshops and classes, visiting the café or attending meetings.

Design considerations

Occupying an infill site, the New Roundhouse replaces a nineteenth century building. It has a similar height and mass, providing a suitably scaled new civic building in place of the old structure. Salvaged fragments of the demolished terracotta façade have been incorporated into a feature wall to act as a focal point within the social space. The shape of the building is determined by the position and volume of the internal spaces.

The building's concrete load-bearing frame was carefully engineered at the design stage to minimise internal columns. This allowed the insertion of non-load-bearing partitions to all floor plates, providing for maximum flexibility through the building's lifetime. The building has been designed to be robust. Exposed concrete surfaces prevail with easily maintainable plaster walls and painted door frames.

The project was designed from the outset to have a low energy use at all levels. The building is constructed from an exposed in-situ reinforced concrete frame giving high thermal mass without recourse to air-conditioning. Complex mechanical services have been avoided in favour of underfloor heating and a passive ventilation system. Exhaust air is drawn up from all floors through a central atrium which acts as a solar chimney.

Organisation of teaching space

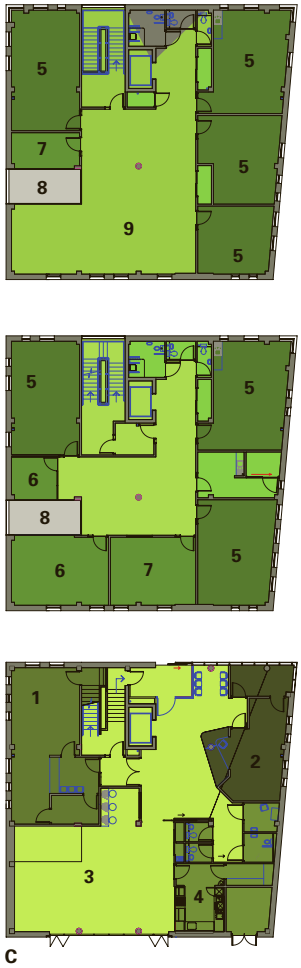
As many of the building's users are young people, some of them in a vulnerable position as learners, it is important that the building

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offers a protective environment. For this reason, the teaching areas are housed on the upper floors. This provides a safe and welcoming setting and allows the ground floor to be given over to community use.

All teaching spaces are arranged around an internal atrium that allows natural daylight to reach deep within the building. The layout of the upper floors is based around the principle of combining cellular teaching and staff accommodation with flexible and more open teaching spaces. This offers opportunities for traditional and transformational learning. Young people share teaching spaces with the college students in order to inspire their learning. This is further enhanced by open teaching areas and the transparency between the floors of the building, providing views of the varied activities happening throughout the building.

The Mosscare Housing and Manchester Settlement offices are on the ground floor. A large part of this floor is given over to a "social space", a place where people can meet and relax. There is a small café that can be used by the public during the day. A glazed opening leads out into a walled garden area. The open areas of the ground floor can be booked for community events and meetings.



C

1 Mosscare offices
2 Manchester Settlement offices
3 Social space
4 Kitchen
5 Classroom
6 Seminar/meeting room
7 Office
8 Atrium
9 Learning resource

C: Floor plans: ground floor (bottom), first floor (middle) and second floor (top).

D: Glazed doors can be pushed back to open out the ground floor to an enclosed outdoor area.



D

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Scuola primaria e secondaria Stefanacci

LOCATION I **SAN PIERO A SIEVE, ITALY**



A

This elegant extension has been built to complement a school complex in San Piero a Sieve, a small town 20km north of Florence. It provides additional accommodation for the primary school (San Piero Fedi Stefanacci) and the middle school (Scuola Secondaria di I grado di San Piero a Sieve) that occupy the site.

The new two-storey building has teaching and learning facilities on the ground floor, including an auditorium and multipurpose hall, a computer science classroom, a science classroom and the school library. On the first floor, there are offices for teachers and administrators and for the headteacher, who has overall responsibility for all the primary schools and middle secondary schools in the area.

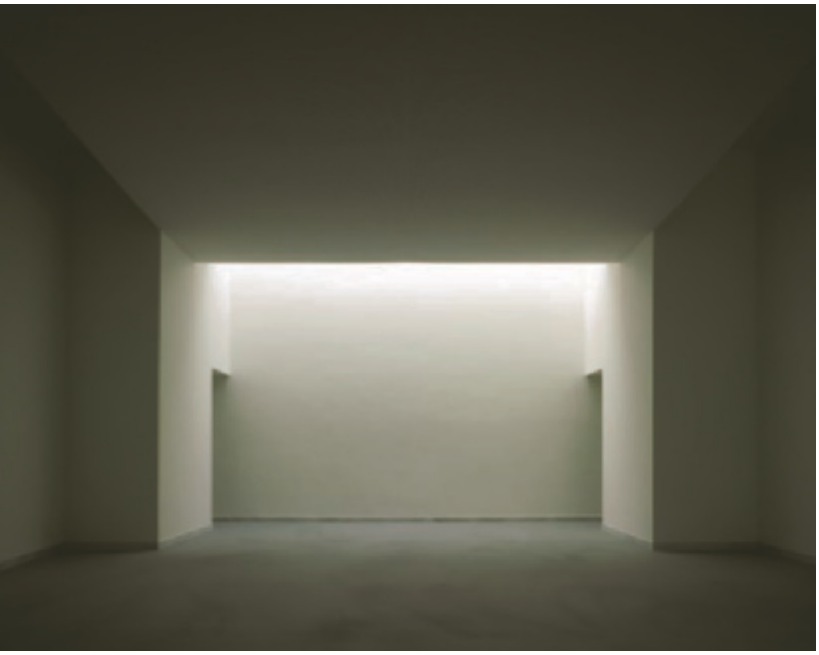
ARCHITECT: **Fabio Capanni Workshop**
CLIENT: **Municipality of San Piero a Sieve**
TYPE OF SCHOOL: **Primary and lower secondary**
NUMBER OF STUDENTS: **80 (extension only)**
TYPE OF PROJECT: **Extension to existing school**
GROSS SURFACE AREA: **630m² (extension)**
YEAR OF COMPLETION: **2009**
CONTEXT: **Small town**

Architectural features

This is a resolutely modern building, both inside and out. It provides a contrast to the original 1950s and 1960s school buildings, but is in complete harmony with the traditional architecture of the town and the surrounding built environment.

A: North façade of the extension.

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B



C

Being a publicly funded initiative there was limited finance for this project and this has influenced the design and choice of materials. However, this constraint becomes a strength, as the simple forms and materials offer a contemporary version of buildings in the Tuscan tradition.

Constructed in pietra serena (a grey sandstone), plaster, wood and marble, the building is organised in two interlocking volumes. One volume encloses the auditorium and provides the external walls for three sides of the building. The second block houses the offices and classrooms; this is offset in relation to the first volume, creating a pleasing asymmetry.

The inclined and curved walls and irregular shapes produce an interesting and dynamic form. Further contrast and tone is added by the brilliant white plaster walls, the grey stone surfaces and the wooden door and window frames.

The building can be accessed from three entrances. The main entrance from the older school buildings is via a promenade along the curved wall of the auditorium that leads directly inside the building.

Interiors

Inside the building every space is designed to make users comfortable. All the windows are positioned to allow natural light to enter the rooms and offer good views of the surroundings. Skylights bring daylight into the two double-height spaces: the auditorium and the main corridor.

Several interior details also draw on traditional Tuscan architectural practice. The space between the ground and first floors creates a kind of loggia. Some alcoves inside the building act as gathering points, referencing the Tuscan tradition of providing public spaces and meeting points.

The auditorium serves as a multipurpose space. It is available for use by the community and, as such, can be used and accessed independently from the rest of the building.

B: The auditorium.

C: The ground floor corridor.

D: Cross section.

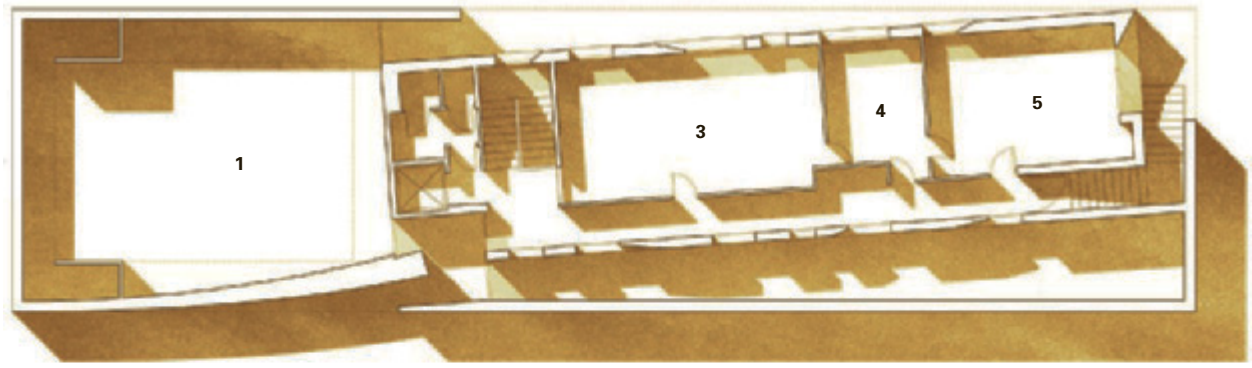
E: Floor plans: first floor (top), ground floor (bottom).

F: The main entrance.

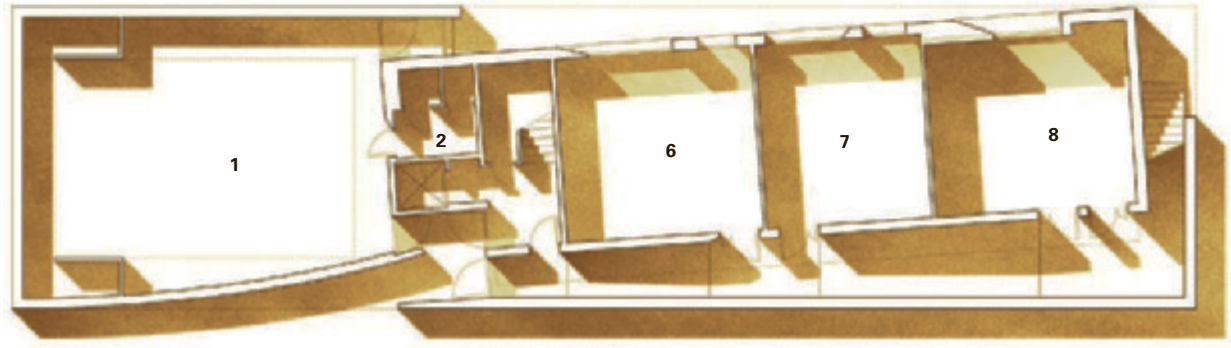


D

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1 Auditorium
2 Toilet
3 Staff office
4 School administration
5 Headteacher's office
6 Computer science room
7 Science classroom
8 Library



E



F

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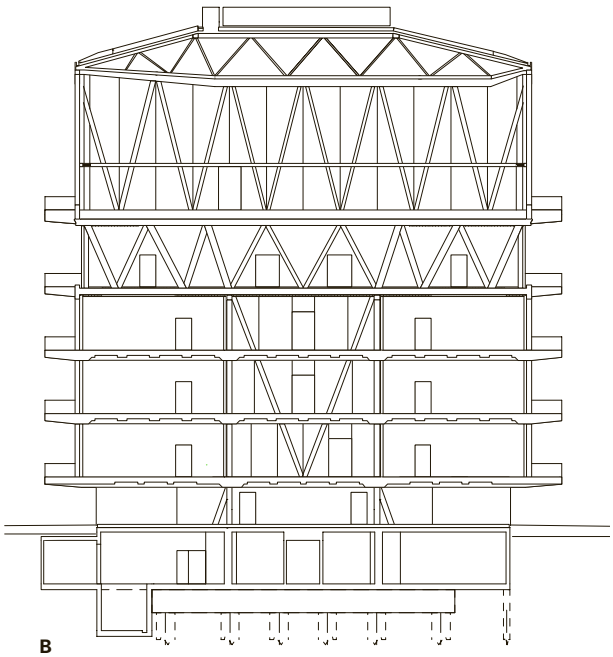


A

Schulanlage Leutschenbach

LOCATION | **ZURICH, SWITZERLAND**

ARCHITECT: **Christian Kerez**
CLIENT: **Stadt Zürich, Amt für Hochbauten**
TYPE OF SCHOOL: **Primary and lower secondary**
NUMBER OF STUDENTS: **420**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **9 840m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **City**



B

A: The school viewed from the south east.

B: A cross section. The gymnasium is on the double-height top floor.

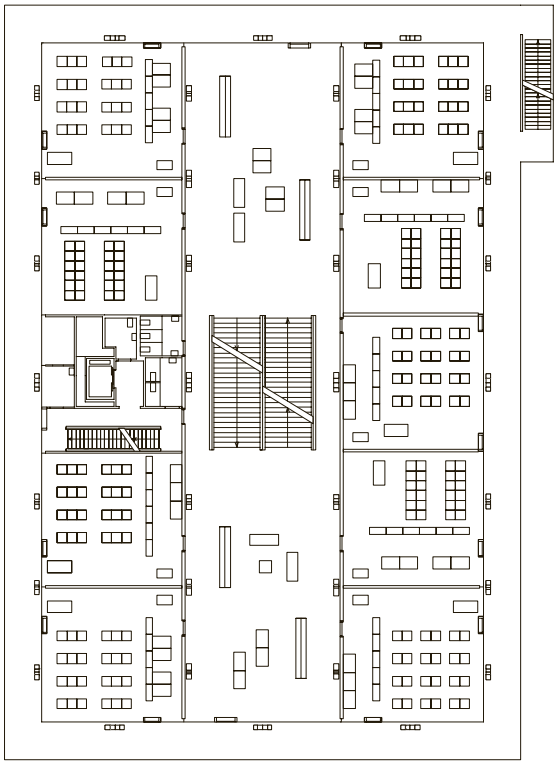
C: The school has panoramic views of the neighbourhood.

D: Typical furniture layout on one of the teaching floors.

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C



D

Situated in a former industrial area on the edge of Zurich, this school is a very visible landmark in an emerging residential development. The elegant six-storey glass and steel structure accommodates 18 classrooms, six rooms for teaching specialisms such as home economics, three handicraft rooms, a gymnasium and a multipurpose hall. The building has a very small footprint, leaving space around the school for an open playground that also serves as a park for the local community.

Design competition

The city's school planning bureau set out the educational concept for the new school. The design was selected through an architectural competition. Members of the school planning bureau, representatives of the school district and the future principal of the school participated in the jury along with architects.

Christian Kerez' design was chosen by the jury for its architectural and educational qualities. It was further developed by the project team, led by the city's building authority, and overseen

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E

E: A kindergarten group being taught in the common area between the classrooms.

by a steering committee, whose members included several educational experts. The school principal was also a member of the project team, and was involved in all decisions taken during the project development and building process.

Structural innovation

The school has an exceptional cantilever steel-frame construction. The frame rests on six load-bearing pillars, allowing for a completely free arrangement of the internal space. The building meets Swiss low energy standards (certified under the Minergie criteria). It was constructed using non-toxic materials, including recycled concrete.

The building has been acclaimed for its architectural and engineering qualities. In 2009, it was given the "Golden Hare" award by SF (the Swiss national television network) and *Hochparterre* magazine for the best example of Swiss architecture. It received the Swiss Steel Award in the same year.

School organisation

The internal organisation supports modern learning and teaching methods but also allows for more traditional classroom-based teaching. The main teaching rooms are on the first, second and third floors. These floors are organised along a longitudinal axis, with the classrooms arranged each side of a wide open central space running down the spine of the building.

The large open common areas on each floor can be used for learning activities. Given their position outside the classrooms, these areas are typically used by the school for silent or relatively quiet activities. They get plenty of light and the entire space can be utilised because the balconies around the building serve as fire escapes.

Classrooms are accessed by double staircases in the centre of the building. There are separate stairs for younger and older students. Doors interconnect all of the classrooms. The internal walls are made of translucent glass, while the glazed façade allows extensive views and natural lighting.

Community resource

This is a community-based school, and many facilities are open to the public. These include the cafeteria and child daycare room located on the ground floor, and the library and multipurpose hall on the fourth floor. The gymnasium is at the top of the building on the fifth floor, and it is in use from 7 am until 10 pm every day.

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École Internationale de Manosque

LOCATION | **MANOSQUE, FRANCE**



A

ARCHITECTS: **Rudy Ricciotti and Jean-Michel Battesti**
CLIENT: **Région Provence-Alpes-Côte d'Azur, Direction des lycées**
TYPE OF SCHOOL: **Primary to upper secondary**
NUMBER OF STUDENTS: **400 at present; capacity 1000**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **15 996m²**
YEAR OF COMPLETION: **2010**
CONTEXT: **Small town**

Built on a greenfield site on the outskirts of Manosque, this new school is a striking addition to an emerging new district. Its external façade is guarded by a colonnade of 280 unevenly spaced precast concrete pillars. From within, its architecture evokes the Roman and Mediterranean heritage of the area, with a series of single-storey buildings enclosing courtyards and play areas.

This international school has been built primarily to provide education for the children of staff working at ITER, an international project that is currently building the world's largest experimental nuclear fusion reactor. It also has places for local children who have good linguistic abilities and meet various other entry criteria. Its programme is structured for a polyglot community, catering for children who might only attend the school briefly during their parents' short secondment to the ITER project. It also offers internationally recognised qualifications.

Layout

Envisaged by the architects as "a monumental temple of knowledge", the school is laid out in a series of more intimate spaces. The columns that surround the school invoke a sense of quiet strength. The main circulation routes are open to the sky, and crisscrossed by horizontal beams producing strong variations of light and shade. The aim has been to create a school open to the elements, in which children can feel in harmony with the environment.

A: The school is surrounded by a distinctive colonnade of concrete pillars.

B: Architects' drawing of the north façade.

C: A shallow pool fills the courtyard in the centre of the administration block.

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B





C

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D

1 Restaurant block
2 Nursery
3 Boarding school
4 Administration
5 Primary classrooms
6 Cultural hub
7 Gymnasium
8 Secondary classrooms

Separate buildings house the nursery, the primary school and the secondary school. There are also separate blocks for the administrative offices, art studios and workshops, the gymnasium and restaurant. These are organised along two main "streets" that cut across the site on the main axes. These interior streets are conceived as agoras, places that encourage interactions between all the nationalities at the school.

Facilities

The school has the facilities to provide education from nursery to upper secondary level. The nursery has eight classrooms plus a quiet room for resting in the day and a room for physical education. The primary school has 14 classrooms. The secondary school comprises 28 mainstream classrooms and 15 scientific and technological workshops and laboratories. The information centre has six workrooms. In the cultural hub, there are four visual art studios, two music rooms, an amphitheatre and a multipurpose room. There is also a small boarding school and some apartments for teachers.

Sustainability

The school has been designed to meet high environmental standards. The buildings are well protected to minimise heat loss, with reinforced insulation in the walls and green roofs. Most rooms benefit from natural light and ventilation, and they are equipped with a system of stackable enamelled aluminium blinds to regulate direct sunlight. A double-flow ventilation system is deployed to reduce heat loss.

The central heating system is powered by a wood boiler. This boiler also supplies the hospital opposite the school and has the capacity to supply the other buildings currently being planned or under construction in the immediate neighbourhood. Solar collectors have been installed to heat the water used in the boarding school, the restaurant and staff accommodation. The roof of the gymnasium is covered by a photovoltaic membrane, which it is estimated will produce around 55MWh a year.



E

D: Site plan showing the layout of the main facilities.

E: Planted borders add colour to the main routes through the complex.

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Hazelwood School

LOCATION | **GLASGOW, UNITED KINGDOM**

ARCHITECTS: **Gordon Murray & Alan Dunlop Architects**
CLIENT: **Glasgow City Council**
TYPE OF SCHOOL: **Pre-primary to upper secondary**
NUMBER OF STUDENTS: **42**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **2 663m²**
YEAR OF COMPLETION: **2007**
CONTEXT: **City**

> *"For me, the complexity and avoidance of straight lines ensure constant interest and variety while still maintaining intimacy and human scale…it is the most exciting new school building in Scotland."*
>
> **Keir Bloomer**, *independent education consultant*



A

Located near a park in a Glasgow suburb, Hazelwood School offers customised facilities to meet the complex needs of children and young people with multiple disabilities and visual impairment or dual sensory impairment. The school aims to maximise young people's independence and provide a learning environment that offers a secure and highly stimulating educational experience for students.

To achieve this aim, the school design includes a gymnasium with floor level trampoline and soft play equipment, a hydrotherapy pool with mobile hoists, art, music and cookery rooms, a library and media suite, an open-plan dining and assembly area, doctor, nurse and physiotherapy rooms, outdoor music and play areas, as well as an outdoor sensory area.

The main school building is a single-storey "s" shape structure that reduces the perceived scale of the school and makes it less intimidating and more welcoming to small children. The shape creates a series of small scaled, intimate internal and external spaces. The design is both imaginative and sympathetic to the school's parkland context, with its use of natural materials such as wood, slate and cork.

Every aspect of the school has been designed to sound and smell distinctive, as this supports the young people in their navigation around

A: Main entrance.

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B

B: One of the exercise rooms with a floor-level trampoline and soft play equipment.

C: Site plan.

D: The cork-clad walls in the corridors have a warm tactile quality and markings to aid navigation.

the school campus. The materials used in the interior of the building have been carefully chosen to be both natural and textured as many of the children rely on their sense of smell and touch to familiarise themselves with their surroundings.

The school is barrier free, thereby minimising the challenge faced by students in moving around the site. Trailing walls, marked with a texture that changes as it nears a classroom, allow students with visual impairments to navigate their way along the corridors. The floor markings, the difference in acoustics generated by the varied ceiling heights, and the print, Braille, moon and graphical signage also help students with navigation.

External spaces

In the school grounds, there is a welcoming and user-friendly environment despite the challenging site, with its tight boundaries, overlooking tower blocks and busy surrounding roads. Great care has been taken to preserve the many mature trees within the school's boundary. There are play areas and a sensory garden. Students mentally map the external spaces using its sensory features, including the rich variety of different textures produced by the use of grass, gravel, woodchip and decking.

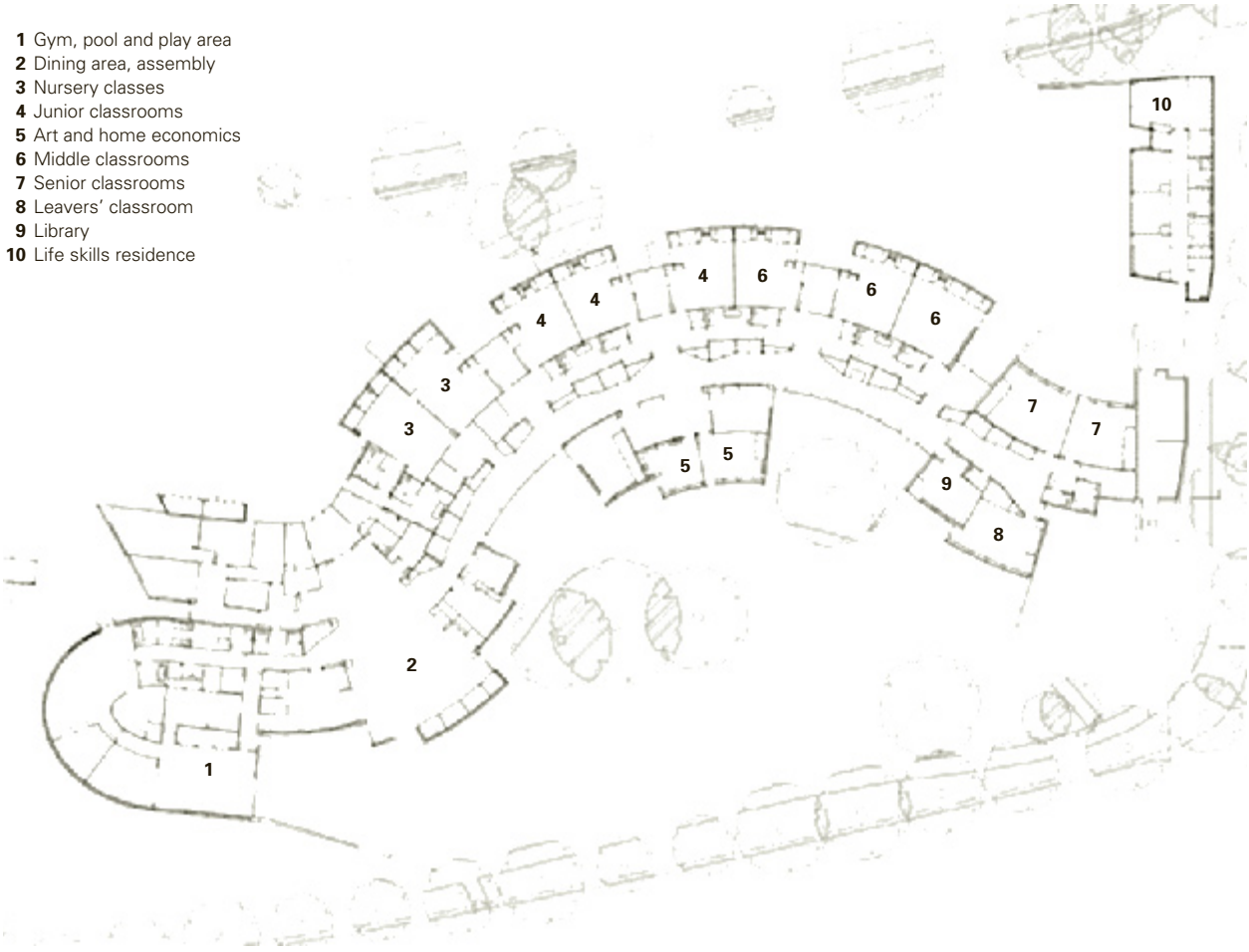
There is a stand-alone, three-bedroom house within the grounds, which is used to develop life skills. This is seen as an essential component of the young people's development, as it provides a realistic domestic environment for the students to learn the skills necessary for independent living.

User experience

Students and teachers are hugely enthusiastic about the spaces within the school, which suit the different and specific needs of the students. The careful attention to detail in every part of the building makes every student feel that the facility has been created with their own specific needs in mind – it demonstrably puts the children at the heart of the design. The new building has been praised by RNIB Scotland, a charity that supports blind and partially sighted people, for its calm atmosphere and subtle colours, contrasts and adaptable lighting that enable students to use their residual vision to maximum advantage.

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1 Gym, pool and play area
2 Dining area, assembly
3 Nursery classes
4 Junior classrooms
5 Art and home economics
6 Middle classrooms
7 Senior classrooms
8 Leavers' classroom
9 Library
10 Life skills residence



C



D

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Holzkirchen Realschule und Grundschule

LOCATION | **HOLZKIRCHEN, GERMANY**

ARCHITECTS: **rheinpark Architekten (Ralph Röwekamp and Sonja Starke)**
CLIENT: **Markt Holzkirchen und Landkreis Miesbach**
TYPE OF SCHOOL: **Primary school, and lower and upper secondary school**
NUMBER OF STUDENTS: **1 200**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **35 000m²**
YEAR OF COMPLETION: **2010**
CONTEXT: **Small town**

This school complex comprises a primary school, a secondary school and a daycare facility for younger children. Around 1 200 students attend these schools, yet the complex is unobtrusive and perfectly in scale with its small town suburban setting.

The architecture consciously references the pastoral landscape of this part of Bavaria. From the air and from many neighbouring buildings, the complex appears as five classroom blocks arranged in a line amid a green meadow. From street level, it becomes apparent that this meadow is a large green roof that covers a lower ground level, where there are further classrooms and a sports hall. Indeed from some perspectives, as the upper classrooms are set back from the edge of the green roof, the schools appear to be housed in an elegant single-storey pavilion.

Architectural features

Making good use of the contours of the site, which has a 4m drop from the top to lower part of the plot, the project has been conceived as a "school with two ground floors". Built at the same level as the top of the site, the flat green roof is the first of these "ground floors". Sunken courtyards have been "cut" into this plate to create courtyards and playgrounds at the lower ground floor level.

General classrooms are accommodated on the upper level. With external façades of larch cladding, these rooms have oak floors and are decorated in warm colours. Students look directly out onto the 7 500m² meadow, which can be used as a play area, as a space for outdoor classrooms and, on part of the roof, as pasture for cattle.

A: Section through the gymnasium.

B: Cows graze on the green roof outside the upper classrooms.

C: Courtyards bring light into the rooms on the lower level.

D: Walls and ceilings in the lower level have simple concrete finishes.

E: The architects' conception of a school with two ground floors.



A



B



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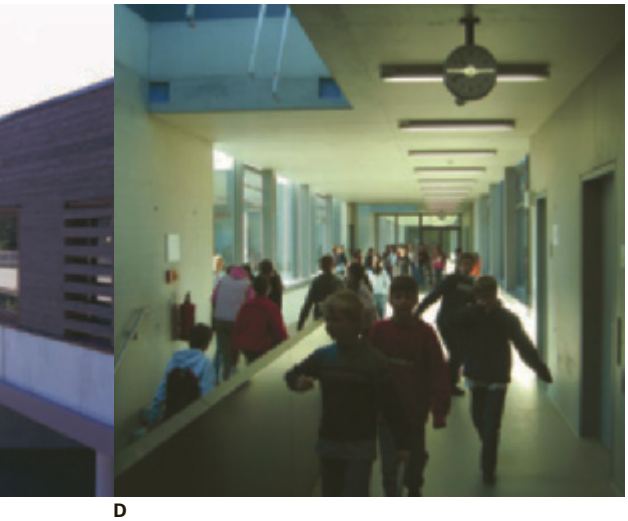
© OECD 2011

The entrances to the two schools are on the lower level – the true ground floor. This floor houses specialist classrooms and laboratories, the school administration and staff offices, the canteen and a sports centre, which is situated at the heart of the complex between the schools. This level has a very different look and feel, with cool colours, white-grey concrete internal walls and flooring, and floor-to-ceiling external glass walls looking out to the courtyards and the street.

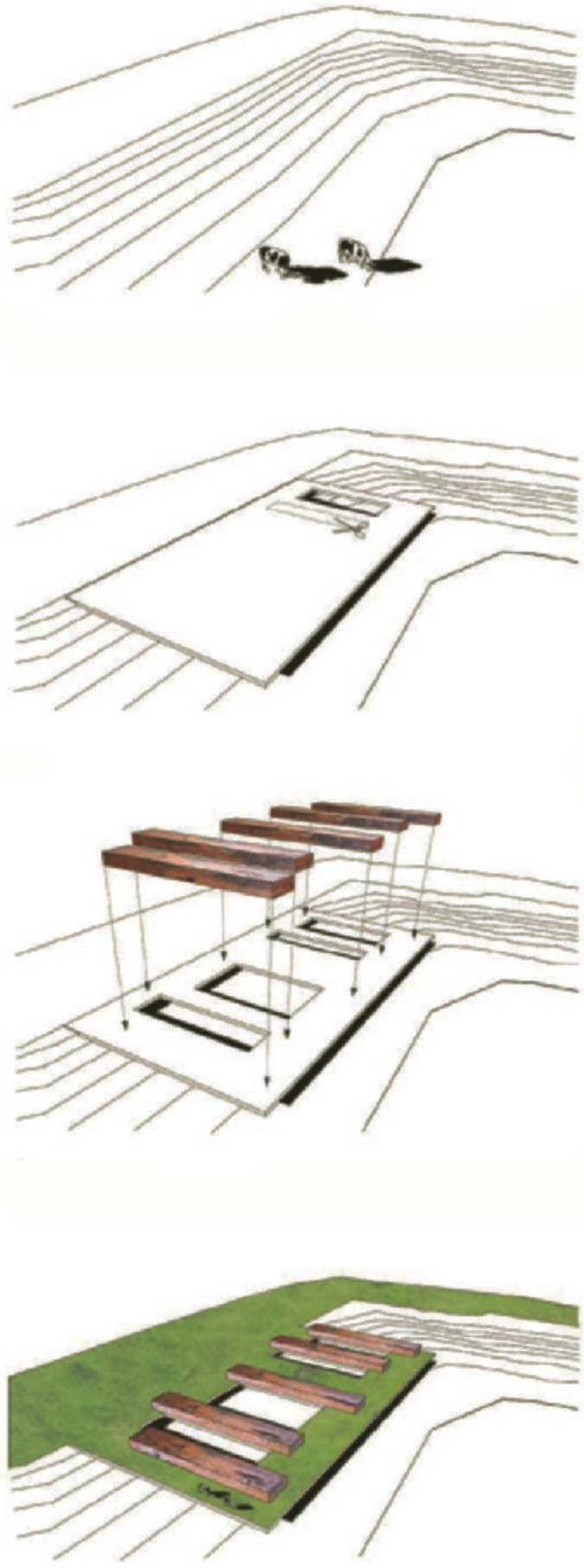
The design provides many spaces for physical exercise. Each school has its own playground, with many rooms having direct access to an outdoor area, and there is a separate sheltered courtyard for the young children attending the daycare centre. The sports hall is a shared facility. It is a double-height space, with the playing floor at basement level, 6.5m below the ground floor. The walls and floor have been painted blue, producing the impression of a pool of water in the ground.

Environmental design

This building has been designed to have a good environmental performance. By arranging the main teaching spaces into five linear blocks separated by four courtyards, each classroom is naturally lit and ventilated. The green roof provides good insulation and minimises rainwater run-off. In the interior, the exposed concrete floors, ceilings and walls throughout the building have a thermal mass that helps to maintain stable room temperatures. This lowers the demand for central heating and air conditioning, cutting the building's energy requirements.



D



E

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1 Secondary school
2 Canteen
3 Gymnasium
4 Day nursery
5 Primary school



F: Ground floor plan **F**

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Sint-Gerardusscholen and Dienstencentrum Sint-Gerardus

LOCATION | **DIEPENBEEK, BELGIUM**



A

> *In the old school, it was much too small. So it is great to be in the new building. It was always a long wait to get to your place, but now it is different – they had to work things out! There wasn't much room for sports or games, now it's something everyone can enjoy.*
>
> *Student, Sint-Gerardusscholen*

ARCHITECTS: **Holistic Architecture 50|5**	
CLIENT: **vzw Sint-Gerardusscholen**	
TYPE OF SCHOOL: **Pre-primary to upper secondary**	
NUMBER OF STUDENTS: **155**	
TYPE OF PROJECT: **New building on existing campus**	
GROSS SURFACE AREA: **7 000m²**	
YEAR OF COMPLETION: **2007**	
CONTEXT: **Small town**	

A: The rear façade – the elegant arched roof is supported by solid wooden beams.

Both of the Sint-Gerardus schools cater for children and young people with a motor, neuromotor or multiple handicap. To deliver education and appropriate therapy requires specialist facilities. The children move around in support structures and special wheelchairs, so they need plenty of room to manoeuvre. Many students have varying degrees of autism, so they also need familiar and calm environments.

These needs are met in the new building which has 24 classrooms, indoor play spaces, therapy rooms, a communal dining area, a gymnasium and a therapy bath. Bathrooms are adapted for people with disabilities, with spaces for individual care that guarantee privacy and lifts to ensure maximum mobility.

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The concept

Housed in a single low-rise structure 162 metres long, the new facility is organised on a clear and simple basis. The elementary school and the secondary school each occupy one end of the building, and the central section houses various shared functions and facilities. These entities are separated from one another by "notches" in the building volume that also serve as individual outdoor playgrounds. These spacious courtyards are carved out of the large roof volume.

Wide corridors cross the large indoor play areas. There are large shared living spaces, spacious classrooms and few doors. Large dormer windows in the roof allow ample daylight into the central space. The aim is to create the space and sense of calm needed to deliver the support that the children need and to provide a high quality living environment.

The arched roof is an emotional gesture; its shape evokes a feeling of protection and affords spaciousness inside and openness to the surrounding area. As well as being aesthetically pleasing, it has economic and structural benefits. The industrially manufactured structures helped make it possible to stay within the budget, and the compact shape produces energy savings.

Facilities

The classrooms are located against the outside walls, while therapy rooms, living areas and bathroom facilities are in the heart of the building. As well as "learning classrooms" where children with relatively normal mental faculties can be taught, there are "social classrooms" where skills such as the ability to cope are taught and which can also be effectively used as living areas.

The therapy rooms are an intrinsic part of the building. Occupational therapy, speech therapy and physiotherapy are provided during school time, in rooms only a few doors away from the classrooms. There are rooms for therapists, social workers, counsellors and psychologists in each school, allowing these professionals to have regular contacts with the students and with parents and other stakeholders.

Environmental features

The building has a compact volume, well thought-out orientation and substantial roof overhangs to prevent overheating in summer. It uses classic climate-control technologies to improve airtightness, and has thermal insulation, heat recovery from ventilation and underfloor heating. Rainwater is managed simply but effectively: it drains automatically from the wide roof overhangs to the subsoil. This avoids complex solutions such as buffering or infiltration and reduces maintenance costs as there are no blocked gutters. It makes every rainy day a special day.



B

© OECD 2011



C



D

1 Existing buildings
2 Secondary school
3 Shared space
4 Elementary school

B: Some of the offices are housed in separate and flexible volumes.

C: Wide corridors and open unobstructed spaces are characteristic features.

D: The site plan.

© OECD 2011



A



B

Tervaväylän koulu, Lohipadon yksikkö

LOCATION I **OULU, FINLAND**

ARCHITECT: **Linja Architects**
CLIENT: **Senate Properties, Oulu**
TYPE OF SCHOOL: **Primary to upper secondary**
NUMBER OF STUDENTS: **50**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **5 456m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **City**

Tervaväylä is one of eight special schools run by the Finnish government to provide education for severely disabled children. This is the only facility of its type in the north of the country, and students come from all around middle and northern Finland. The school also offers temporary education for disabled children placed in local schools and provides support for teachers, therapists and parents.

Given the limited space on site and a very tight construction budget, the design is necessarily pragmatic. However, the architecture is distinctive and not merely functional. The building has an expressive form, with irregularly shaped roof and façades. The four-storey L-shaped structure allows room for a small garden as well as a parking area (the budget did not stretch to an underground car park). It is a low-energy building that uses green materials and has effective insulation.

Fitness for purpose

All students attending this school have physical disabilities, and move around in wheelchairs or other assistive devices. Some also have other sensory impairments. Great care has therefore been taken to provide a suitable learning environment: one that facilitates independent working and supports each student's education and rehabilitation.

Three big elevators allow students to move easily between floors. Each elevator is sufficiently large to accommodate four large indoor wheelchairs. The floor plans are simple, following the L-shaped structure of the building, with wide corridors for ease of movement. To further assist students with sensory impairments to navigate through building, there are great contrasts between the floor and wall colouring, distinctive and bold colours on columns and other structures, no back lighting but only side lighting in hallways, and distinctive floor markings.

A: The spacious lobby and dining area.

B: View from the west.

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C



D

Throughout the building, every feature has been designed to be accessible to all users. In the classrooms and workshops, all desks are height-adjustable. In the home economics classroom, the kitchen tops are electronically adjustable so that they are accessible to all students. In the cafeteria, the buffet is sufficiently low to allow students in wheelchairs to see and choose their meals without needing assistance.

Facilities

The school provides a wide range of therapies and support for disabled children and their families. On the ground floor, there is a therapy pool, gymnasium and an exercise hall. The entrance to the pool is through an automated sliding door, and there is a ramp down into the pool for wheelchair users. The exercise hall includes a court marked for some disabled sports and is equipped with ropes and spotlights that can be used in sensory integration therapy.

Also on the ground floor, there are common rooms for students, where they can practise skills necessary for independent living, and a lobby and restaurant area for students and visitors. This double-height space has big windows giving fine views over central Oulu.

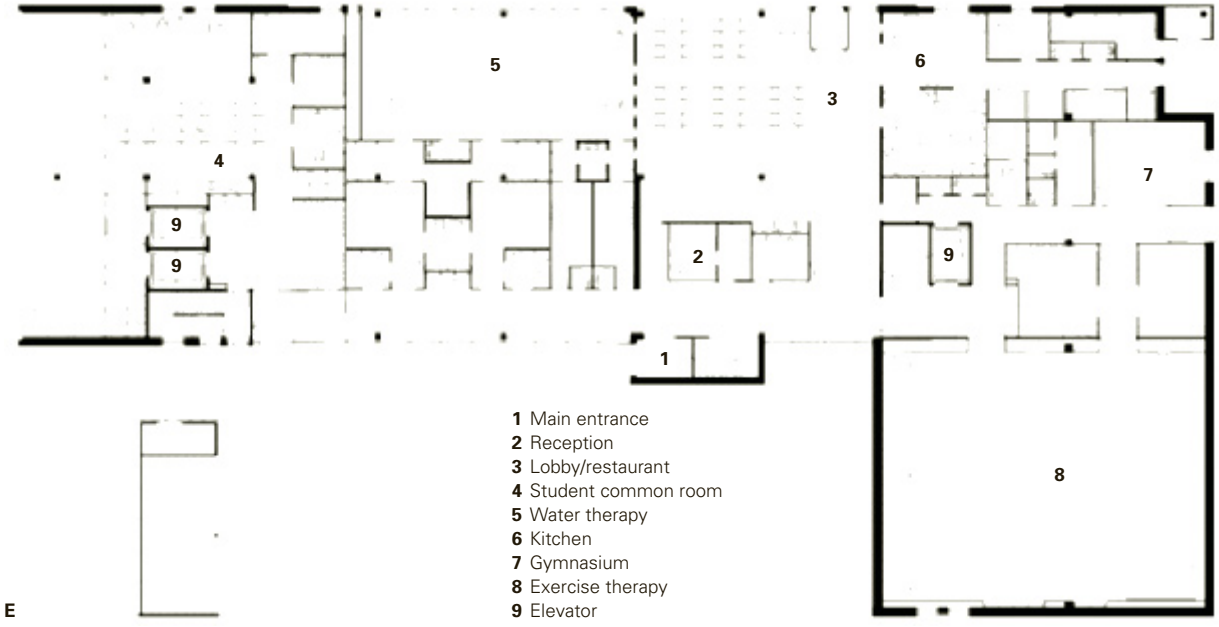
On the first floor, there is a dormitory for students who live too far away to travel to the school each day. There are two family rooms for parents who wish to help and involve themselves in their children's therapy, an office for the onsite doctor and further rooms for various physical therapies.

On the second floor, there are the main classrooms, the teachers' study and a small staff dining area. There is also a further therapy room on this floor. The third floor is mainly occupied by the school's administrators, and there are conference rooms and offices for use by the professional staff working at the school.

C: Ramps lead down into the therapy pool.

D: A teacher demonstrating some of the technology used to teach mathematics.

E: Ground floor plan.



1 Main entrance
2 Reception
3 Lobby/restaurant
4 Student common room
5 Water therapy
6 Kitchen
7 Gymnasium
8 Exercise therapy
9 Elevator

E

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A

Liceo Aldea Educativa Rapa Nui

LOCATION I **EASTER ISLAND**

A: The school's classroom block and the ocean beyond, with the computer room in the foreground.

Rapa Nui is a Polynesian island in the Pacific Ocean, better known to the world as Easter Island or Isla de Pascua in Spanish. More than 2 000 kilometres from the nearest inhabited land and 3 500 kilometres from the South American continent, the island only has a population of around 5 000 people.

Liceo Aldea Educativa Rapa Nui provides secondary and tertiary education on the island and it is an important community resource. The site for the new school was carefully chosen. The Rapa Nui community has strong ties with nature, and the school faces the ocean so that the "air of the ancestors" flows into the building.

Situated some three kilometres from Hanga Roa, the main town on the island, the school enjoys a large degree of privacy. This is important in an economy dominated by tourism, which often makes it difficult for local inhabitants to maintain their traditional routines.

Referencing local styles

The architecture of this new school respects and is inspired by all aspects of Rapa Nui culture. The school is organised around an oval courtyard. The shape and position of this courtyard echo ritual sites on the island and specific elements of the design are inspired by a local historic stone village and ceremonial centre of the southwestern tip of the island.

ARCHITECTS: **Hugo Molina, Gloria Barros and Marcelo Sarovic**
CLIENT: **Municipality of Easter Island**
TYPE OF SCHOOL: **Lower secondary to tertiary**
NUMBER OF STUDENTS: **190**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **2 236m²**
YEAR OF COMPLETION: **2005**
CONTEXT: **Periphery of a small town**

The shape of the classroom block is reminiscent of the shape and layout of moais, the famous monolithic human figures that are set on stone platforms along the island's coastline. High, thin windows regularly punctuate the roof line, demarcating each classroom. They give the building a vertical rythym and, viewed from the courtyard, the block appears like a line of moais looking at the sky.

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B

With its clean white façade and ovoid shape, the computer room is the most distinctive building on the campus. This room is the focal point of the school. It is a meeting point and a symbolic "cradle of wisdom". Its shape deliberately evokes that of the egg of the manutura bird (the Polynesian name for the Sooty Tern).

Largely built of stone, with some concrete and laminated wood, the school has a very discrete profile and it does not detract from the island's monuments. Furniture and equipment is designed to make students feel at home. Wooden sculptures and paintings have been commissioned to decorate the bare walls of the classrooms.

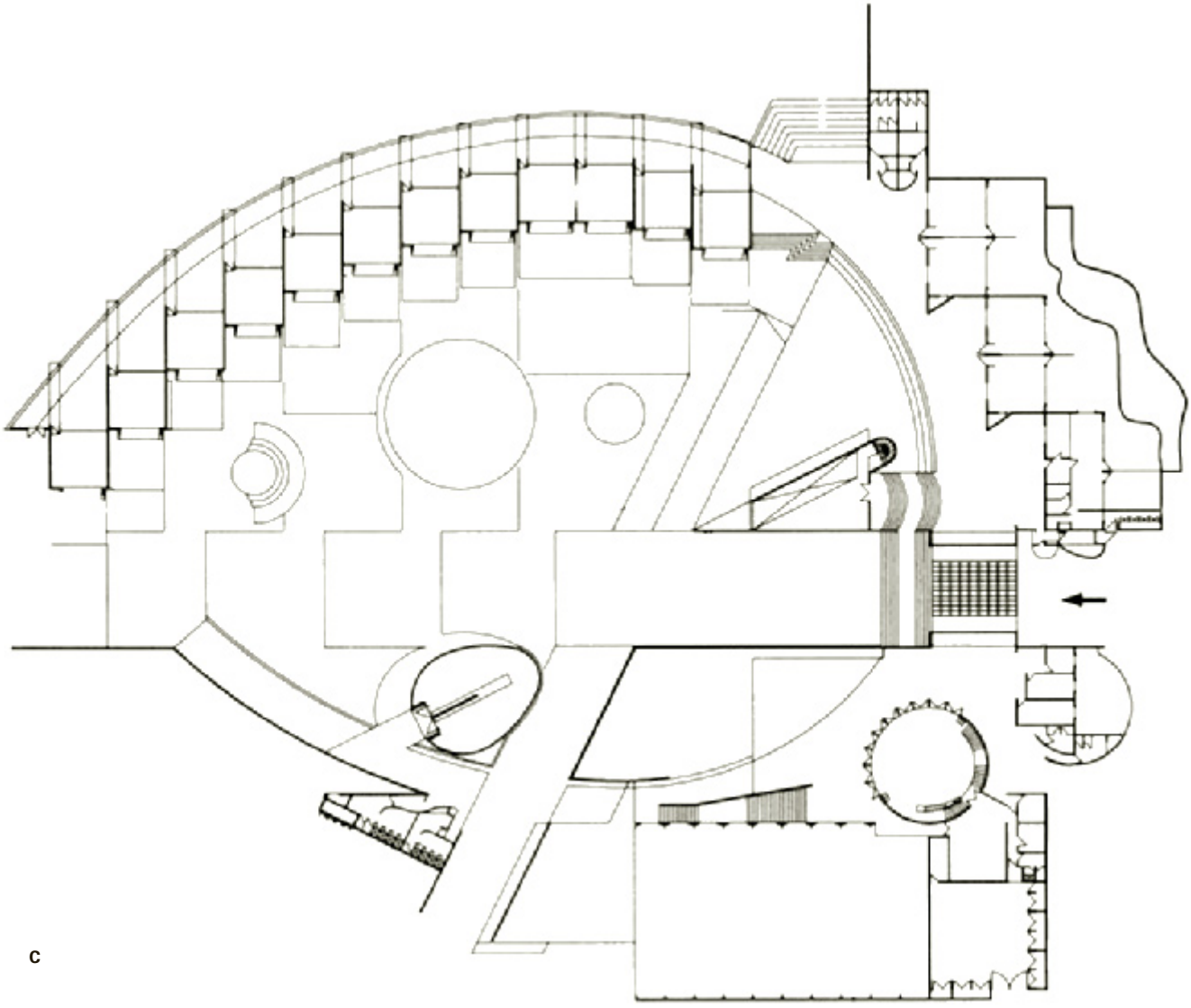
Building on traditions

School practices also adopt or build on Rapa Nui traditions. Many lessons are taught outside and when it rains students retreat indoors, taking off their shoes so that they do not dirty the white floors. There is no bell to signal the end of a class. Instead drums announce the breaks between lessons.

Part of the mission of the school is to rebuild respect for the sacred places on the island and to increase understanding of the legacy of the founding fathers. It encourages the participation of the community in educational activities and provides a meeting place outside school hours.

This respect for Rapa Nui culture, evident in the architecture and in the school ethos, is appreciated by the students. As one noted: "In this school we feel free, and we can learn and respect our teachers, but at the same time we feel they respect us as Rapa Nui people."

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C



D

B: The classrooms look out onto the central courtyard.

C: The site plan.

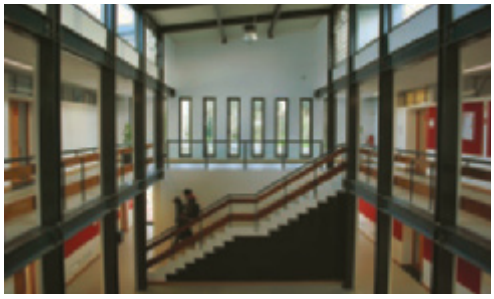
D: A school assembly.

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Escola Secundária Gabriel Pereira

LOCATION | **ÉVORA, PORTUGAL**

ARCHITECTS: **João Lúcio Lopes Arquitectos**
CLIENT: **Parque Escolar, EPE**
TYPE OF SCHOOL: **Upper secondary to tertiary**
NUMBER OF STUDENTS: **1 277**
TYPE OF PROJECT: **Renovation and extension**
GROSS SURFACE AREA: **11 243m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **Town**



A

A: Interior of one of the refurbished 1970s buildings.

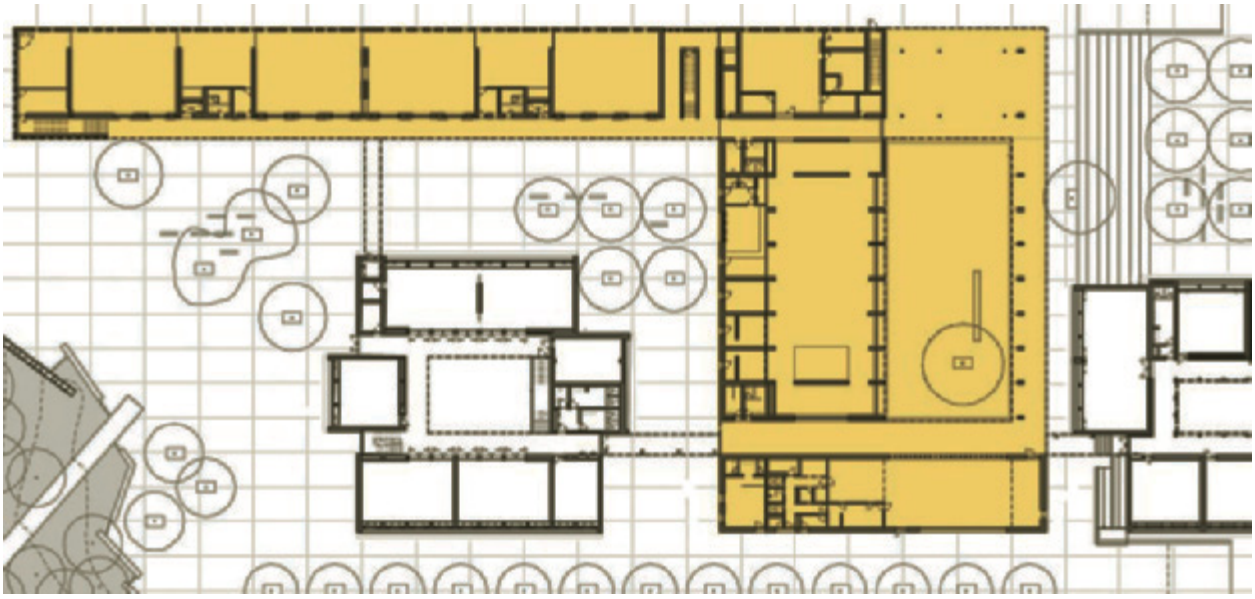
B: The central block from the front of the school.

C: Ground floor plan showing the new building in relation to existing structures.



B

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C



Escola Secundária Gabriel Pereira opened in 1971. It occupies a split-level site, with the main teaching facilities on the lower terrace and the sports area on the upper terrace. The original school buildings comprised three independent blocks of classrooms.

The school has been renovated and extended under the school building modernisation programme, which was launched by the Portuguese government in 2007. The main aims in modernising the school were to renovate and refurbish all classrooms to ensure that the school could deliver a modern curriculum, to expand the space for social and community activity, to improve the sports facilities, and to make greater use of the outside space on the campus. A further objective was to reorganise the use of the existing buildings, improving the flexibility of the space, and to ensure easier access for students, teachers and the community.

New buildings

The most important intervention was to extend the school by constructing a new central block. This provides additional facilities and reorganises the campus by linking the original buildings, forming a more coherent site with much more clearly delineated playgrounds. The other addition is a new gymnasium, which is located next to the sports hall and the outdoor sports courts on the upper terrace.

The central block includes an auditorium, a library, five computer classrooms and art workshops. It is a long two-storey structure that extends along one boundary of the site, parallel to the street that leads to the main school entrance. From the entrance, the upper floor of the central block overhangs a covered area leading to an open central courtyard. This is bounded on two sides by single-storey wings of the new block, which house a canteen, kitchen, snack bar and the student common rooms.

Renovation programme

The transformation of the original buildings focused on structural reinforcement, a consequent realignment of the geometry of the roof and the deployment of a new passive heating and cooling system that leverages the existing courtyard configuration. This passive geothermal system improves energy efficiency and maintains comfortable conditions in the classrooms throughout the year.

Rooms have been renovated to provide new workshops, science laboratories and arts classrooms. All classroom spaces are equipped with new furniture, and the infrastructure is designed to be easily maintained. Every room is soundproof. The materials used in the interiors are washable, so the school always looks clean. There is wireless access throughout the school.

Meeting educational needs

The school premises now contain all the facilities needed to teach the current curriculum and it can be easily adapted to accommodate changes in the future. The group spaces – the hall, the foyers, the small group classrooms, the auditorium and the student common rooms – are multifunctional and they are used by

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D

many different subject groups during a typical school day.

The new spatial layout is very well organised. The arts classrooms, the science laboratories, the computer rooms and the workshops are in clusters. Although learning and non-learning areas are interconnected, they are arranged to ensure functional autonomy.

The reorganisation of the campus means that the school can be opened up to the local community for evening classes and other activities outside of school hours. The sports facilities are regularly used by local handball and futsal clubs as well as by people training in the gymnasium. There is also community access to the library and to the auditorium for concerts and plays.

D: A class in progress in one of the refurbished science laboratories.

E: The library in the new block includes workstations and study spaces.



E

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Ekonomska šola Murska Sobota

LOCATION I **MURSKA SOBOTA, SLOVENIA**

ARCHITECTS: **IZTR d.o.o. (Rok Benda, Primož Hočevar and Mitja Zorc)**
CLIENT: **Hypo Leasing d.o.o. and Ministrstvo za šolstvo in šport**
TYPE OF SCHOOL: **Upper secondary to tertiary**
NUMBER OF STUDENTS: **675 (secondary), 300 (tertiary)**
TYPE OF PROJECT: **New campus**
GROSS SURFACE AREA: **11 317m²**
YEAR OF COMPLETION: **2007**
CONTEXT: **Small town**

A: The main entrance, with the college wing in the foreground.

The new campus for this secondary school and tertiary college is on the edge of Murska Sobota. Located close to a new commercial and industrial development, the school building is characterised by a uniform and sober façade realised in dark grey ceramic tiles punctuated by long glass panels. This contrasts strongly with the colourful façades in the nearby commercial area, and provides a neutral background for the school's external spaces.

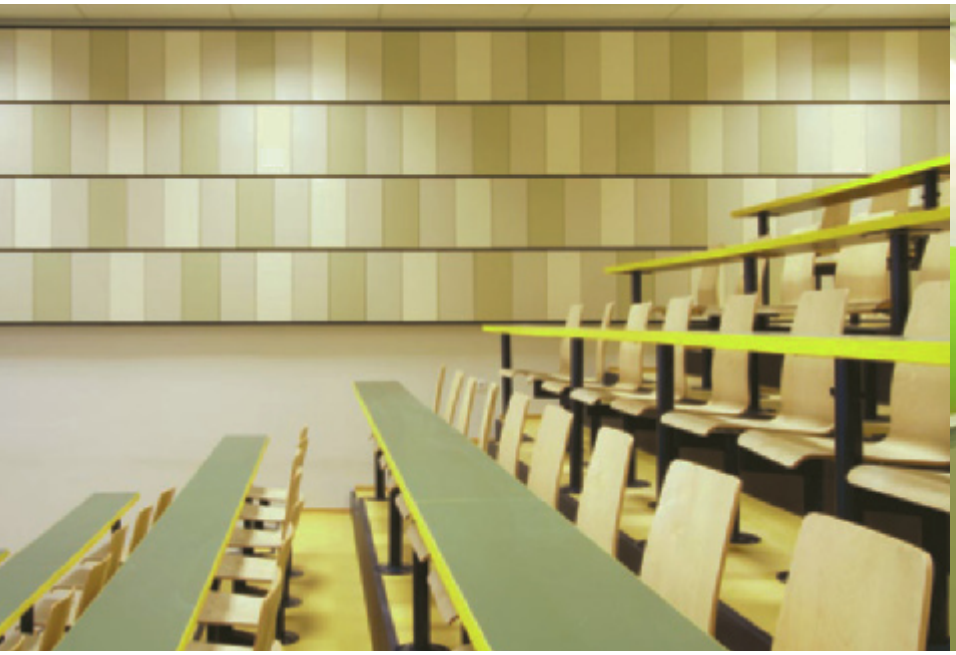
An oblong structure of uniform height, the school building comprises interconnected wings that fit compactly within the relatively narrow rectangular plot. The building neatly divides the grounds into small parks and sports grounds.

School organisation

The school management and teaching staff were involved in the design process, developing the brief initially prepared by the Ministry of Education and Sports, and offering comments and suggestions, especially at the beginning of the process. This helped to inform the organisation and layout of the complex.



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B



C

As the school provides education at secondary and tertiary level, it has been organised into discrete spatial and programmatic cores. The college occupies the front wing of the building and the central wing accommodates the secondary school. The sports hall, training rooms and changing facilities are in the third wing at the rear of the building. Sets of uniform classrooms and teachers' offices are located between the main wings and can be used flexibly by each educational unit.

Each wing is organised around a double-height hall. There are some 30 classrooms in the school, with a large lecture hall in the front wing of the building, and a multipurpose hall, a small lecture room and a refectory in the central wing.

The circulation space occupies a relatively small area, and consists of a set of interconnected halls, corridors and niches. This constitutes the public space within the school and provides a framework for informal learning and social contact.

Interior design

When planning the furnishing and fittings, standard solutions and elements had to be used to complete the project within budget. By manipulating colour schemes, carefully considering the dimensions of different elements and refining details, the design succeeds not only in meeting the needs of the client but also in creating a satisfying visual and spatial experience.

The colour scheme is vivid, sometimes almost playful. Doors, acoustic and protective panels, furniture and other elements are in distinct colours that correspond to different programmes, thus enabling clear orientation through the complex.

There are large windows and glazed walls in classrooms, offices and circulation spaces, providing daylight and panoramic views, thus merging interior and exterior spaces. Entrances to the classrooms are partially glazed, and these not only bring daylight into the internal corridors but also offer glimpses into the rooms. This enhances spatial transparency, and affirms the openness of the educational process and the school as a public institution.

The school community

Specialising in business and economics, Murska Sobota School of Economics is one of the largest educational establishments in the town. It not only attracts locals, but also students from neighbouring areas and the wider region of north-east Slovenia. The new campus also serves the community, and it has become a centre for sport, cultural activities and other social events. Through its rational design and flexible use of space, the school easily accommodates its different users groups and works as a small community.

B: One of the lecture theatres.

C: Colour is used throughout to aid orientation.

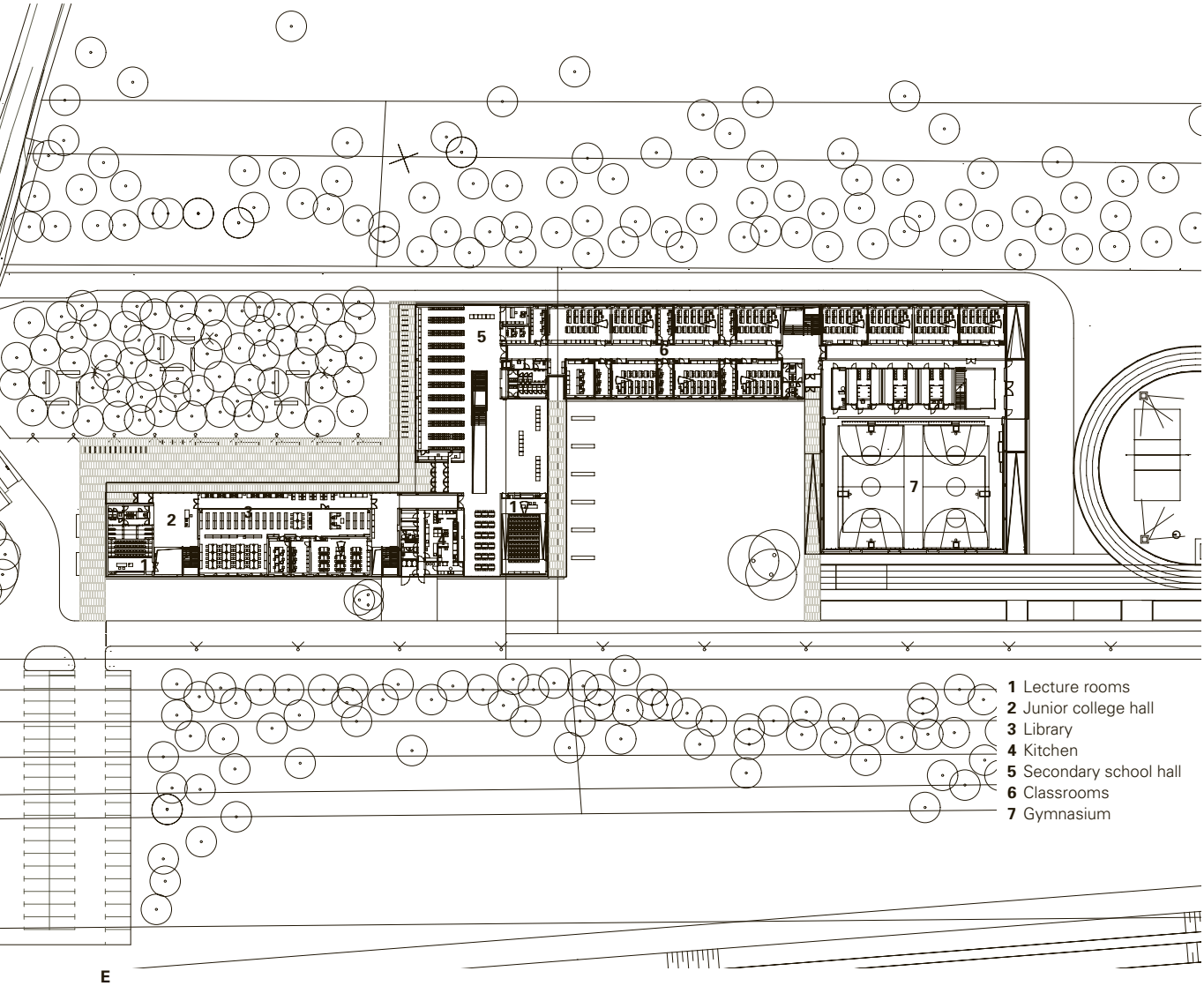
D: Floor-to-ceiling windows in the library.

E: Site plan, the college wing (left), the secondary school (centre) and the sports facilities (right).

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D


1
2
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5
6
7
1 Lecture rooms
2 Junior college hall
3 Library
4 Kitchen
5 Secondary school hall
6 Classrooms
7 Gymnasium

E

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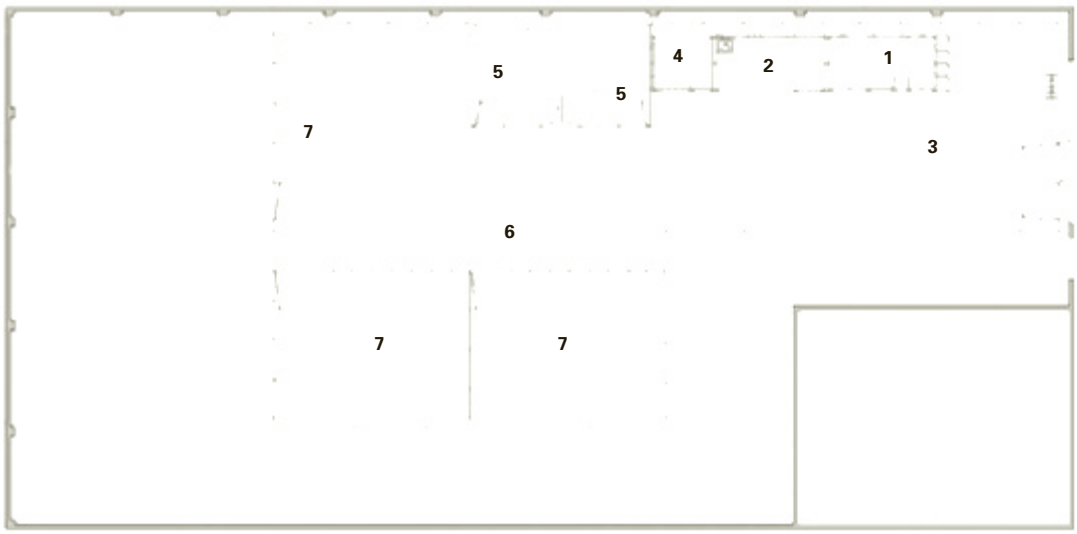
Red de Innovación y Aprendizaje

LOCATION I **ESTADO DE MÉXICO, MEXICO**



A

1 Reception module
2 Cafeteria module
3 Lobby
4 Rack module
5 Toilets
6 Open access computers
7 Classroom



B

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> *A centre like this facilitates learning; the teaching is practical and interactive. I like that the reception has small couches, bean bags and picnic tables where parents can wait for their children.*
>
> **Thalía García**, *facilitator, RIA Naucalpan 2*



ARCHITECTS: **Ludens**
CLIENT: **Fundación Proacceso ECO and Red de Innovación y Aprendizaje**
TYPE OF SCHOOL: **All levels**
NUMBER OF STUDENTS: **Around 6 000 users per centre**
TYPE OF PROJECT: **Conversions**
GROSS SURFACE AREA: **250–700m² per centre**
YEAR OF COMPLETION: **2010**
CONTEXT: **City**

The Red de Innovación y Aprendizaje (RIA) is a network of centres that offers low-income communities access to computers, the internet and education. Each centre acts as a community hub, helping people become part of the digitally connected world, and brings together schools, businesses and local government. Partnerships are made with local schools to create courses that supplement their curriculum. Businesses can use the centres to host conferences and to train their employees.

During the three phases of the initiative, 70 centres have been opened in 28 municipalities in the State of Mexico, an administrative district in south-central Mexico that surrounds the capital city. The project has received support from the State of Mexico and the National Council of Science and Technology.

The largest centre has 80 computers and the smallest 30 computers. A typical centre has a reception area, four classrooms and

A: Reception and lobby for RIA Naucalpan 1.

B: Floor plan for RIA Ecatepec 2. This centre is housed in a disused warehouse.

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an auditorium. Each centre caters for around 6 000 registered users of all ages. Some users take courses and others use the facilities independently on a drop-in basis.

Urban pressure points

Each centre is located in a densely populated urban area with high pedestrian and vehicle traffic. The aim is to place centres in "pressure points", creating positive local effects that spread to adjacent areas. All centres are renovations of existing buildings. This approach not only allows them to be situated where they can achieve tangible social impact, but it is also cheaper and quicker than constructing new buildings.

The architecture evokes elements of the local environment. The façades are made of galvanized steel and are adorned with colourful posters promoting the centres' services. The registration modules resemble informal market and food stands.

The centres aim to create a welcoming atmosphere that inspires learning by providing an environment where students can come to do their homework, study or play. Carefully selected colours highlight doors and floors to guide users through the centres, enhancing the navigability of the space.

Sustainable architecture

Each centre is a model of modular, ecological and sustainable architecture. The registration desks and the walls are built to a modular design. The main dimensions are set to match the measurements in which materials are manufactured and supplied. This minimises waste and reduces assemblage time. This also makes it possible to easily reconfigure the space to meet user requirements.

Walls and registration desks are made from OSB wood (comprised of leftover woodchips from construction sites). All chairs and tables are made from recycled plastic and recycled antistatic material is used for the flooring. Most of these materials are easily reusable. The technology is energy efficient and bare low-energy light bulbs are used throughout.

The educational spaces are designed in such a way that they too are didactic. Each centre is in itself a lesson to users on how to work with low-impact materials. The internal infrastructure is not concealed but left so that users understand how the centres are built, and materials that are traditionally used as walls whilst the buildings are under construction become the skin of the centre. Materials that normally serve a transitory purpose, and are often considered cheap and undesirable, are used as finishings. Structural cabling lies on top of metal supports that run across the ceilings.

C: Classrooms are kept simple and can be easily reassembled to produce new configurations.

D: Teachers are on hand to deliver classes and support independent learning.

E: Standardised reception modules are used in each centre.



E

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Chapter 8: **Pre-primary and primary levels**

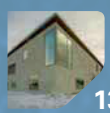

118 Aadharshila Vatika
India


121 Ajurinmäen päiväkoti
Finland


124 Jardin de Infantes Nº 911
Argentina


127 Jardim de Infância Popular
Portugal


130 Infantário de Bicesse
Portugal


133 Lehtoniemen päiväkoti
Finland


136 Tuomarilan päiväkoti
Finland

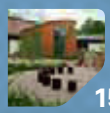

139 Yuyu-no-mori Nursery School and Day Nursery
Japan


142 Golden Lane Campus
United Kingdom


145 MFA & GGZ Zeeheldenbuurt
Netherlands


148 Gemeentelijke basisschool Sint-Joost-ann-Zee
Belgium


151 Seven Fountains Primary School
South Africa


154 Water Hall Primary School
United Kingdom


157 École de Cressy et Centre de Quartier
Switzerland


160 Escola Estadual Bairro Feital
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163 Lorentzschool
Netherlands


166 Escuela Nº 330 de Tiempo Completo
Uruguay


169 Schulhaus Baumgarten, Schule Buochs
Switzerland


172 Snells Beach School
New Zealand

Aadharshila Vatika

LOCATION | **NEW DELHI, INDIA**



A

ARCHITECTS: **Spaces Architects**
CLIENT: **Vijay Goel**
TYPE OF SCHOOL: **Kindergarten**
NUMBER OF STUDENTS: **90**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **700m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **Large city**

Aadharshila Vatika has been carefully designed to create a child-friendly environment. The bold use of colours, variety of non-regular spaces and customised furniture and fittings create a playful ambience. The kindergarten is in high demand by the local community, and feedback from parents suggest that attempts to provide a "home away from home" have been successful.

There is a strong emphasis on visual stimulation. Children are encouraged to explore the variety of spaces; this in turn stimulates their thought processes and development. It is a play school where children can readily learn by having fun.

Architectural features

The school building clearly stands out in the neighbourhood. The elevations are built up from basic geometric shapes – circles, triangles and squares – but the bold use of colour and the highly stylised detailing results in a very distinctive building. Deliberately setting out to avoid visual references to fairy tales or castles, it exudes a senses of wonder yet retains a raw and modern feel.

The architecture, the construction materials and the colours combine to create a building with a unique character. The client was initially apprehensive that the building might look too much like a shopping mall, but the colour palette and playful features, such as the large upturned pencils guarding the entrance, clearly establish the play school's identity.

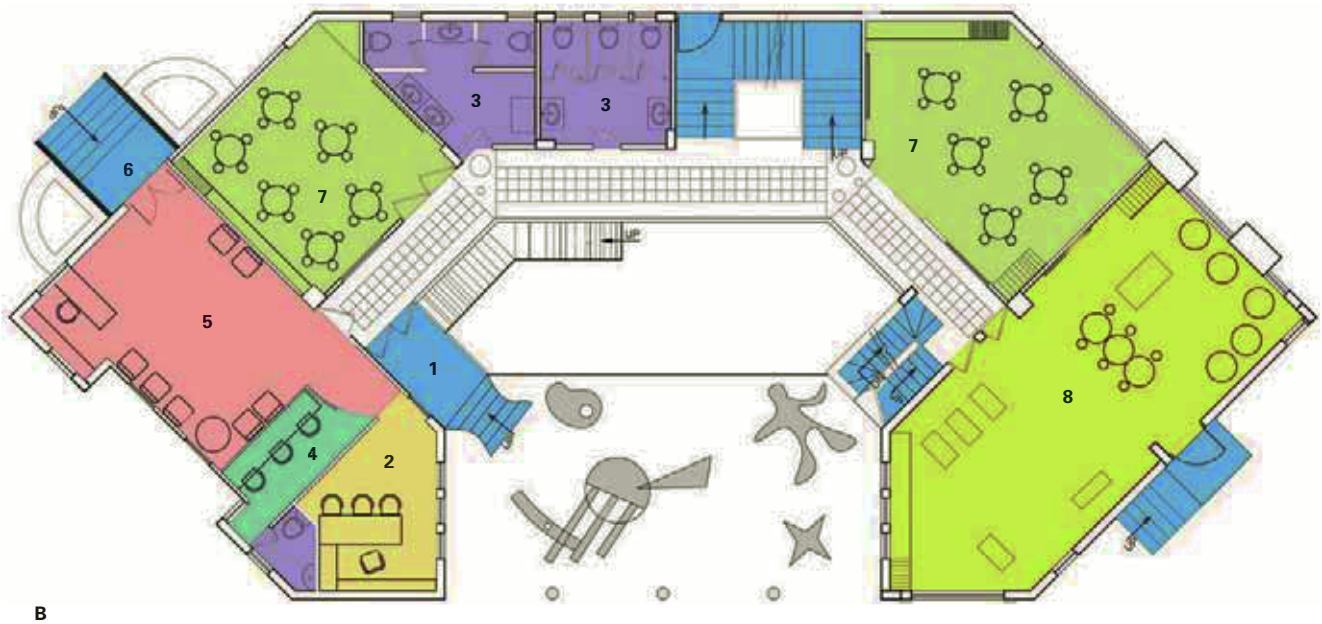
A: The main entrance.

B: Ground floor plan.

C: One of the classrooms: the children are seated in groups of four.

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1 Courtyard entrance
2 Principal's room
3 Toilets
4 Office
5 Reception
6 Side entrance
7 Classroom
8 Activity room



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The two-storey building has been placed in the middle of the site, allowing all rooms to have natural ventilation. The building plan is based on a hexagonal shape, and encloses an open courtyard that provides a secure, open play space. The grounds also include a further playground, a swimming pool surrounded by a wooden deck and a shower, and a small stage for holding open-air assemblies.

A distinct sense of transition has been created between the internal and external spaces through the use of different materials and colours.

Interiors

As well as accommodating five classrooms, the kindergarten has an activity room, a media room, a music and dance space, a medical room, reception area and staff offices. These are connected by a single corridor on each floor that overlooks the courtyard. There are two small open terraces on the first floor.

By keeping the plan as simple as possible, the architects have maximised the use of interior space. The classroom areas are not closed rooms but have big windows looking out into the corridor and into the grounds. These openings allow parents to watch class activities, and makes it easier for staff to supervise children inside and outside of the classroom.

All spaces in the internal environment have been designed for children. They can easily identify them and find their way around. Pastel colours and interior decorations have been chosen so as to create a calm atmosphere.

Security

Children's safety has been taken into account in the design. The risers in the staircases are only 13cm high so children can access them easily. Anti-slip tiles are used to prevent accidents. Railings are at child height. The pool at the rear of the building is no more than 45cm deep and is monitored by a camera which sends feeds from the reception to the principal's room.

The kindergarten has two entrances, and children use the side entrance. This means that children access the school well away from the busy main road at the front of the building and their movements can be monitored as they pass through the main reception area.

D: The corridor is lined with windows providing views out into the courtyard.

E: Classroom windows are positioned to allow children to see in and out.

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Ajurinmäen päiväkoti

LOCATION I **ESPOO, FINLAND**

ARCHITECTS: **AFKS Architects (Jari Frondelius, Jaakko Keppo and Juha Salmenperä)**
CLIENT: **City of Espoo**
TYPE OF SCHOOL: **Kindergarten and daycare centre**
NUMBER OF STUDENTS: **66**
TYPE OF PROJECT: **New school and community centre**
GROSS SURFACE AREA: **1 060m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **City**

This new single-storey building serves as a kindergarten and daycare centre and as a neighbourhood community building. As well as having space for over 60 children in the kindergarten, the community facilities attract 200 to 300 users a day.

The long linear structure has a distinctive dragon red exterior. Another notable feature of the architecture is the seemingly arbitrary

A: The front façade viewed from the children's play area.



A

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placement of the windows, the different pitches of the roof landscape and the three lanterns that protrude through the roof, bringing daylight into the interior.

Interior spaces

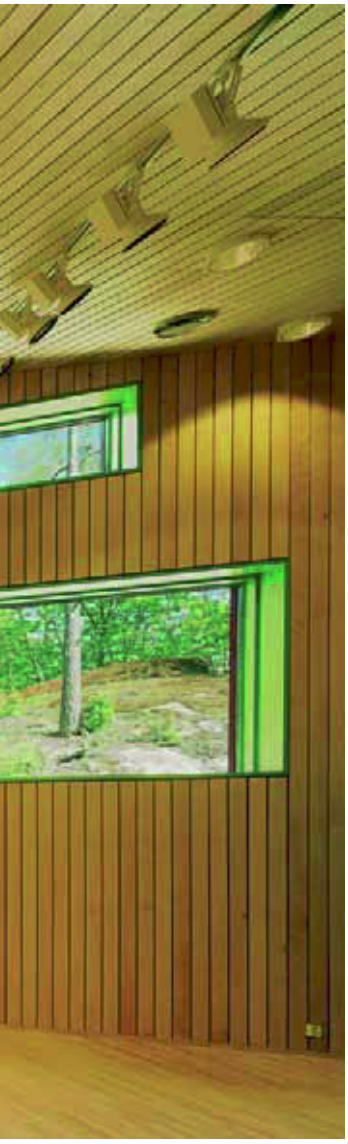
There are self-contained areas for each of the building's user groups organised around a central corridor running down the main axis of the building. The community facilities are accommodated in the eastern half of the building towards the main entrance. In this area there are two workshops, an office, a kitchen and an open seating lounge area for local people to use on a drop-in basis.

The kindergarten occupies the western half of the building and has two separate entrances. There are three separate "home areas", one for very young children (aged one to three years old) and two for older children (aged four to six years old). Each home area comprises a suite of three rooms, with a main activity room, a side room for small groups and a room with cots where children can sleep.

At the centre of the building, between the kindergarten and the community accommodation, there is a large hall. This resource can be easily accessed by all users without disrupting other activities or having to go through the children's area.

The building is light and decorated in soft pastel colours throughout, with timber finishes on doors, walls and ceilings. The interiors vary in height and the attic space below the shallow roof is utilised in some rooms. For example, there is an open loft area in one of the children's activity rooms.

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B: The main hall.



C: Floor plan.



D: Site plan.

Open areas

Good use is made of the site to create play areas and sheltered outdoor spaces. As the rear of the plot rises up to a steep rock outcrop, where there are (protected) Second World War fortifications, construction was confined to the flatter south side of the plot. This means that the yard at the front of the building opens up towards the favourable southerly orientation.

The plot includes part of an established garden, belonging to a nearby group of houses, with several mature fruit trees. These have been preserved within the kindergarten playgrounds – there are separate areas for the youngest children and the older cohorts – and the rest of the grounds, which serve as a fenced off park for local residents.

User feedback

The kindergarten staff were involved in planning this new facility. They contributed to the design process, setting targets and commenting on the proposals. The centre's principal took part in meetings during both the design and construction phases.

Since the kindergarten and community centre opened, feedback from users has been very positive. According to Sari-Nina Kaidesoja, the kindergarten's principal: "The beauty of the main hall brings joy every day, and the well-proportioned group rooms give us the flexibility to provide numerous activities. The children enjoy coming here. The character of the building creates a positive, playful atmosphere, and the interior is cosy."

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Jardin de Infantes Nº 911

LOCATION I **MORENO, ARGENTINA**

ARCHITECTS: **Ana Ines Bajcura**
CLIENT: **Ministry of Public Works, Province of Buenos Aires**
TYPE OF SCHOOL: **Kindergarten**
NUMBER OF STUDENTS: **160**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **430m²**
YEAR OF COMPLETION: **2006**
CONTEXT: **City**



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Children refer to this kindergarten as "the palace". It has a storybook quality, with a variety of spaces that provide plenty of scope for children to explore and play. The aim has been to create a fun and colourful environment, built on a child's scale, that supports learning through play and allows children to exercise and develop their imagination.

Spatial organisation

The kindergarten is organised around a central patio. Four play and activity rooms wind around one end of this patio. A multipurpose room and music room are situated at the other end of the patio. The school offices and kitchen are grouped along one side, and the fourth side remains open and leads into the playground.

The entrance to the school is through a covered gate and down a short path leading to the patio area. This path can be seen from the school offices, providing a measure of security. Benches have been built into the walls around the entrance gates for the comfort of parents waiting for their children after school. Simple mosaics line the lower half of the wall by the gate, creating visual interest.

All the buildings are linked by an arcade that opens out onto the patio. From here, children can access the activity rooms. The entrance to each room is through a small recess in the wall, referencing the sunken features (*hornacina*) found in many old buildings that contain religious icons or decorative objects.

A: The kindergarten is set in a small area of parkland.

B: Mosaics line the walls outside the school gates.

C: The arcade that links the school buildings.

D: Site plan.

E: The alcove (or small amphitheatre) at the back of one of the classrooms.

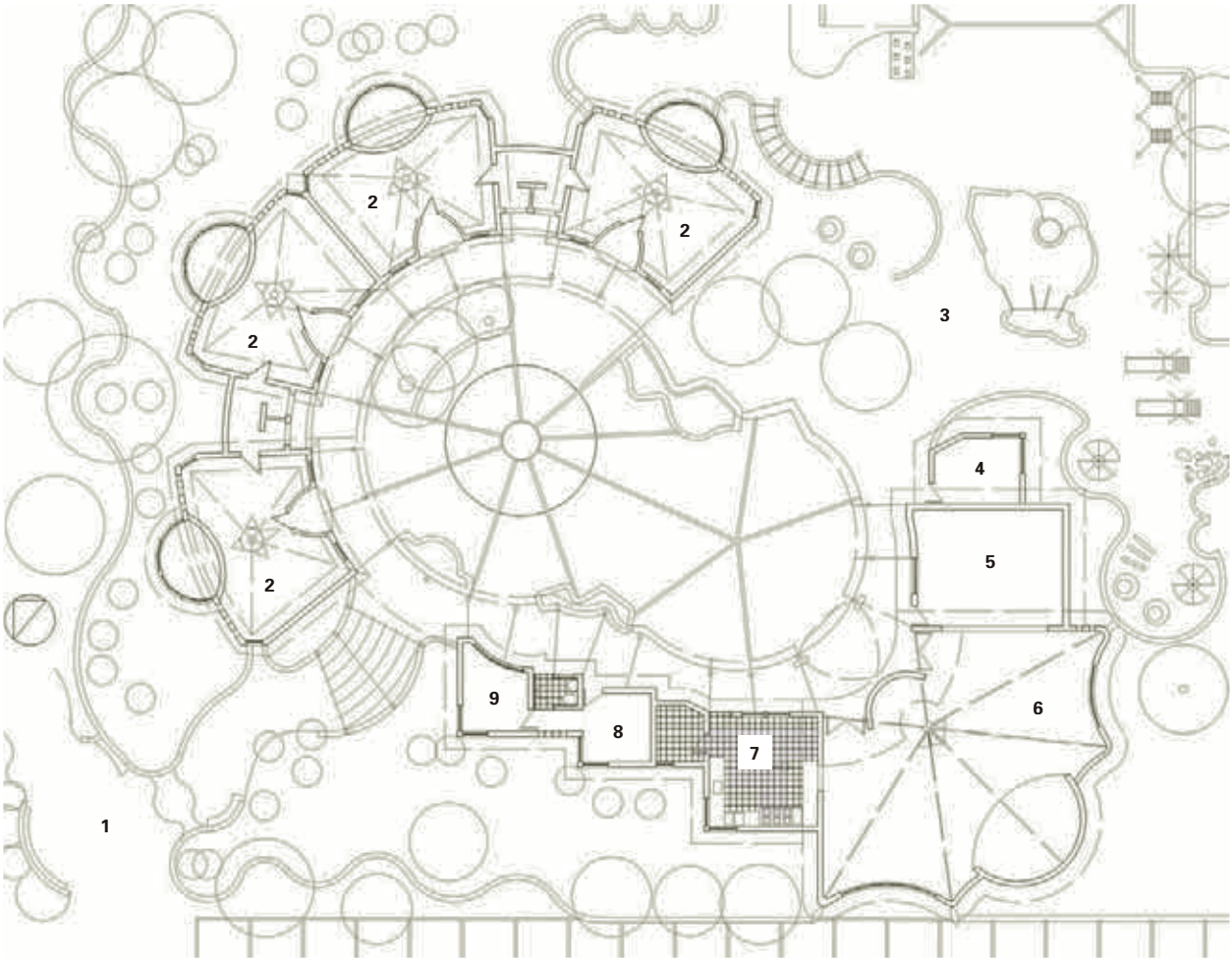


B



C

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1 Entrance
2 Play and activity room
3 Playground
4 Reception
5 Music room
6 Multipurpose room
7 Kitchen
8 Secretary's office
9 Director's office

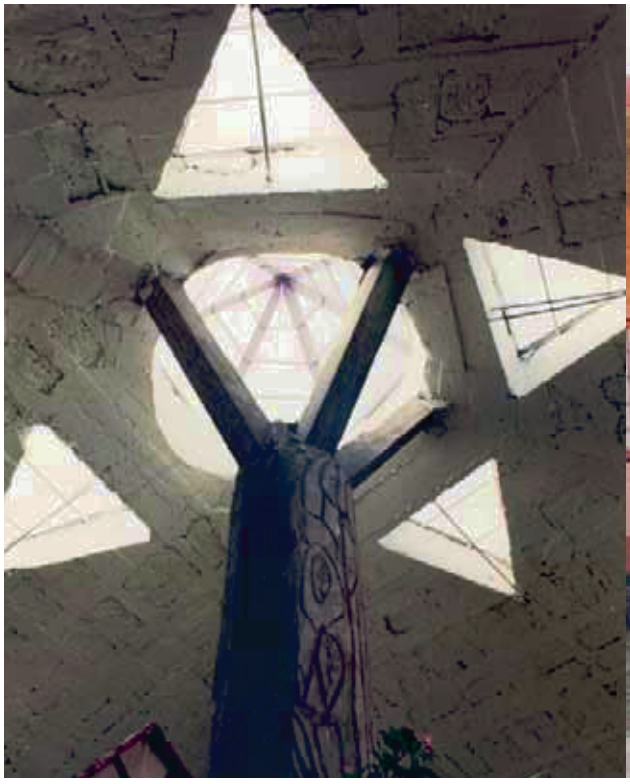
D





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Play and activity rooms

The main classrooms have been designed to create a magical atmosphere. Each room has an irregular shape, with ceilings of varying height. Floors are laid with ceramic tiles and coloured mirrors. Bottles and jars are embedded in the walls to create multicoloured and shifting patterns as the sun filters through the glass, creating different light effects. Recesses in the wall provide storage spaces for toys, treasures and cookies.

The vaulted brick ceilings rise to a small cupola built around skylights. This is supported by a central column, designed to look like the trunk of a tree, with a series of branches connecting to the ceiling. Shelving is placed around the trunk, and this is used to store materials and resources for teaching science and natural history.

At the back of each room steps lead down into an oval alcove. This creates a small amphitheatre that is used by teachers at storytelling time. The ceiling here is lower, and can be used to hang mobiles and toys.

Multipurpose room

The larger multipurpose room also has skylights, which allow daylight to play in different forms through the room. One wall has a rose window made out of bottles and jars. All other windows are at child height. A mezzanine provides storage space and the curved roof gives a pleasing range of scales.

Located next to the kitchen, the multipurpose room can double up as a dining room. It is also linked directly to the music room, and the two rooms can be combined to create a space for large assemblies.

Community involvement

Situated in the municipality of Moreno, 36km west of Buenos Aires, this kindergarten has close community ties. Teachers and local residents were involved in the planning and design process from the beginning of the project, providing feedback on the plans and models at each stage. Once it was finished the school authorities were slow to give it final approval, so the community mobilised itself and moved the furniture from the old kindergarten to the new establishment.

After opening, these strong links remain. The facilities are open to the community for a variety of activities, from meetings on health care and gardening courses to games and sports. Local mothers cook in the kitchen for the children at lunchtime. And, as the headteacher reports, the kindergarten is a success with children: "The register is always full. All [local] children want to come here."

F: Central skylights bring daylight into each room.

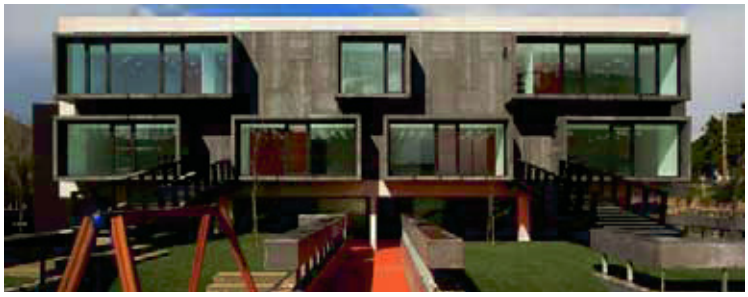
G: The entrance to one of the play and activity rooms.

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Jardim de Infância Popular

LOCATION I **AGUALVA-CACÉM, PORTUGAL**

ARCHITECTS: **nbAA (Nadir Bonaccorso and Sónia Silva)**
CLIENT: **Cacém Polis**
TYPE OF SCHOOL: **Kindergarten and daycare centre**
NUMBER OF STUDENTS: **149**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **902m²**
YEAR OF COMPLETION: **2006**
CONTEXT: **City**



A

Set adjacent to a linear urban park created around the Jarda torrent, this new kindergarten combines many features that enhance energy efficiency. Conceived as a simple box structure, with a longitudinal east-west axis, the school has been oriented to create visual continuity between the school gardens and the urban park and to ensure that the south-facing classrooms benefit from solar gain.

The building façades are predominantly in white concrete and have a simple, clean appearance. Providing some visual contrast, the south-facing façade is covered with black panels of cement agglomerated with pigmented sawdust. The inner face of this structure is lined with thermal insulation panels, and a third brick skin protects these panels and guarantees thermal inertia inside the building.

A: The south façade viewed from the school garden.

B: The east façade, with the school entrance behind the gates on the left.



B

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Building services

The heating system comprises a mix of solar panels and a gas boiler. These supply hot water for the bathrooms and to the radiating pavement that heats the building in winter.

To ventilate the building, air is mechanically extracted from the bathrooms, which draws air into the structure through a system of external grills.

A system has been installed to collect rainwater and feed it to a central point. This water is used to flush the toilets and to irrigate the school garden.

A central longitudinal volume in the building accommodates the service areas and contains most of the passive and active energy systems. This volume acts as the lungs of the building: it functions as a chimney that enhances natural ventilation flows and brings daylight into the core of the structure.

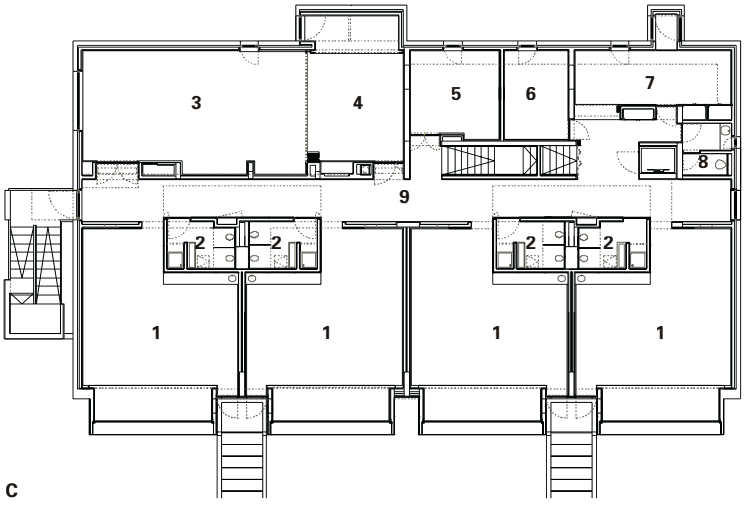
Interior organisation

Given the potential flood risk on the site, the building is raised off the ground. Only the entrance and some support functions, housed in rhythmic volumes separated by opaque and translucent screens, are located on the ground floor. These screens also effectively divide the exterior space. A semi-public area lies to the north of the building, and serves as a car park and access area. There is a more secluded area to south, containing the school garden and recreation area.

On the first and second floors, the central longitudinal volume effectively divides each floor into two areas. All support services, such as the kitchen, dining room and administration,



D



C

1 Classroom
2 Bathroom
3 Free activities room and dining hall
4 Free activities room and library
5 Teachers' office
6 Director's office
7 Administration
8 Bathroom
9 Circulation areas

C: First floor plan.

D: All classrooms have big picture windows.

E: The north façade. The kitchen, dining rooms and offices are housed on this side of the building.

F: The circulation space that runs along the longitudinal access.

G: North-south cross section.

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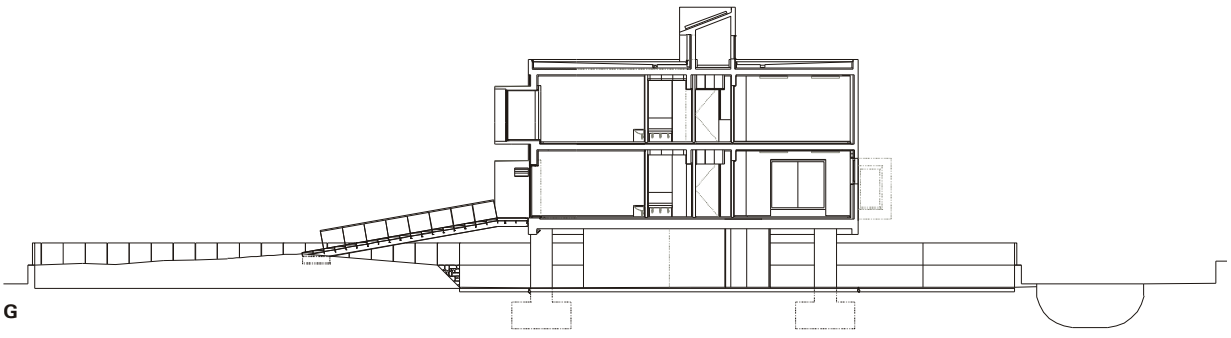
E

are on the north side of the building. All rooms for children are on the south side. The south-facing rooms all include volumes jutting out of the main façade. With floor-to-ceiling windows, these provide views over the school gardens and additional space for class activities.

The kindergarten classrooms are grouped on the first floor, together with a multipurpose room and a reading room. Two flights of stairs provide direct access from the first floor to the garden. Rooms for older children are on the second floor. Here there is a special educational needs classroom and an activity room, as well as the staff lounge, the medical room and a nursery.



F



G

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Infantário de Bicesse

LOCATION | **CASCAIS, PORTUGAL**



A

ARCHITECTS: **Atelier Central (José Martinez Silva and Miguel Beleza)**
CLIENT: **Santa Casa da Misericórdia de Cascais**
TYPE OF SCHOOL: **Kindergarten**
NUMBER OF STUDENTS: **85**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **5 039m²**
YEAR OF COMPLETION: **2005**
CONTEXT: **Town**

This spacious and bright school incorporates references from the world of children's play in its architecture. The single-storey building is composed of pure and regular volumes and shapes. With prominent cylindrical skylights on the roofs of some blocks, elements of the structure mimic Lego bricks.

The main structural elements are grouped around a longitudinal corridor. This is the main axis of the building, and it neatly divides the children's rooms from the administrative and service areas. With upper walls in translucent glass, the corridor is the main source of daylight into the interior areas. When seen at night from the surrounding area, it appears as a bar of light.

School organisation

The kindergarten is organised into three main sections; these have been designed as different-sized volumes distributed around the corridor.

The administrative volume is towards the front of the building, and accommodates an office for the kindergarten secretariat, a meeting

A: The front of the school as seen from the road.

B: The dining and kitchen area is across the corridor from the classrooms.

C: Floor plan.

© OECD 2011



B

room, the staff restroom and a medical consultation room. A large window overlooking the entrance and the reception area allows staff to monitor everybody coming and leaving the building.

The service area is situated at the other end of the kindergarten. This section accommodates the kitchen, pantry, laundry, and staff changing rooms and toilets. There is a service entrance for delivery of goods.

Comprising five activity rooms, toilets and storage rooms, the children's volume is situated to one side of the main corridor and runs its entire length. Dining areas and the library are situated on the other side of the corridor. There is also a small gymnasium at the front of the building.



C

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D

Activity classrooms

Children start off in the day nursery, which is in the most protected part of the building furthest from the main entrance. As they grow older, they move along the corridor to the class in the adjacent room. This means that the older children (the five and six year olds) occupy the room nearest the entrance. The corridor symbolises a child's progression in the kindergarten.

All rooms have built-in wall cabinets and small ancillary spaces to store materials and learning and play resources. The nursery is partitioned to provide separate areas for a milk station and comfort station. All rooms have a glass wall facing the playground. This ensures plenty of daylight in the rooms and makes it easier to monitor any children playing outside. A large sloping overhang protects the rooms from direct sunlight and affords shelter to children playing outside in bad weather.



E

Outdoor spaces

Located on a promontory, the school has two outdoor play areas. One is an open patio, located next to the refectory. It is oriented to the north and has a beautiful view to the Sintra mountains. It is a pleasant enclosed space: a cork oak tree presides over the centre of the yard, a water mirror shimmers under the effect of a slate fountain and a steel pergola filters the light before it reaches the interior spaces.

The second play area, which is immediately outside the classrooms, faces south towards the sea. It has a grass playground with wooden equipment and garden toys, an instructional garden and a paved recreation area.

D: The kindergarten, lit up at night.

E: Children playing outside the activity classrooms.

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Lehtoniemen päiväkoti

LOCATION I **KUOPIO, FINLAND**



A

> *"The starting point for the design was [to emphasise our] closeness to nature. The ceilings are high, which is wonderful. There is a sense of there being enough air to breathe. The gymnasium is a source of pride when showing the building to visitors, as it is clearly larger than those usually found in daycare centres."*
>
> **Tiina Kerman**, *headteacher, Lehtoniemen päiväkoti*

This kindergarten serves the new suburbs of Kuopio that are being developed on five peninsulas jutting out into Lake Kallavesi, creating an "archipelago city". As the first building erected in the immediate vicinity, the Lehtoniemi kindergarten and daycare centre sets the architectural tone for the planned development of the area. This will eventually include a mix of apartments and detached family houses set back from the shoreline.

ARCHITECTS: **Linja Architects (Johan Lindfors)**
CLIENT: **City of Kuopio**
TYPE OF SCHOOL: **Kindergarten and daycare centre**
NUMBER OF STUDENTS: **140**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **2 100m²**
YEAR OF COMPLETION: **2010**
CONTEXT: **Town**

A: Looking across the playground from the street.

Architectural features

The school has two distinct aspects to its architectural character. It displays an urban public style towards the street but a more intimate feel on the other side of the building that encloses a courtyard and the children's playground. The walls facing the street are plastered and painted white, while the courtyard façades use more wood, generating a warmer appearance.

Although essentially a single-storey structure, the building has been given a dynamic profile by making use of the contours and topography of the site. The spaces that require extra height are on the street side of the building and the lower spaces face the courtyard. This gives a distinctive flow and angularity to the building.

Interiors have been designed to provide a playful, arbitrary and organic structure for children. The inner roof follows the contour of the outer roof, which creates some spectacular spaces in parts of the building. The main material for the load-bearing walls is unsmoothed concrete (which is painted white) resulting in a rich and vibrant feel. There are few parallel walls, which reduces the formation of echo and dampens noise.

Play areas

Retaining some of the mature trees from the surrounding forest and a small rock outcrop, the courtyard and playground harmonise with the semi-rural natural surroundings. There is a small enclosed yard for the youngest children outside the nursery. Picture windows make it

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B

easy for staff to monitor children from inside the kindergarten.

In addition to play equipment and two small play houses, the courtyard also contains a sculptural work of art by the artist Jan-Erik Andersson. Entitled *The Ski Jumper's House*, this work evokes the beautiful wooden structures that supported the early ski jumps. It includes two slides and three small cabins which the children can use for play.

School organisation

The interior of the school is structured to accommodate six groups of children. Spaces for the different age cohorts are kept separate. There are rooms for the oldest children aged five and six in one wing and suites of rooms for younger children together with the nursery rooms (for twos and under) in the other wing of the building.

The school aims to offer the children an unconventional, thought-provoking environment. Much attention has been paid to detail. There is a water play room, where young children can have their first swim. The gymnasium, which doubles as the school hall, can be split using folding partitions into five



C

spaces in order to cater for different groups. Bunk beds fold neatly away into wall cabinets when children are not resting.

Community links

At present the kindergarten serves families that live some distance away, but the aim is to make the building a centre for the community as the new residential development proceeds. Two rooms can be used by the local parish after school hours. The gym can also be used by residents for meetings and events.

B: The school's public face as seen from the street.

C: View of the entrance from the foyer.

D: Floor plan.

E: Many rooms have views of the forest.

F: Children playing in the foyer area.

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D



E



F

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Tuomarilan päiväkoti

LOCATION | **ESPOO, FINLAND**

ARCHITECTS: **Auer & Sandås architects**
CLIENT: **City of Espoo**
TYPE OF SCHOOL: **Kindergarten and daycare centre**
NUMBER OF STUDENTS: **100**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **1 270m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **City**

Built to replace a crowded and rundown 1960s facility, this brightly coloured kindergarten and daycare centre is a new community resource for Tuomarila, a neighbourhood in an eastern suburb of Espoo. One of 25 projects selected for an exhibition of the best of contemporary Finnish architecture, this school strives to meet the needs of young children of different ages and to support creative activities. The key objective has been to create a tolerant and inspiring learning environment for children.

With a compact mass, the two-storey building has a relatively small footprint and maximises the space available for the playground which occupies the southern half of the plot. Situated on a sloping site, some of the lower level of the building is partly below ground, and this allows entrances to be located on both the ground and first floors.

To create a sense of transition between the indoor group activity spaces and the outdoor playground, triangular wedges have been sliced from the mass of the building. The façades of the cut-out spaces are clad in a playful mosaic of colours inspired by children's building bricks.

A: View of the colourful façades from the playground.

B: Cross section of the eastern end showing the sunken ground floor.

C: Floor plans, upper floor (top), ground floor (bottom).

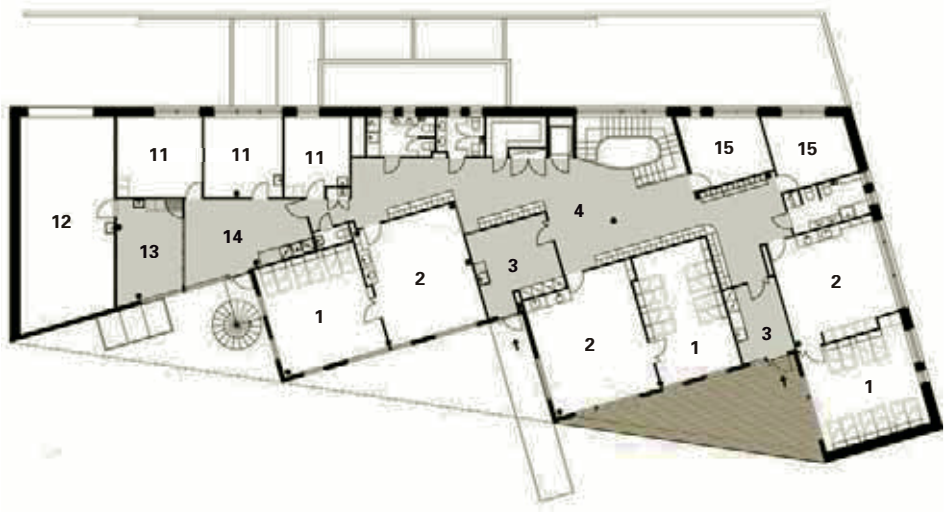


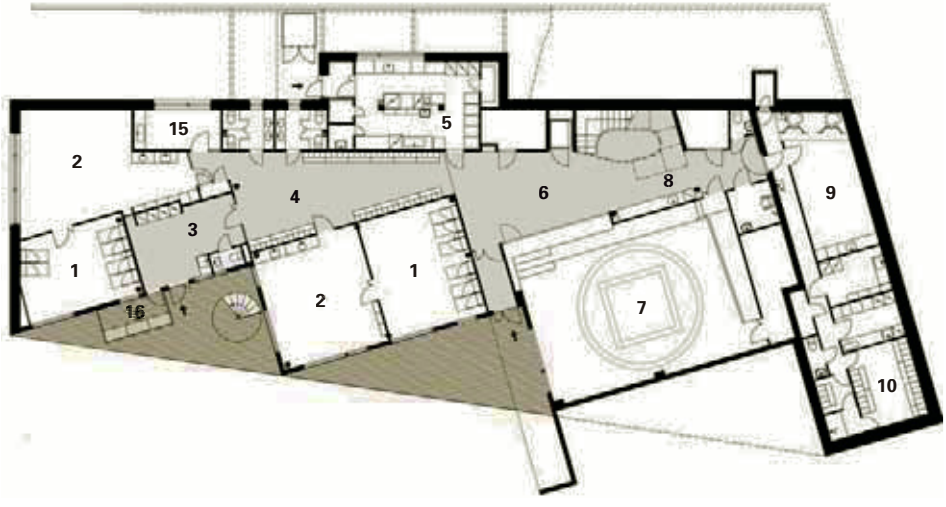
A

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B





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1 Resting room
2 Activity room
3 Children's entrance
4 Entrance hall
5 Kitchen
6 Play area
7 Hall
8 Kitchen/dining area
9 Hobby room
10 Staff restroom
11 Office
12 Technical room
13 Working room
14 Staff break room
15 Small group room
16 Greenhouse

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This has an iconographic effect and breaks up the mass of the building, making the scale more appropriate for young children. Each mosaic-like façade has its own colour code, so that they can more easily identify the entrance for their group.

Internal layout

Inside, the rooms lare laid out around continuous street-like spaces that can also be used for play activities. These areas afford long internal views and provide several "meeting points", helping to create a sense of community for staff and children. Spaces have been oriented to introduce daylight deep into the interior of the building. Comfort is ensured through sun-protected window glass, overhanging sheltering roofs and carefully positioned transparent partitions.

There are home areas for five groups of children, two on the ground floor and three on the upper floor. These comprise an activity room and a resting room. Although the activity and resting rooms are all white, the mosaic of colours on the exterior walls can be seen through the windows. The aim is to provide a neutral backdrop for the children's creative activities, and a space where "the children provide the colour".

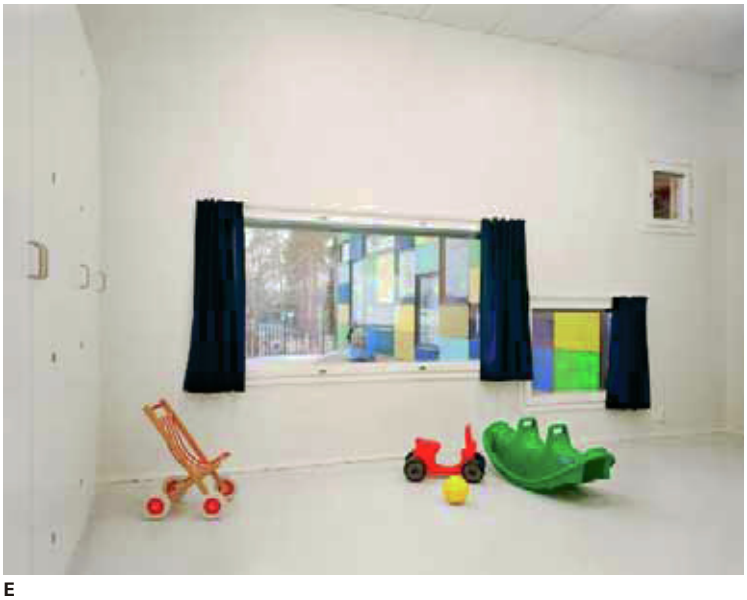
The facilities are very functional. As well as the home areas and the play spaces in the open plan area, there is a multipurpose hall, activity rooms for small groups, a kitchen and dining area, and facilities and offices for staff. Each children's group has direct access to the playground through the triangular terraces.

Wet entrances are provided at each of the three access points used by children, with compact and flexible systems for storing and drying clothes. The youngest children's shelves are located at adult height, while the older children are encouraged to take care of their own clothes by using hooks and shelves at a lower height.

Easily adapted to the needs of children of different ages, the overall layout of the building supports interaction between groups and has an environment that nutures and inspires creativeness, learning, self-initiative and activity. The multipurpose hall, open plan area and kitchen can be used outside of school hours by members of the community. The playground is frequently used by children from a wider area during evenings and weekends.



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D: Storage space for wet and outdoor clothes is provided at each entrance used by children.

E: Activity rooms are painted white, providing a neutral canvas and a strong contrast with the façades.

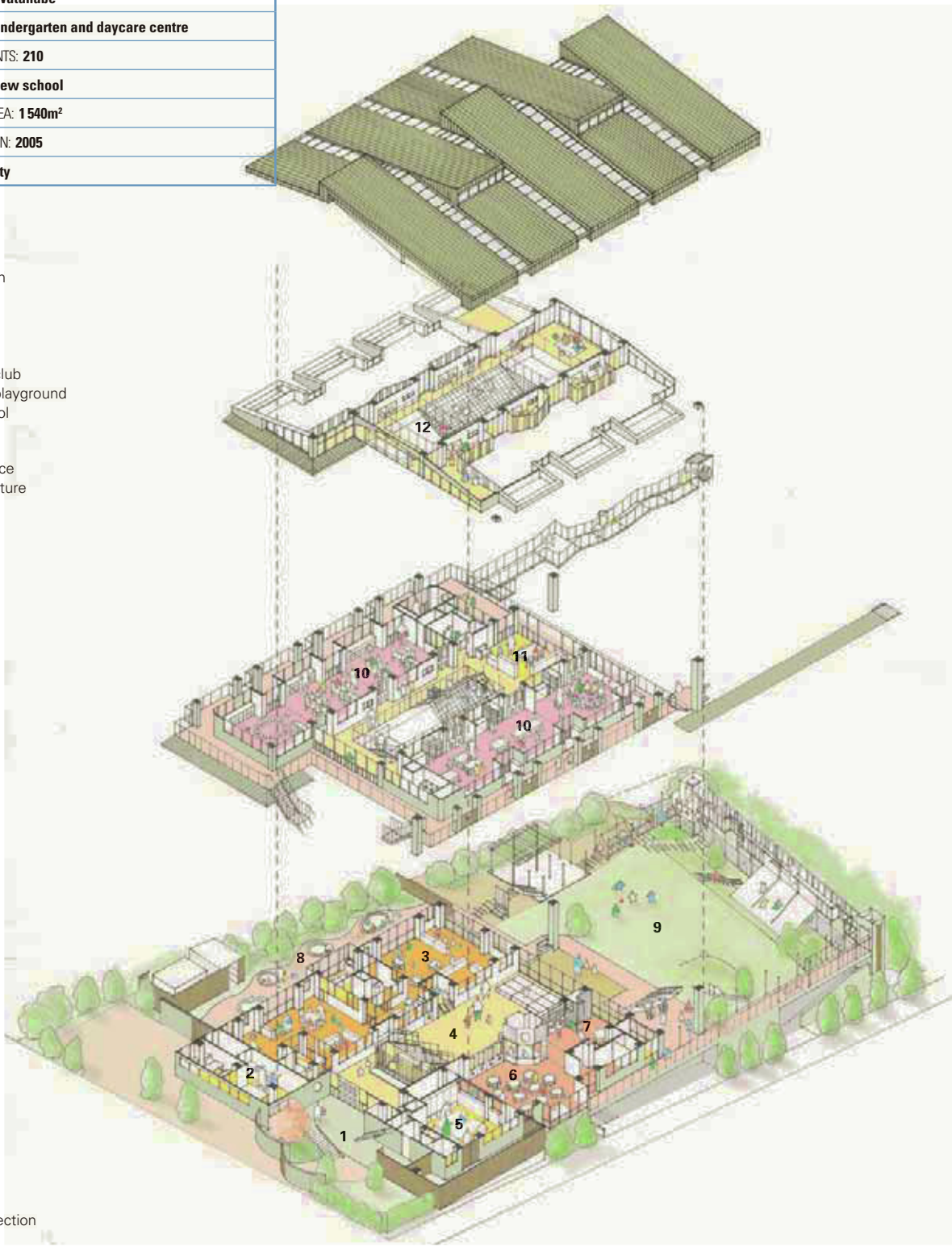
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Yuyu-no-mori Nursery School and Day Nursery

LOCATION I **YOKOHAMA, JAPAN**

ARCHITECTS: **Environment Design Institute (Mitsuru Senda)**
CLIENT: **Hidenori Watanabe**
TYPE OF SCHOOL: **Kindergarten and daycare centre**
NUMBER OF STUDENTS: **210**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **1 540m²**
YEAR OF COMPLETION: **2005**
CONTEXT: **Large city**

1 Entrance
2 Administration
3 Day nursery
4 Hall
5 Kitchen
6 Lunch room
7 After-school club
8 Day nursery playground
9 Nursery school playground
10 Classroom
11 Teachers' office
12 Play net structure



A: Isometric projection showing layout.

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B

It is relatively rare in Japan for pre-school facilities to combine a nursery school with a day nursery for babies and toddlers. Yuyu-no-mori is the first such combined facility in Yokohama.

In designing this nursery, there has been a clear focus on providing an environment that encourages and supports play rather than one which makes it easy to manage children. This child-centred approach aims to create a place where children enjoy spending their days and where parents are happy to enrol their children.

Play spaces

Children are encouraged to explore all of the building and the grounds. The emphasis is on movement, not restraint. This is exemplified by the nursery's most unusual feature, a large play net suspended from the loft space above the first floor. This daring though secure feature allows children to play and practise skills like jumping, sliding, balancing and seizing the net. It allows them to exercise even when its raining and they cannot play outside.

The nursery playground is composed of three areas: a small playing field for active play such as ball games, a grass-covered slope for games such as tag and sliding, and a two-storey wooden play structure with decks, towers and bridges. There are also slides and other play equipment.

For the younger children attending the nursery there is a separate, secluded play area running down the side of the building. Overlooked by a teacher's office, this space has sand pits, shallow pools and play equipment.

Both playgrounds are places where children can run around, with spaces for quiet play and for relaxing when they feel tired. Both areas are planted with different species of trees and shrubs to provide colour and shade and to attract birds and insects.

Layout

The nursery is housed in a two-storey building. On the ground floor there is the nursery, a small kitchen and lunch room, administration office and a room for an after-school club. The main entrance opens out into a lobby and reception area and a hall (below the net), which can be used for assemblies or performances. The nursery occupies a self-contained area on the ground floor. There are three rooms for children – one for babies, one for one-year-olds and the

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third for two-year-olds – with a self-contained area with toilets and washing facilities, a milk station and teacher's room.

On the first floor there are six classrooms for the nursery school, three on either side of the internal corridor running around the atrium housing the net. Partitions between the classrooms can be opened up to create larger spaces. Each classroom has a ladder leading to a small loft area, which provides access to the catwalk surrounding the net. Wooden floors, furniture and fittings give the rooms a warm and intimate feel. There is an office for teachers on the first floor, which is positioned to overlook the playground and the children playing in the net.

Children do not need to enter the ground floor of the building to reach the nursery school. A series of stairs at the main entrance leads to a sheltered outdoor corridor that runs around the outside of the school and has doors giving onto all classrooms. This gives the nursery school some spatial independence within the building. External stairs also give the nursery school children direct access to the playground, and they can also get to the playground using a slide or the wooden play structure.

Parental involvement

The nursery was planned in response to the needs of local residents. In the design process, the architects sought the opinions of the neighbourhood association and the parents who would be sending their children to the nursery. Parental involvement is encouraged, and the nursery aims to encourage the adoption of care practices centred on children, spreading the message not only to parents but also to other carers and more widely among the community.

B: Children playing on the net that is suspended above the first floor.

C: A nursery school classroom. The net is accessed via the wooden ladder.

D: The front entrance.



D

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Golden Lane Campus

LOCATION | **LONDON, UNITED KINGDOM**



A

ARCHITECTS: **Nicholas Hare Architects LLP**
CLIENT: **Islington Borough Council & CEA@Islington**
TYPE OF SCHOOL: **Pre-primary and primary**
NUMBER OF STUDENTS: **490**
TYPE OF PROJECT: **New campus for three institutions**
GROSS SURFACE AREA: **6 400m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **Large city**

A: The campus sits between the imposing Barbican development in London and smaller-scale buildings, streets and a park to the north.

B: Ground floor plan.

> *"The many discussions [with the architects] about design and fabric have had a very positive outcome. From a special school perspective we think we have the ideal design that suits the children's emotional, social and educational needs."*
>
> **Anne Corbett**, *headteacher, Richard Cloudesley School*

The Golden Lane Campus comprises three institutions, Prior Weston Primary School, Prior Weston Children's Centre and the primary department of Richard Cloudesley special educational needs school. Situated on a former burial ground, this brownfield site has been transformed into a new educational campus that allows the three schools to retain their distinct identities but gain by sharing resources.

Organisation of the campus

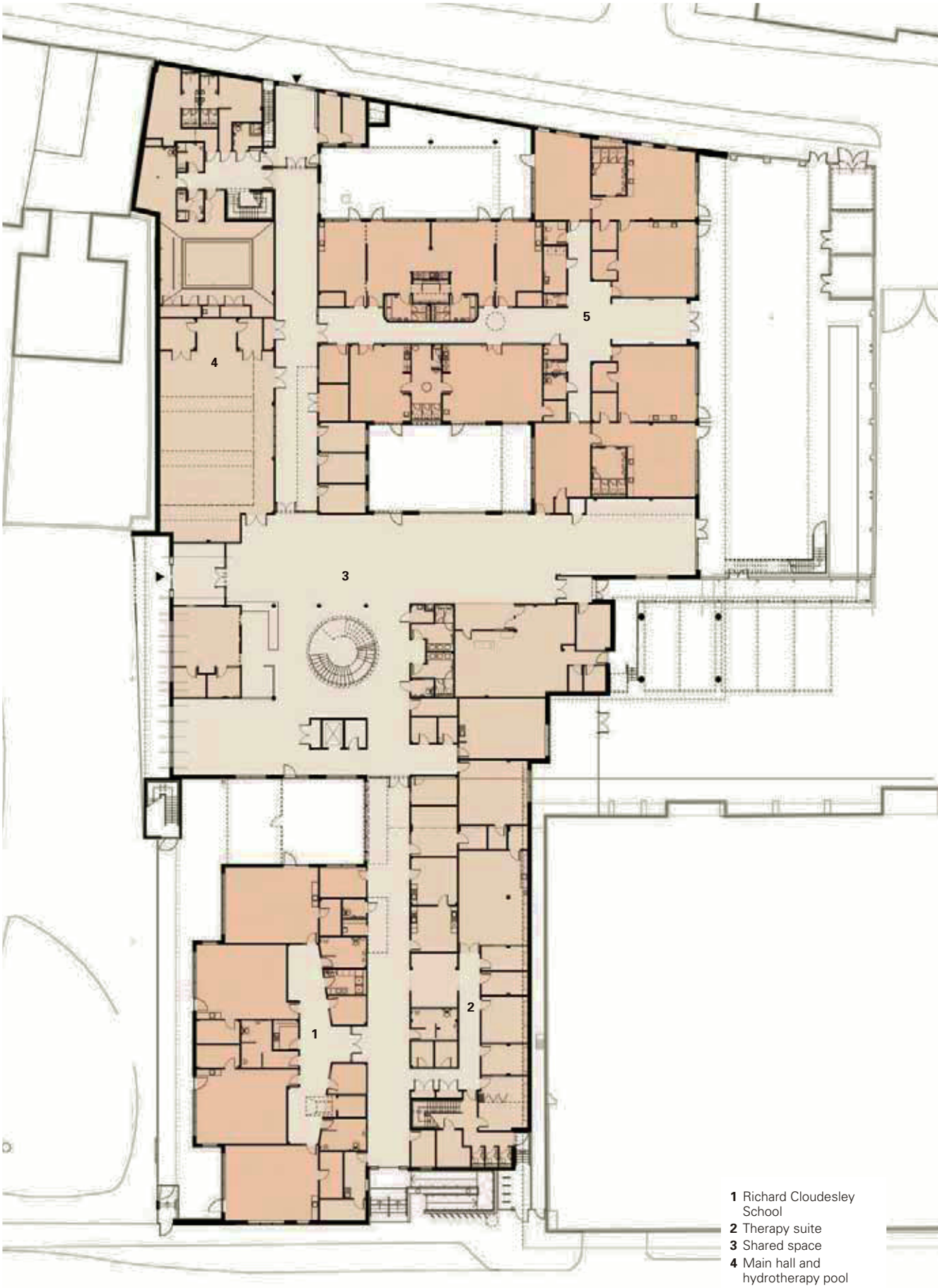
The building has been planned to provide each school with independent space. The Richard Cloudesley School, the Children's Centre and the Prior Weston Primary School pods are situated on either side of the central shared areas. These can be independently zoned, allowing inclusive access to the heart of the building without compromising the safety of the children or the security of the accommodation.

The special needs school and the children's centre are based on the ground floor level. This allows them to be closely linked with the communal parts of the building. The primary school occupies the first floor of the building. The extensive ground floor plan allows for a generous first-floor playdeck outside the primary school classrooms.

The campus serves the local community through the daytime and during evenings and weekends. For example, there are courses on healthy eating and childcare, free legal advice for local residents and a drop-in centre for teaching parenting skills.

The design creates a sense of connection and accessibility for all users of the building, while offering protected and secure environments for young and vulnerable children. At the start and end of every school day, there are

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1 Richard Cloudesley School
2 Therapy suite
3 Shared space
4 Main hall and hydrotherapy pool
5 Children's centre

B

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three entrances allowing students to access or leave the school. At other times a single public entrance is securely controlled by reception. Spatial clarity is provided by strong organisational devices such as the street, central square and courtyards. The more public functions of the building for community use are accessed via the central town square or street.

Internal environment

Despite the tight site and dense surrounding urban environment, the internal spaces are filled with natural light and make full use of natural ventilation. The building's energy usage is reduced through these passive environmental design features and through the exposed thermal mass, which acts as a climate moderator.

The children's centre is accessible and welcoming to parents, and provides an uplifting environment while ensuring safety and security. It is located between the heart of the school and the main entrance, making it isolatable from the main building circulation. Two enclosed courtyards provide an external play space that cannot be overlooked.

The provision for Richard Cloudesley includes state-of-the-art special educational needs learning facilities. In addition, there are rooms adjacent to the school that can be used to provide professional therapy support, and there is a hydrotherapy pool that not only serves the school but also the local community.

The shared space includes central meeting rooms that can be used for a variety of events, along with two halls and a dining area.

Play areas

External spaces are extremely valuable, especially in an area where space is in short supply. They are a key resource in delivering the educational aims of all three schools. Externally, there are three enclosed courtyards, providing play space at ground-floor level and a landscaped play environment. At first floor level there is a multi-use games area.

Every classroom has access to high quality landscaped external space at each level of the building. Students at Prior Weston Primary School use the external space for both learning and recreation. The spaces have therefore been designed to support discovery and personal development as well as sport and health.

C: Internal courtyards provide sheltered and secure play areas.

D: Colourful and textured street frontages.

E: Classrooms and play rooms are bathed in natural light.

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A

MFA & GGZ Zeeheldenbuurt

LOCATION I **TILBURG, NETHERLANDS**

ARCHITECTS: **atelier PRO architekten bv (Dorte Kristensen, Lisette Plouvier and Pascale Leistra)**
CLIENT: **Gemeente Tilburg & TIWOS (Tilburgse Woonstichting)**
TYPE OF SCHOOL: **Pre-primary and primary**
NUMBER OF STUDENTS: **200**
TYPE OF PROJECT: **New community centre**
GROSS SURFACE AREA: **4 500m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **City**



B

A: The foyer and meeting area located at the heart of the building.

B: The main entrance. The primary school occupies part of the ground and first floors running down the right-hand side of the building.

This multi-functional building accommodates a primary school, a playroom for young children, community support services, a gymnasium and a health centre. In addition, there are nine residential flats as well as accommodation and facilities for people with mental health problems requiring permanent care.

Meeting the needs of all users

The building needs to serve a wide range of users and meet the disparate needs of the school, the health centre and community facilities. The different user groups, including the school and a branch of the Netherlands Mental Health Care Association (GGZ), were consulted extensively at the planning stage. Numerous meetings were held to discuss various aspects, ranging from the provision of multipurpose rooms and issues of building management to the choice of colours and materials. This helped to achieve a design that met with everyone's approval.

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Much thought has been given to how the space is organised. To keep the building manageable, it is arranged so that everyone can get where they need to go without disturbing or confining others. There is a clear distinction between the communal spaces and the areas designated for individual facilities. The flats and permanent care facilities are on the second and third floors. The community and health centres occupy separate wings of the L-shaped building.

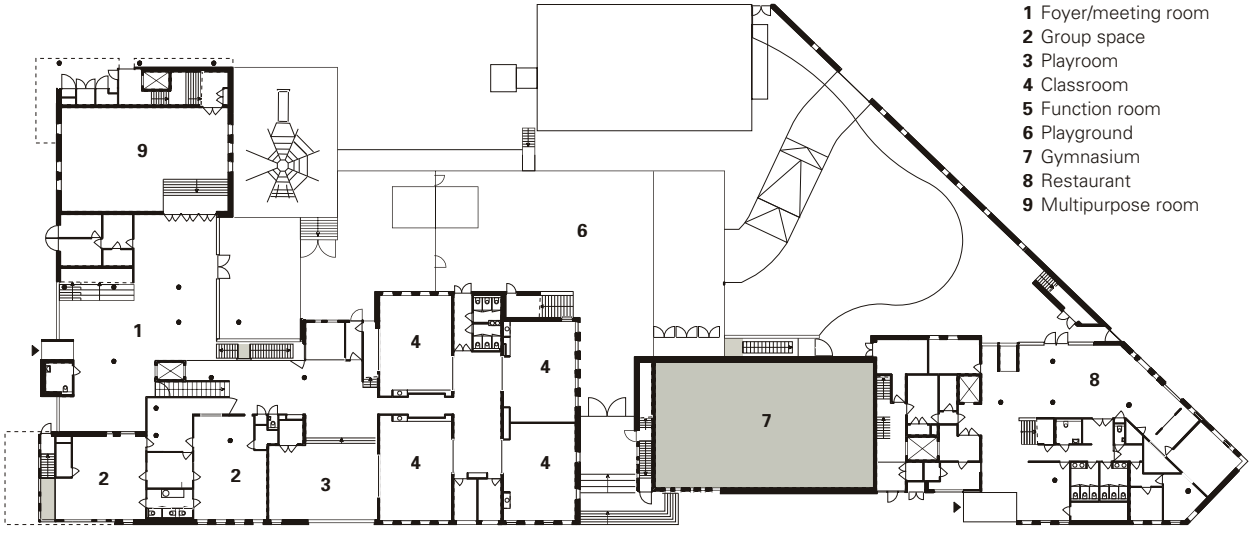
The primary school

The primary school is situated at the heart of the building. There are 13 classrooms over the ground and first floors, and a gymnasium and playground at ground level. Each age group occupies its own wing. The school is self contained, and the caretaker can lock up at the end of the school day without restricting access to the other parts of the centre.

As a community school (*brede school*), the institution encourages the participation of parents and others in the children's education and welfare. The school has been designed to provide a safe environment where children, parents, neighbours and workers can engage and interact. Its location within a building that is used by many other people gives children a greater sense of their place within the local community.



D



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Shared spaces

A key part of the design brief was to deliver a building that supported encounters and collaboration between the users of the various facilities, hence it is characterised by its openness. The building has a three-dimensional heart that stitches its storeys together. This allows the different users to always have visual contact.

The main entrance leads into a wide foyer, which acts as a main meeting area. With seating and a stage, this multipurpose space can be used as an assembly hall or for performances. It is at the heart of the building and can be easily accessed from all directions. It also makes for easy orientation: standing in this space one can see through to the main parts of the building.

There are several shared spaces between the clusters of facilities. These give a sense of community as people of all ages access services, support and healthcare, and participate in the programmes run in the centre. Some facilities are opened up to the community in the evenings. For example, the gymnasium can be used out of school hours and accessed in the evening through a separate entrance.



F

C: Ground floor plan.

D: Floor-to-ceiling windows ensure classrooms have natural light.

E: Open corridors and stairwells cleverly integrate the various levels of the building.

F: The playground is sheltered by the two wings of the building.

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Gemeentelijke basisschool Sint-Joost-ann-Zee

LOCATION | **SINT-JOOST-TEN-NODE, BELGIUM**

ARCHITECTS: **BAS bvba (Dirk Jaspaert); Kathleen Mertens**
CLIENT: **Sint Joost ten Node local authority**
TYPE OF SCHOOL: **Pre-primary and primary**
NUMBER OF STUDENTS: **340**
TYPE OF PROJECT: **Renovation and extension**
GROSS SURFACE AREA: **3 694m²**
YEAR OF COMPLETION: **2005 (phase 1) and 2010 (phase 2)**
CONTEXT: **City**

A: The nineteenth century façade of the main building. Part of the new extension can be seen on the second floor.

B: Ground floor plan of the school campus.

Sint-Joost-ann-Zee Municipal Primary School is housed in nineteenth century buildings on a small site. It is situated in an inner suburb of Brussels and the most densely populated municipality in Belgium. An extensive renovation programme has increased the capacity of the school and opened up the facilities for community use.

Roof extension

Given that space is at a premium in the surrounding neighbourhood, the school has been extended without encroaching on the existing playgrounds. This has been achieved by building a roof extension on the main school building.

This building had a typical nineteenth century school structure. The classrooms were arranged on two floors around a central covered space. It was covered with parallel gable roof trusses. These were removed and replaced with a concrete slab that serves as an artificial floor for the new extension. This has enabled the school to accommodate six new classrooms, a multimedia centre and a library.

The new classrooms on the second floor have glass panelling, bathing the rooms in natural light and providing extensive views of the surrounding area. They are linked by a wide internal corridor, allowing space for activities outside the classroom and for interaction between classrooms.

There are also four patios outside the classrooms on the roof. These spaces, which have a similar surface area to the classrooms, can be used for teaching outdoors.


A

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Interior renovation

On the ground and first floors, the structure of the main building has largely been respected. Some minor modifications have been made to allow more flexible use of the space. The classrooms have been grouped in pairs around a small passage, allowing for easier interaction between each pair of classrooms and providing additional space for teaching small groups.

Mezzanines have been added to the ground floor classrooms used by the pre-primary children. These have created additional space and, by linking the classrooms, make it easier to run large group activities. The infrastructure has also been improved by the installation of new bathrooms, better circulation thanks to new staircases, and large windows that bring natural light into the covered play area.

Community access

As well as increasing the school's capacity, the renovation has helped to realise the school's vision of an "open school". Its goal is to build relationships with parents and the community by allowing the school to be used to support social networks of teachers, welfare workers, students, parents and local people.

The facilities that can be used by the community are all accessible without going through the areas that are exclusively reserved for the school. These include the refectory, the gymnasium and the playground. Although the new extension is primarily a teaching space, it can also be accessed without entering the main school building.

Educational benefits

The investment is bringing clear benefits. According to the school's principal: "Many children who come to the school grow up in underprivileged families and live in an environment where space is fairly limited. Thanks to the space, the light and the quiet, we can now offer our children a structure within which they feel safe. We can use the various spaces in a multifunctional way. Children work at different levels, and our teachers can work very flexibly with groups of children in different areas of the school."



B

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C



D

C: A new classroom seen from the central space in the extension.

D: The covered play area. High windows allow light to flood in from the garden.

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Seven Fountains Primary School

LOCATION I **KOKSTAD, SOUTH AFRICA**



A

This new school demonstrates the benefits of community involvement in an educational project. The local community was involved in the planning, design and construction of this school, and now makes use of the facilities outside of school hours. There is a strong sense of community ownership, with a high demand for places and no incidences of theft or vandalism.

All stakeholders were invited to participate in the project. Learners were involved through a series of creative workshops. Educators took part in an interactive workshops. Parents and other community members contributed to the design process through public meetings.

ARCHITECTS: **East Coast Architects**
CLIENT: **Kwa-Zulu Natal Department of Education and Oprah's Angel Network**
TYPE OF SCHOOL: **Pre-primary and primary**
NUMBER OF STUDENTS: **1 117**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **2 730m²**
YEAR OF COMPLETION: **2007**
CONTEXT: **Small town**

Many of the design elements, such as the circular buildings and thatched roofs, reflect the local vernacular architecture. The choice of materials and construction systems were informed by audits conducted within local



B

A: Lower primary playground (grades 2–4).

B: The library is organised over two levels at the heart of the school.

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C

communities. This enabled all construction workers to be employed from the vicinity.

Sustainability

The plans incorporated several features that reduce the environmental impact of the school, and these were all implemented for little or no extra cost. The main teaching blocks have been carefully oriented to take full advantage of the seasonal and daily solar cycles. All learning and administrative areas are well insulated to improve the thermal comfort levels. Though the rooms make full use of natural light, glare and heat gain are reduced through appropriately positioned shades and light shelves.

These passive solar design strategies ensure that classrooms are cool in summer and warm throughout the icy Kokstad winter. Their effectiveness is monitored by sensors that measure room temperatures, light levels and energy consumption. Live weather data is recorded so that the thermal performance of the buildings can be monitored.

The school takes various steps to use water efficiently. Rainwater is collected from all impermeable surfaces throughout the school and stored in an underground reservoir. A windmill pumps this grey water to header tanks from where it is gravity-fed to flush toilets. Low-consumption water fittings and appliances have been installed.

Teaching spaces

There are a variety of spaces for teaching and learning. Many classrooms have mezzanine or loft areas that provide breakaway spaces for creative teaching and for project work. Several outdoor spaces can be used for teaching when the weather is good. There are three multipurpose rooms for creative and cultural activities. These rooms have been built using traditional methods.

The library and computer rooms have been housed in a separate block to create an information hub. This is situated at the heart of the school and is easily accessed by the students and the local community.

C: Loft areas provide additional spaces in some classrooms.

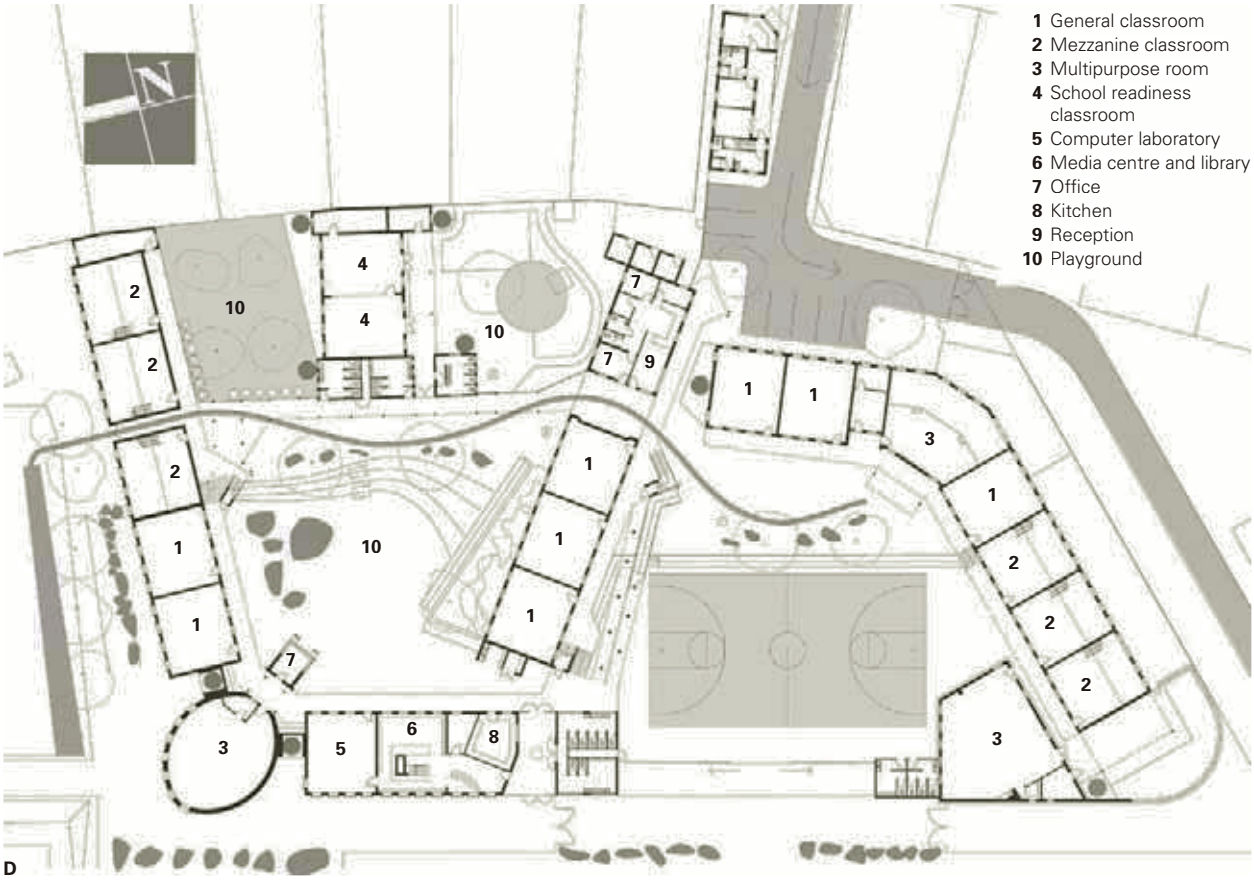
D: Ground floor plan.

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Community engagement

Seven Fountains School has become a valued resource for local residents. It is a venue for community meetings and social gatherings. Adult education programmes are run in the classrooms and computer centre. Volunteers assist in the school programmes and in the school garden, with some of the produce distributed to local poor families. The sports fields are also available for community use.



D

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Water Hall Primary School

LOCATION I **MILTON KEYNES, UNITED KINGDOM**

ARCHITECTS: **Architecture MK (Alex Freemantle)**
CLIENT: **Milton Keynes Council**
TYPE OF SCHOOL: **Pre-primary and primary**
NUMBER OF STUDENTS: **371**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **2 450m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **City**



A

> *Users were so involved in the design and build process that the sense of ownership permeates every brick in the building. The children love to learn in an environment that works for all users. Behaviours for learning have improved beyond recognition.*
>
> **Tony Draper**, *headteacher, Water Hall Primary School*



B

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As well as supporting the core educational function, the design brief for Water Hall Primary School emphasised the need to create a building that could be owned and valued by the wider school community. Many students come from disadvantaged families, and the new school had to be able to deliver good educational support.

This has been achieved by closely integrating the internal and external spaces to create a variety of welcoming teaching and learning environments. The school is organised around a large inner courtyard, which provides a protected, safe and therapeutic environment and helps the students focus on learning. The courtyard can be used for teaching in good weather. The main circulation route surrounds this central courtyard. Large sliding glazed openings give views across the school.

Teaching environment

Each room has its own distinctive physical form, providing visual variety and interest. The rooms have high ceilings, and feel spacious and unconstricted. They make good use of natural light and ventilation. High-level clerestories provide cross ventilation between rooms.

The use of natural materials such as timber and a calm colour scheme create a sense of wellbeing and help to encourage a positive attitude to learning.

The classrooms have been designed to allow a variety of furniture layouts and class organisation. All teaching rooms have electronic whiteboards, and are linked up to an integrated IT system delivered over a wireless network. Each of the nine main primary classrooms has direct access to the outside through a small protected terrace.

In addition to the nine main classrooms, there is a library, school hall, three small group teaching rooms, a food technology space, a music and story telling room, and rooms for pre-primary children. This accommodation for the nursery and foundation stage has a north-facing glazed wall to avoid solar gain. Sliding doors open onto an external teaching space under a large canopy, which leads to the separate nursery playground and soft play area.

For relaxation and therapeutic benefit, there is a specially designed "kaleidoscope" space. Using a combination of light, music and sound,

A: The inner courtyard at night.

B: With trees, plants and artworks, the courtyard is a calm environment at the heart of the school.

C: Sample furniture layouts: nursery and foundation rooms (left), typical teaching rooms (right).







Wet area with washable floor

Door mat

Furniture

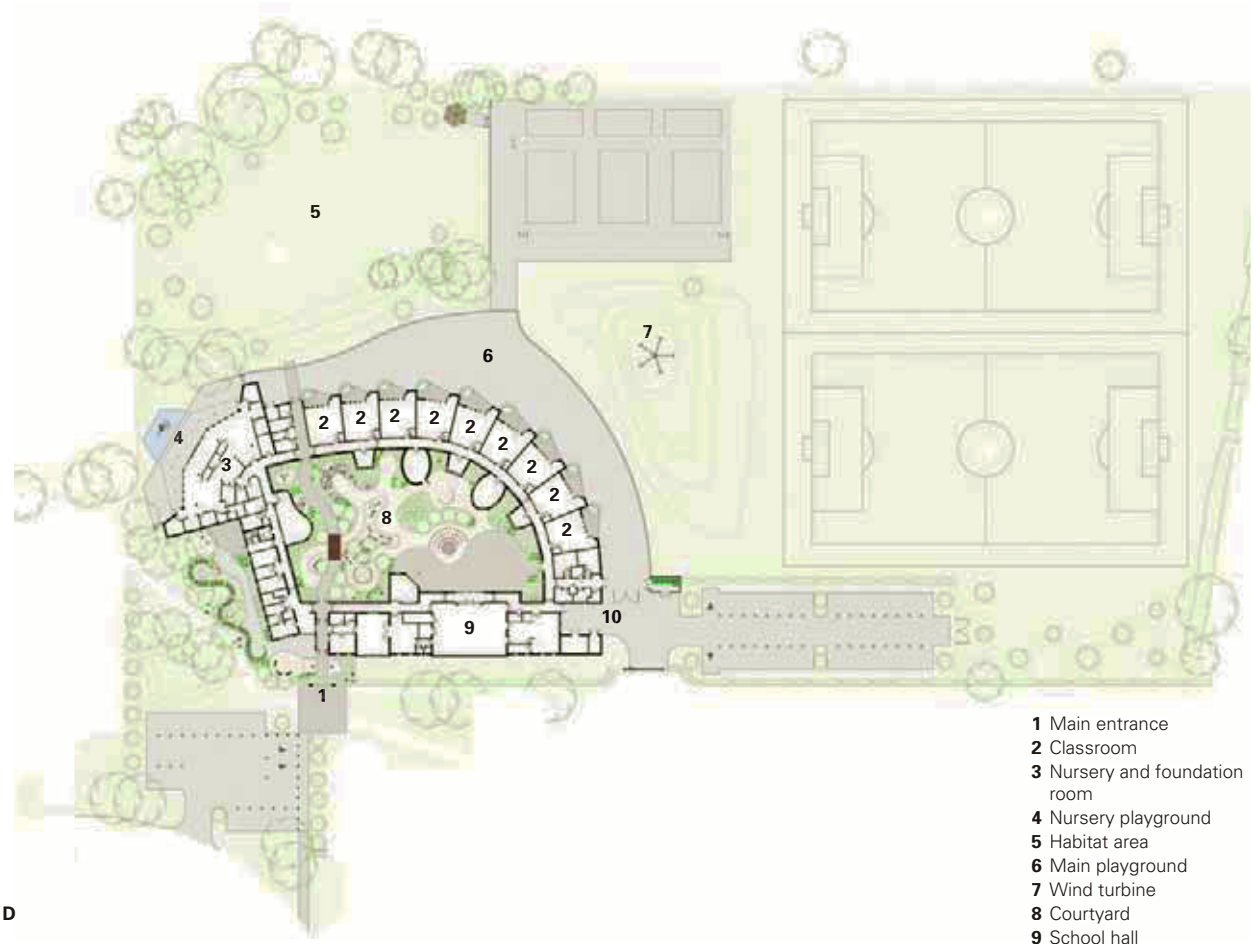
Terrace

1 Kaleidoscope room

2 Small group room

C

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D

1 Main entrance
2 Classroom
3 Nursery and foundation room
4 Nursery playground
5 Habitat area
6 Main playground
7 Wind turbine
8 Courtyard
9 School hall
10 Delivery area

this room is designed to be a haven where children can unravel emotional issues and rebuild their self-esteem so that they can refocus on learning. This has already become a valued school resource.

The school grounds include a habitat area for environmental studies, a play area, courts for ball games and football pitches. A 20kW wind turbine is situated in the grounds, which should provide around a sixth of the school's energy requirements.

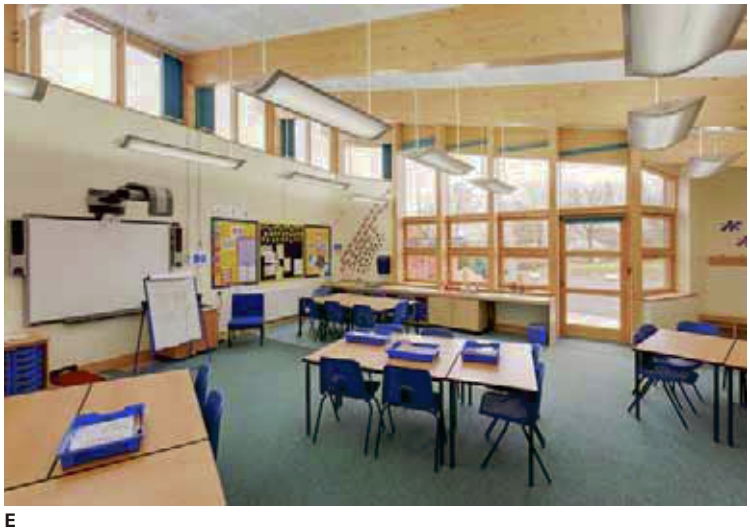
Parental involvement

The school is piloting a new approach to encourage parents to become more involved in their children's education. There is a parents and community room on the site, and an office for social and community workers. Other facilities such as the school hall and the kaleidoscope space can be used by the community. The school hosts education and family support programmes for residents of the local housing estate.

All users – students, staff and visitors – access the school through the main entrance. This allows controlled access without compromising school security. By situating the entrance opposite the local secondary school, the two schools can easily share facilities and activities.

D: Site plan showing the organisation of the main buildings.

E: Classrooms are light and airy, with a door leading out to a small terrace and the playground.



E

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École de Cressy et Centre de Quartier

LOCATION I **CONFIGNON, SWITZERLAND**



A

Cressy is a new residential district in the municipality of Confignon, a few kilometres from the centre of Geneva. The school occupies a plot in the centre of Cressy. It has become the main focal point of the area, and the gymnasium and other facilities are available for community use.

ARCHITECTS: **Devanthéry & Lamunière Architectes**
CLIENT: **Communes de Bernex et Confignon**
TYPE OF SCHOOL: **Primary**
NUMBER OF STUDENTS: **336**
TYPE OF PROJECT: **New school and community centre**
GROSS SURFACE AREA: **6 042m²**
YEAR OF COMPLETION: **2006**
CONTEXT: **Town**

School organisation

The main school building is a large cuboid structure. The auditorium and a suite of rooms used by community groups are in a separate, smaller block with a similar square footprint. The gymnasium and changing rooms are in a low, partially sunken rectangular building.

The three buildings are arranged at angles to each other to create a fluid and differentiated public space. They are linked at ground level by a brushed concrete terrace. There is also an underground corridor lit by skylights connecting each building. This arrangement is not only user friendly, it is specifically designed to make the facilities accessible both to school users and local residents at all times.

In the main school building, there are 14 classrooms and three multipurpose rooms, which are mainly used for play and exercise, arranged over three floors. All of the rooms are organised around a central open staircase. A skylight brings natural light into these interior circulation areas.

A: A double-glass skin envelopes the three-storey classroom block.

© OECD 2011

The buildings housing the auditorium and the gymnasium also have plenty of natural light. There is a skylight in the auditorium block illuminating the centre of the building. In the gymnasium, the glazing at the top of each wall gives a uniform level of light across the play and activity area.

Energy efficiency

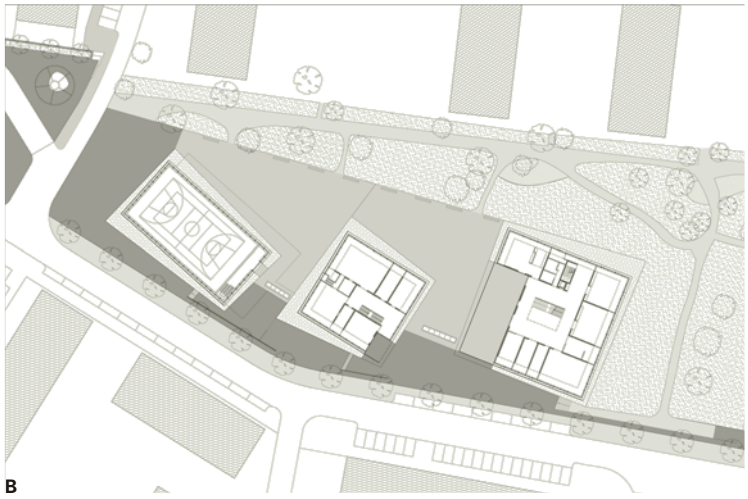
All three buildings are entirely enveloped by glass. Visually, this gives unity to the complex. The glazed blocks, with their contrasting volumes and simple geometries, produce a pleasing symmetry. This look is maintained in a fourth structure, a bus shelter at the western end of the site.

The glass façades enable the buildings to operate on low-energy principles. The double skin of glass allows for controlled and efficient heat exchange and, through a combination of fixed glass and sliding windows, natural ventilation. During the day, there is little need for artificial light. Brightly coloured blinds can be lowered on very bright days.

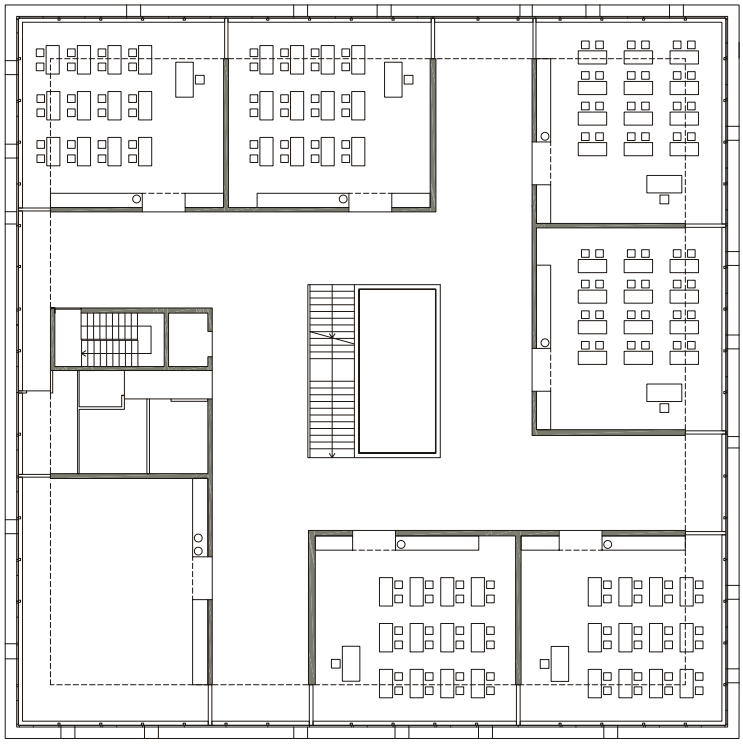
Light displays

Perhaps the most striking visual feature of the school is seen after dark. As night falls, the buildings light up. The glass becomes metamorphosed into a display of changing light and colour: passers-by cannot miss this public space.

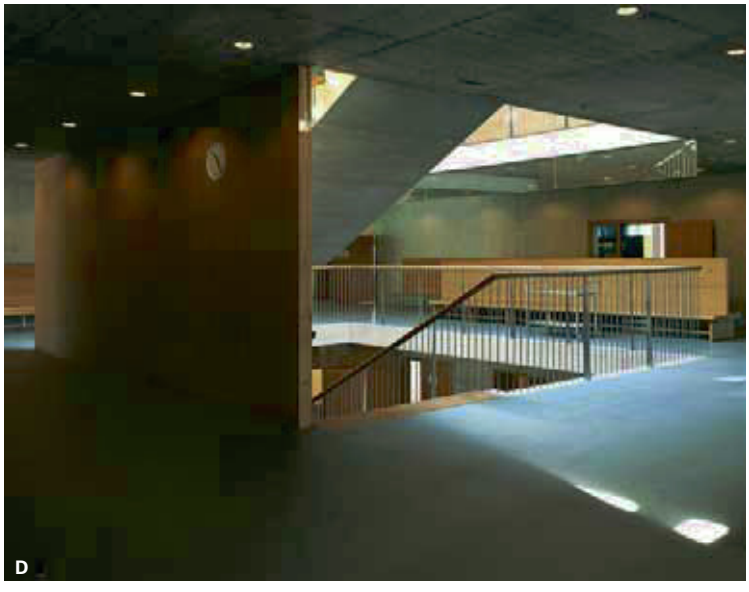
Designed with input from Daniel Schlaeper, a Lausanne-based light sculptor, there are specific colour sequences determined by the energy accumulated during the day. There are nine different sequences. For example, after a sunny autumn day, the frontages are bathed in intense yellows and oranges. After a rainy summer day, paler shades dominate, with various tones of blue and grey.



B



C



D

B: Location plan.

C: Furniture plan for one of the upper floors of the classroom block.

D: A large skylight brings natural light into the internal circulation space.

E: Coloured blinds keep rooms comfortable on bright days.

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Escola Estadual Bairro Feital

LOCATION I **MAUÁ, BRAZIL**



A

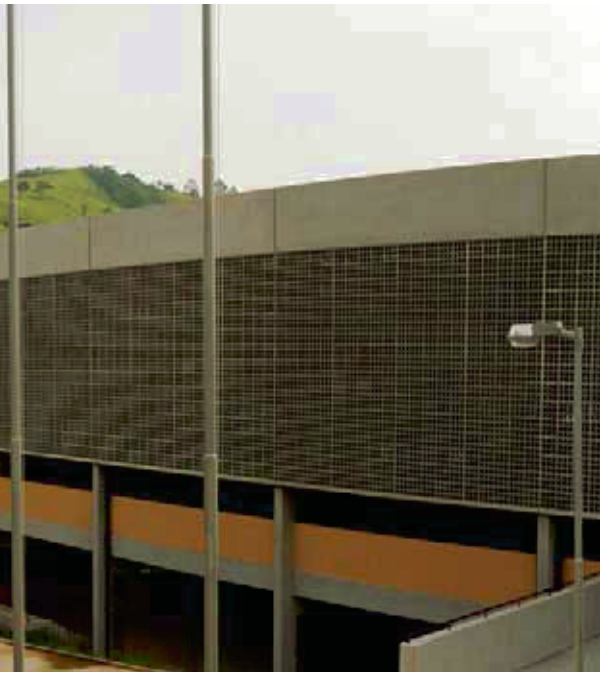


B

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> *Before this school opened, my son studied in the centre of town, and I had to pay quite a lot for school transport. [This school] is closer and beautiful. It doesn't look like a school, it looks more like a club.*

Alessandra Auxiliadora Kuchnie, *mother of one of the school's students*





C

Bairro Feital is in a poor suburb of Mauá. The local neighbourhood largely consists of highly compact housing with many self-built dwellings. Demand for school places has exceeded supply, and this school has been built to provide more local capacity.

Schools are virtually the only publicly funded facilities available for households in this low-income area. So as well as providing a new educational resource, this project sought to provide a building that would serve the wider community and enhance the urban environment.

ARCHITECTS: **SIAA (César Shundi Iwamizu, Ricardo Bellio Alexandre Mirandez, Marcelo Pontes and Moracy Amaral)**
CLIENTS: **Foundation for the Development of Education, Sao Paulo State Department of Education**
TYPE OF SCHOOL: **Primary**
NUMBER OF STUDENTS: **812**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **2 486m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **City**

Site considerations

The new school occupies a relatively large plot of land. It is a hilly site with a steep gradient, bounded on one side by an existing primary school. Good use is made of the topography of the site. The architects have organised the new school into two blocks at the foot of the hill. The trees and open grassland towards the top of the site have been preserved as a recreational area open to the community.

At the front of the school, a 10m setback from the street which was previously used as a parking lot has been transformed into a plaza. The school is not separated from the rest of the district behind a wall or fence; instead it gives the impression that all are welcome.

Design

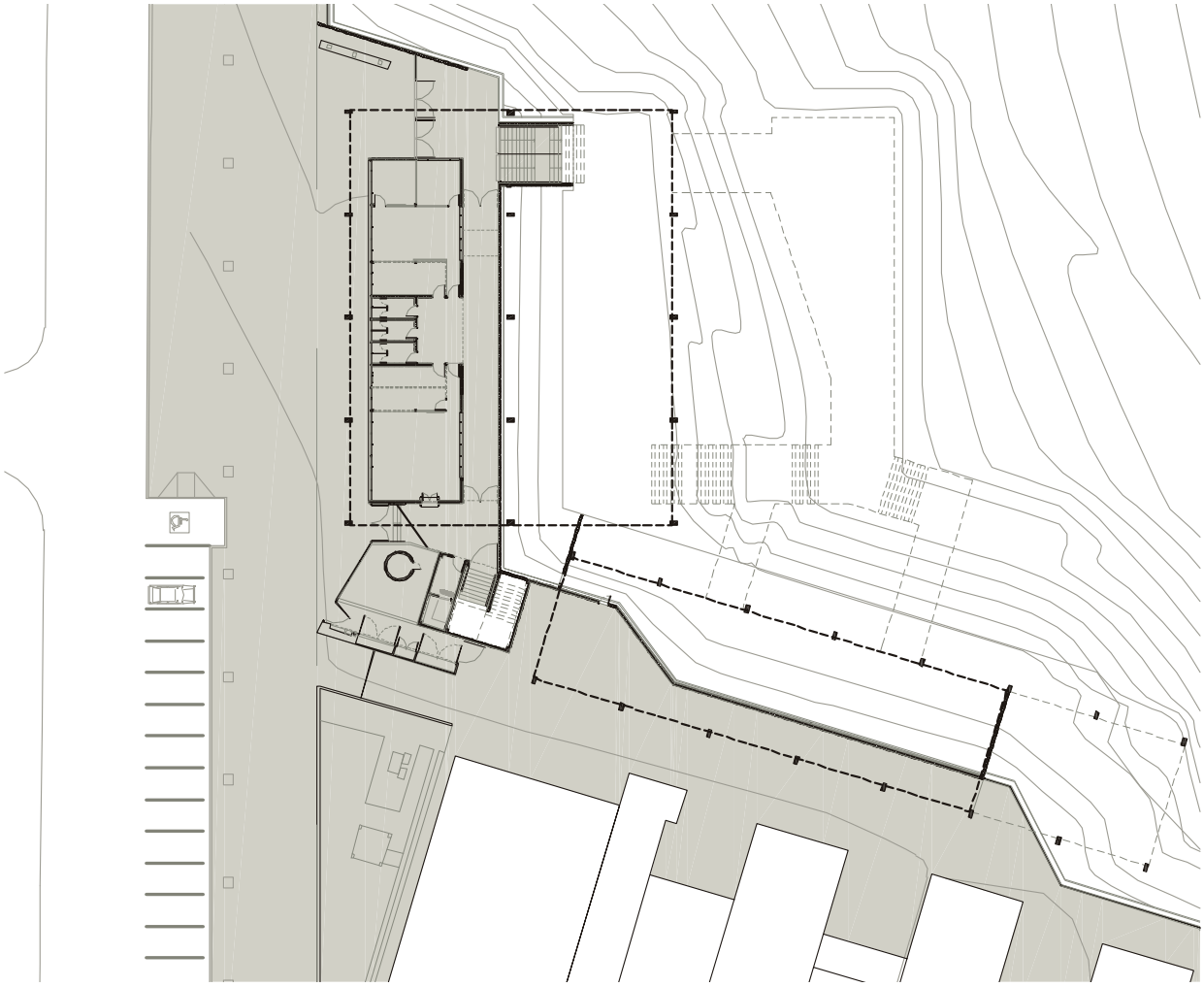
Functional and well-constructed, the school buildings have a strong aesthetic appeal. The interiors are well illuminated and ventilated, and the lattice elements in the external walls allow

A: View of the school from the rear, with walkways leading to the teaching block (centre) and the sports hall (right).

B: The open plaza at the front of the school.

C: A corridor linking classrooms in the main teaching block.

© OECD 2011



D

D: Ground floor plan.

good air circulation. Colour is used generously throughout. There are clear circulation flows and open spaces for students to meet and congregate.

There is a clear separation between the block where teaching takes place and the facilities intended for community use outside school hours. The sports area and other resources that can be used by the community are in a rectangular block at the front of the site, close to the street. Classrooms are in a linear block that runs parallel and just off the boundary of the neighbouring school.

The school also has a kitchen, dining room and canteen, staff room, an association room for students, and offices for the principal and an educational counsellor.

Flexibility

The 13 main classrooms are organised over three floors in the main teaching block. There are also two classrooms for additional teaching support and a multipurpose room.

The information technology room and reading centre are located towards the front of the school, so that they are easily accessible by residents taking part in adult education programmes.

The facilities meet the requirements of the current pedagogical programme, but the design allows the school to adapt to meet any future curriculum changes. The furniture can be arranged in several configurations. The partitions between the classrooms are not load-bearing walls, so there is some flexibility to change the internal organisation of space in the future.

Community use

The school, which opened in 2008, is already widely used by the community at weekends. It has a varied educational and leisure programme, which has been developed by university students. Painting and other arts classes, the HIV and drug education programmes, and futsal and volleyball in the sports hall are particularly popular.

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Lorentzschool

LOCATION I **LEIDEN, NETHERLANDS**

ARCHITECTS: **atelier PRO architekten (Leon Thier and Sechmet Bötger)**
CLIENTS: **Gemeente Leiden Dienst Bouw en Wonen en Bureau Openbaar Onderwijs**
TYPE OF SCHOOL: **Primary**
NUMBER OF STUDENTS: **850**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **4 350m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **City**



A

A: Open playgrounds surround the school building on all sides.
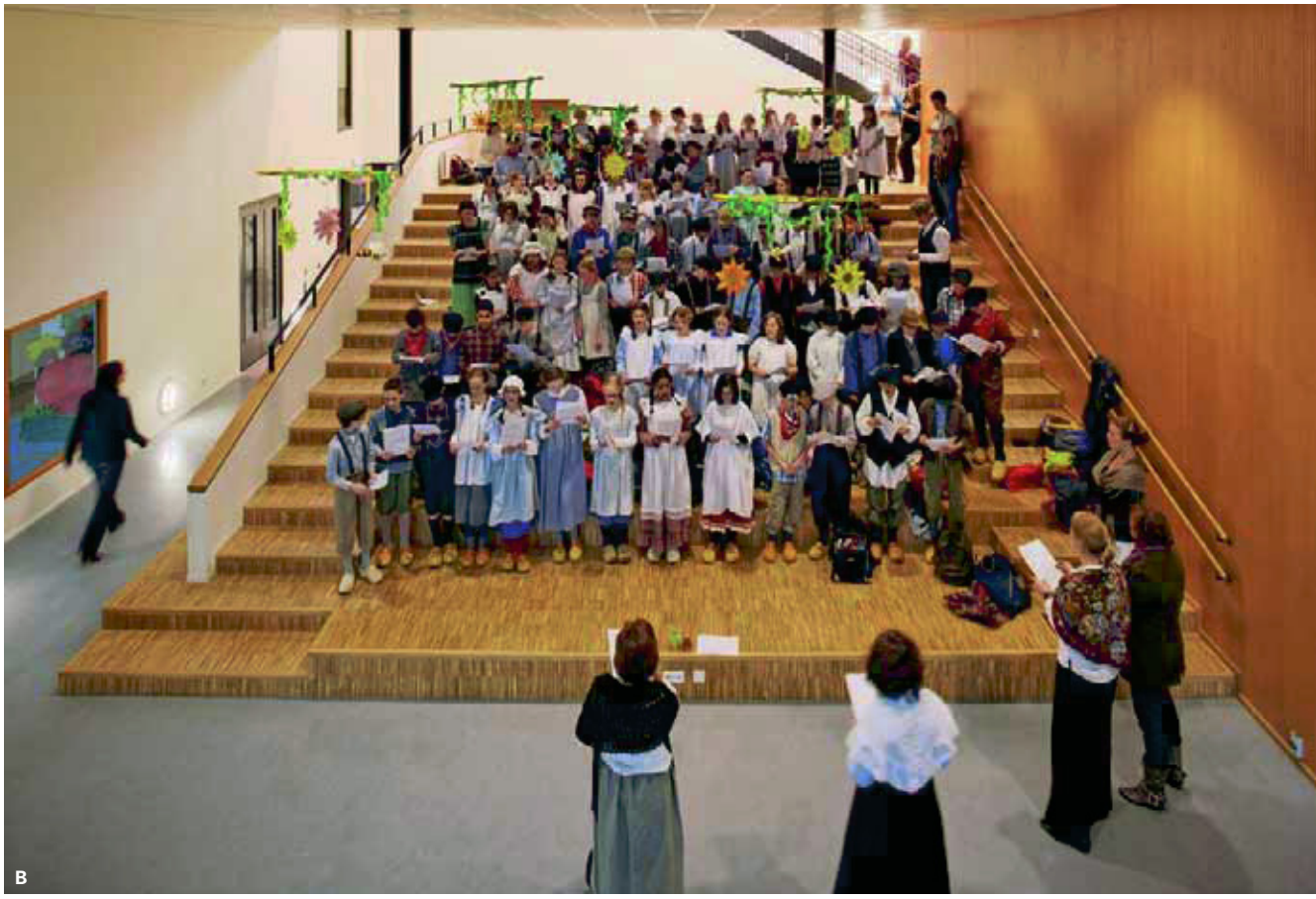
B: The auditorium can be used for meetings, assemblies and performances.

Lorentzschool's 38 classrooms make it a large primary school by Dutch standards. To make this school work in a single, relatively compact, three-storey building has required thoughtful planning and an imaginative use of space.

The input of school users and the local community was sought during the design process. The consultative process covered a variety of aspects ranging from the colour scheme and use of materials to the organisation of working areas and classrooms. This helped to fashion the interior appearance of the school.

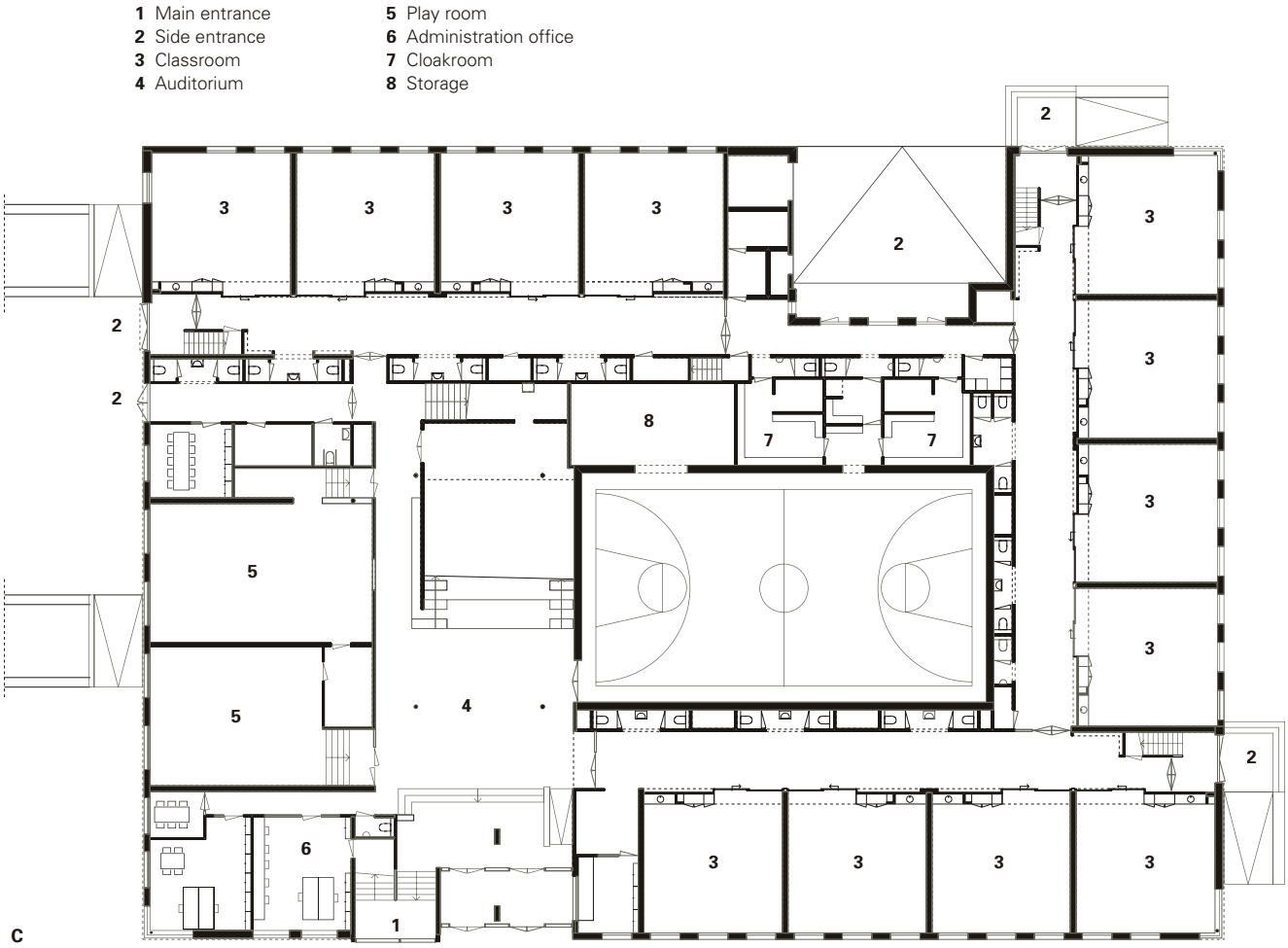
Three "houses"

The building is divided into three "houses", each with a different colour scheme and a separate entrance. Each house is arranged over three floors. Within a house, each age group



B

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C: The ground floor plan. There is a suite of four classrooms for the junior students in each house, each with its own entrance.

D: The documentation centre and library – every seat has a workstation.

E: Wide corridors and sliding glass doors allow the space outside classrooms to be used for extension activities.

F: The layout of the documentation centre allows it to be used for computer lessons.

G: Cross section through the documentation centre.

has its own storey. This divides the school into well-defined spaces that are finely scaled and easy to navigate. Vertical connections via stairs and landings encourage interaction between all age groups, the objective being to create the feeling of a small school despite the size of the institution.

Centrally positioned in the block, an open playground surrounds the building on all sides. The youngest children, the juniors, have three separate points of entry to their suite of classrooms on the ground floor. From here, they can explore the rest of the school. The middle and senior students have their own recreation areas, and entrances lead them into the heart of the school to their separate floors.

All classrooms are located towards the outside of the building. This allows the main teaching spaces to make full use of natural light. Outside each classroom is a wide corridor, which has been designed to provide room for computer workstations and allow a space for independent work.

Shared facilities

At the heart of the school, easily accessible to all, are the gymnasium, an auditorium, and a documentation centre and library. Inspired by the Donner bookshop in Rotterdam and a school in Sweden, the architects have interwoven stairs, terraces and landings. This has created a variety of spaces around the gymnasium that can enhance teaching and learning. These spaces link all the floors together.

The auditorium is a multipurpose space that can be used for meetings. The main stairs leading down to the auditorium can seat 100 people. For the monthly stage performances at the school, this space is transformed into a festive hall with a foyer, seating and a stage. There is plenty of space for parents and others to attend children's musical events and plays. Stairs lead from the auditorium to the documentation centre and library. This is organised over two floors, with bookcases positioned on the wide treads on either side of a flight of stairs. There are workstations

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D

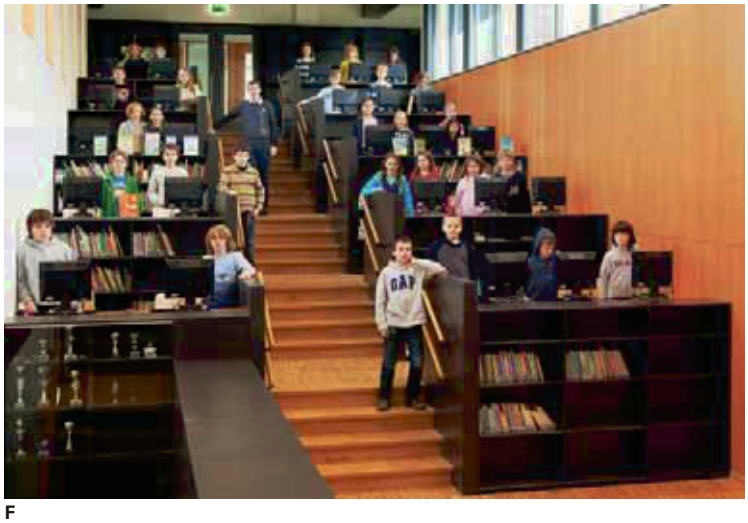


E

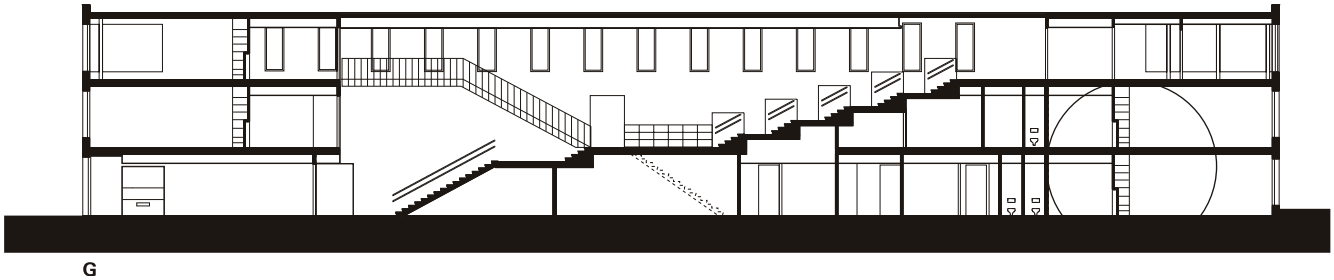
installed throughout. This layout allows the documentation centre to be used for computer lessons and other classes.

Community use

The school is becoming an important community resource. It is used by several organisations in the evenings, including a chess club, a music school and several sport clubs. It is also used to provide childcare outside school hours and in the school holidays.



F



G

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Escuela Nº 330 de Tiempo Completo

LOCATION | **MONTEVIDEO, URUGUAY**

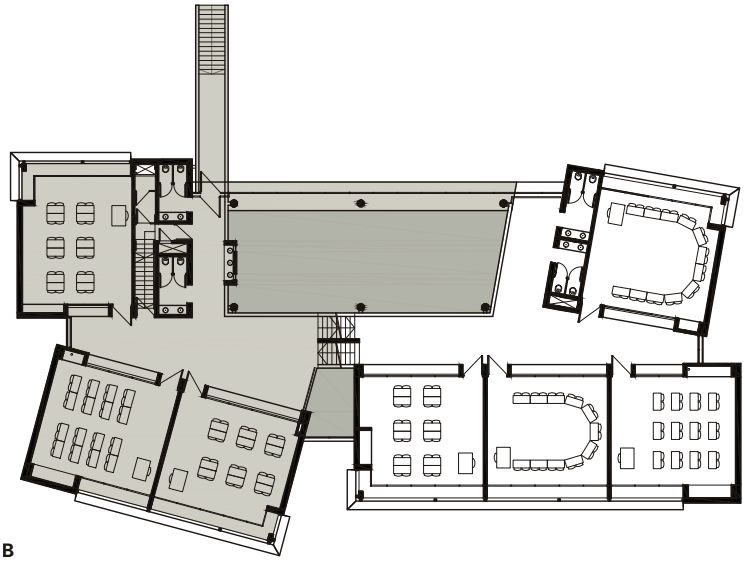


A

"I think it is almost unbelievable that this is a public school. We really like the use of colours, the chosen flooring, the floating ceiling and the sunscreens, and the use of light globes in the atrium, which are much prettier than standard fluorescent lights. The classrooms and the rest of the spaces are really close to each other."

Fifth-grade teacher, Escuela Nº 330 de Tiempo Completo

ARCHITECT: **Proyecto de Apoyo a la Escuela Pública Uruguaya (Pedro Barrán Casas)**
CLIENT: **Administración Nacional de Educación Pública**
TYPE OF SCHOOL: **Primary**
NUMBER OF STUDENTS: **300**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **1 760m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **Large city**



B

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Situated in a northern suburb of Montevideo close to the Maronas racecourse, this new school occupies a relatively generous rectangular plot in an area characterised by open ground and low-rise residential homes. There is a slope down the longitudinal axis of the plot, and this has been landscaped and organised into a sports court, tree-lined terraces and an open amphitheatre.

Core multipurpose space

The school building occupies one end of the grounds. The classrooms are housed in four linked volumes organised around a large atrium. This atrium is the focal point and core of the school. Overlooked on three sides by the wide and open corridors on the upper floors, this space affords clear views out to the courtyard and school grounds through a glazed wall. Attractive globular light fixtures hang from the ceiling.

The atrium acts as multipurpose space. It is an open-sided hall that can be used by students from different classes to work together on joint projects or to take part in workshops. It serves as a recreation space at break times during cold and rainy days, and it can be used for physical education. The space is also large enough to be used for assemblies and meetings of the whole school, and it is open for community use in the evening.

Open ground floor plan

The ground floor of the school is designed as an open shared space, one that encourages interaction between the children from different classes. Only two classrooms are accommodated on the ground floor, along with the kitchen and dining area and the offices for the school administration.

There is an open feel to this floor, with ramps connecting the areas that are at slightly different levels. With the multipurpose space at its centre, there is a pleasing continuity.

Classrooms

Most of the classrooms are on the upper floors. Here the school is divided into four blocks, with three or four classrooms in each block. Every classroom door has a distinct colour, and the

A: The pedestrian walkway leading to main entrance.

B: Typical furniture arrangements in the classrooms on the first floor.

C: A view down into the multipurpose space at the heart of the school.



C

© OECD 2011

rooms are fully equipped to meet the needs of the curriculum.

Windows provide views into the classrooms from the wide circulation spaces. These provide room for informal or small group activities outside the classroom. The school has proved to be flexible enough to adapt seamlessly to the "one laptop per child" programme.

Achieving within limited budgets

This publicly funded facility shows what can be achieved within a very tight budget. The compact design has kept construction costs low. However, the architects have found a way to include a large multipurpose space within the plan. The surface features of the site have been cleverly exploited, resulting in discrete slopes and variations in the height of the ceilings, which has created a variety of volumes. There school's configuration is flexible and there are variations in scale, yet it is sufficiently intimate to allow children to feel at ease and have a sense of belonging.

D: The school has a sense of openness, with spaces outside the classrooms used for informal learning.

E: The furniture can be rearranged within the classrooms to suit different groups and teaching styles.



D



E

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Schulhaus Baumgarten, Schule Buochs

LOCATION I **BUOCHS, SWITZERLAND**



A

ARCHITECTS: **pool Architekten (Mischa Spoerri, Dieter Bachmann, Michael Bosshard and Floris Besserer)**
CLIENT: **Schulgemeinde Buochs**
TYPE OF SCHOOL: **Primary**
NUMBER OF STUDENTS: **220 (Schulehaus Baumgarten only)**
TYPE OF PROJECT: **New building for existing school**
GROSS SURFACE AREA: **2 700m² (Schulehaus Baumgarten only)**
YEAR OF COMPLETION: **2006**
CONTEXT: **Small town**

"The educational concept has been directly translated into a spatial idea. Our need for flexibility, in which classrooms and group rooms can be easily combined or shared, is fully served. The new school building allows us to organise and create our daily school life more effectively."

Vreni Intlekofer, *administrator, Schule Buochs*

A: The undulating roof and textured façade of timber panels help integrate the building with its surroundings.

© OECD 2011



B



C

Buochs is a small town on the western shore of Lake Lucerne. Its primary school occupies several buildings in the centre of the town, with the oldest dating from 1904. Schulhaus Baumgarten was commissioned to provide additional space for the school. Situated close to the existing buildings, it provides classrooms for children aged 7–10 in the middle school.

The exterior draws on local architectural traditions. With a textured façade of white wood panels and a pitched roof, the new building is well integrated in its surroundings. Numerous windows provide users with views down to the lake and to the nearby mountains.

Contrasting interior styles

Inside, there are two contrasting styles and floor plans. The ground and basement levels are divided by a generous corridor. This functions as a meeting and circulation space, and gives clear sight lines to the connected rooms. Here, the architecture uses mainly concrete and brick. Interior finishings include coloured glass, clay tiles and rhythmically positioned concrete piers. Elm is used for doors and stair rails.

On the upper floor, there is a compact arrangement of classrooms and group rooms along the longitudinal spine of the building. The roof has a series of folds, which varies the height of the ceiling. Although the classrooms here are a standard size for Swiss schools (at 70m^2), the full height windows and inclined high ceilings make the rooms seem much bigger.

A sophisticated system provides lots of natural light throughout the upper level. Spaces in the centre of the building receive indirect sunlight through the classrooms as well as natural light through windows under the stepped roof. This part of the building has a prefabricated wood structure, which significantly reduced construction time. The walls, door and window frames are made of white wood.

Flexible learning

The architects worked closely with the client and a planning committee consisting of representatives from various educational, political and community stakeholders. This committee took an active role in the planning process. It helped to establish the brief for a building that would allow flexible learning models to be implemented in the daily school routine.

On the lower levels, there are four specialist classrooms together with a music room and offices for school staff. The music room is used by orchestras, choirs, theatre and music groups. This combination of administrative and educational rooms in one building is designed to promote better

© OECD 2011



D

communication between students, teachers and the school administration.

The eight main classrooms are on the upper floor. The layout of this area is flexible and it can be easily reorganised into different learning spaces. Across the width of the building, each pair of classrooms is connected to a group room. These are in the centre of the building, and the glass partitions at each end of the group rooms can be opened up to allow the rooms to be used in clusters.

This flexibility allows teachers to bring classes together or to split children up into small groups according to their needs. The school's wide corridors and glass walls help to promote a culture of transparency and co-operation.

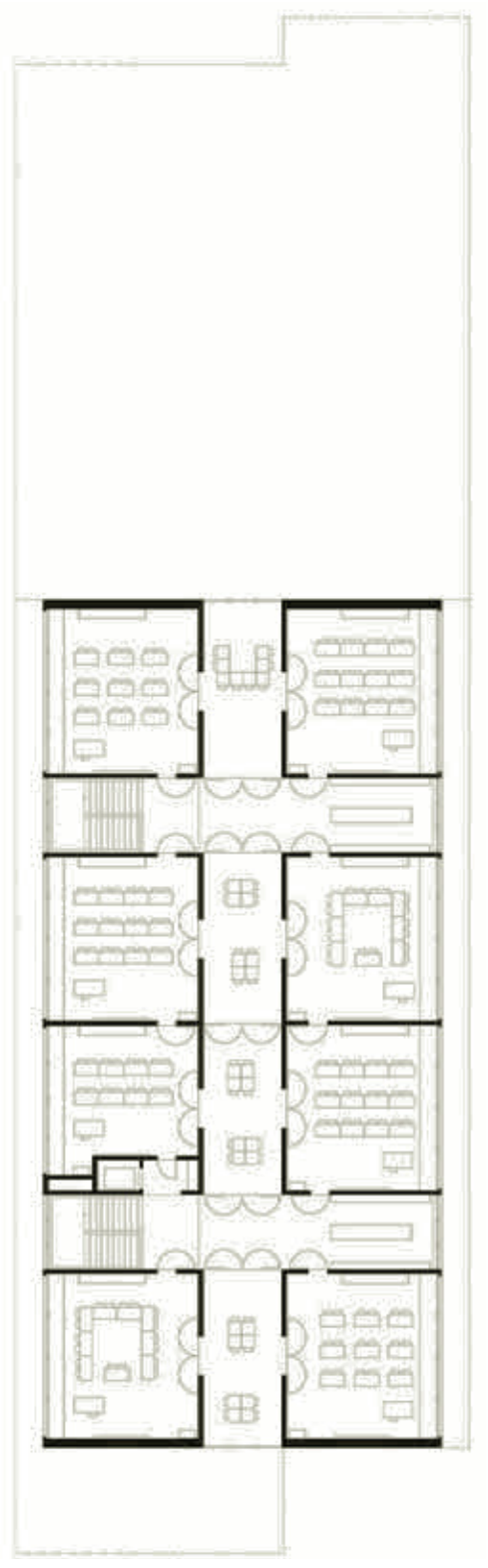
B: A group room with connecting classrooms.

C: The main circulation space on the ground floor.

D: Glass partitions between the group rooms can be opened to create a larger space.

E: The upper level floor plan, showing typical furniture layouts.

F: Cross section, showing the stepped roof.



E



F

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Snells Beach School

LOCATION I **SNELLS BEACH, NEW ZEALAND**

> *The design has served us well, with the teaching spaces providing very effective and comfortable learning environments. Our imagery and core values have been reflected in the design, so it has been easy to reinforce these concepts with the students and the parent community, resulting in a great sense of ownership and pride.*
>
> **Jill Corkin**, *principal, Snells Beach School*



A



B

ARCHITECTS: **Brewer Davidson Architects (Peter Davidson)**
CLIENT: **Northern Regional Office, Ministry of Education**
TYPE OF SCHOOL: **Primary**
NO. OF STUDENTS: **173**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **1 824m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **Small town**

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Located in a semi-rural beachside community, the design of Snells Beach School reflects the idea of a village or community of buildings. The unobtrusive style of the school buildings complements the residential and holiday homes in the area.

Room for growth

The school comprises five single-storey classroom blocks, with a separate hall, library and administration block. The current set-up allows a total enrolment of 260 students, but there is room on the site for additional teaching blocks that will take the capacity to 520.

The school hall and library are positioned around an outdoor central courtyard, which has become the heart of the school and is a favourite area for children to meet and play. The library is large enough to accommodate two classes and allows for small groups to work independently.

The building materials are natural and soft-looking. Recycled concrete and other environmentally sensitive materials have been used in the construction. The colour scheme has been selected to reflect and blend with the local flora and fauna and the beach.

A: The unobtrusive low-rise school buildings blend in with the local environment.

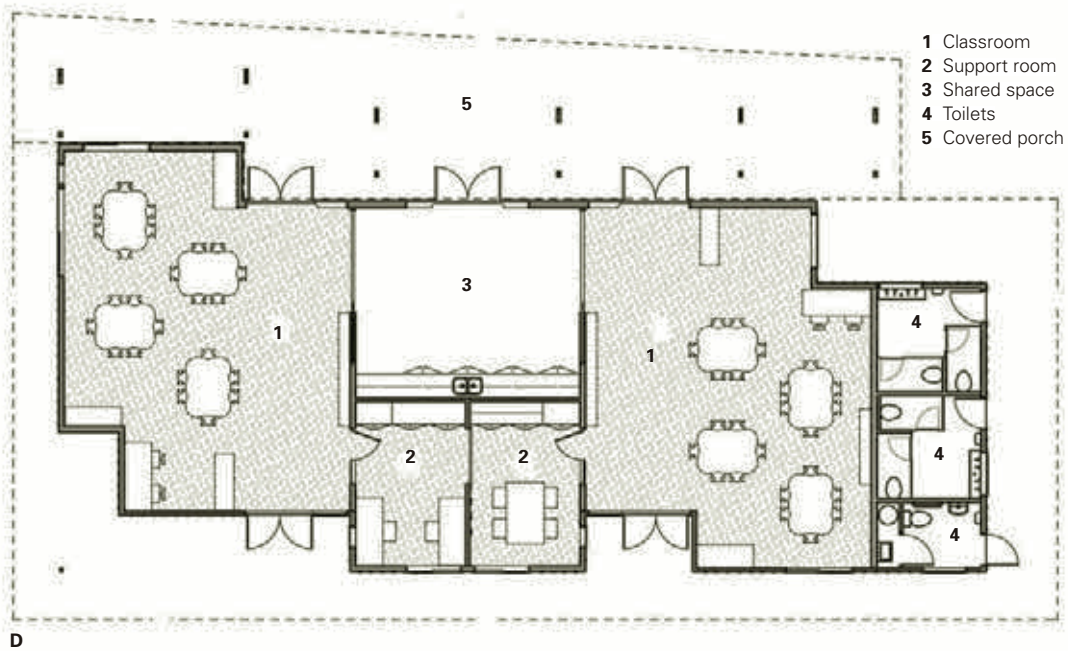
B: Learning boards around the campus explain how the facilities were built on sustainable principles.

C: Large roof overhangs provide shade and shelter.

D: Floor plan of one of the classroom blocks.



C



D

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E

E: The classrooms can be arranged to accommodate different teaching styles.

A range of pedagogies

Each single-storey teaching block incorporates two classrooms and professional work spaces that teachers use for planning and administrative purposes. They have been designed to facilitate a range of pedagogies: whole class instruction, small group instruction, one-to-one teaching or support work, independent study and combined classes for team teaching. They also incorporate very large "wet spaces" for art and other messy activities. There is wireless access from all areas, both inside and outside the buildings.

There are no built-in cabinetry or fixed furniture in any of the classrooms. Each room is a blank open space that can be set up in a way that suits the children and their teacher. This allows teachers and students to group tables for co-operative learning in all classrooms as there are no restrictions on positioning. The shared spaces in each block allow both classes to interact by sliding back the doors to the classrooms.

Sustainability

The school places a strong emphasis on sustainability and environmental education, and this is reflected in its design. The school meets the five-star green rating criteria, signifying "New Zealand Excellence" according to the ratings developed by the New Zealand Green Building Council.

The classrooms are designed for excellent airflow and passive heating. Windows are at student height in all rooms, so that when children are seated they can see outside. Large overhangs provide shade to the classrooms in summer, but allow for sun in winter. They also provide shelter from the wind and rain so that shoes and bags can be left outside. Smart technology is used to turn lights off in rooms where no movement is detected. Rainwater is collected and filtered for use in flush toilets and for outdoor irrigation.

The children are encouraged to walk, cycle or bus to school. The school organises "walking school buses", where students walk to school, chaperoned by one or more adults, following designated routes. It has also had to put in a second bike rack to cope with the numbers cycling. It has established an area of native planting to encourage birds to live and breed on the school grounds, and a kitchen garden and orchard designed and planted by the children themselves.

Snells Beach School has a strong community focus. It has developed partnerships with the local iwi (Maori) community, with Rotary and Lions clubs, Auckland Regional Council, and with the local tennis club, whose facilities are used by the school. People in the community are invited into the school to assist with literacy and gardening programmes.

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Chapter 9: **Secondary level**


176 Bridge Academy
United Kingdom


180 Elm Court School
United Kingdom


183 Het 4e Gymnasium
Netherlands


186 Marlowe Academy
United Kingdom


190 Park Hall Academy
United Kingdom


193 Collège de Wazemmes
France


196 Escola Secundária Passos Manuel
Portugal


199 The Lilley Centre, Brisbane Grammar School
Australia

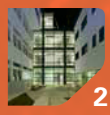

202 Victorian College of the Arts Secondary School
Australia


205 Hilde-Domin-Schule
Germany


208 Albany Senior High School
New Zealand


211 Incheon International High School
Korea


214 Schulanlage Falletsche
Switzerland


217 Escola Artística de Soares dos Reis
Portugal



A

Bridge Academy

LOCATION I **LONDON, UNITED KINGDOM**

> *Visitors to the building are invariably struck by the flair and ingenuity of the design. It is not only utilitarian; the design is inspirational and has given the students in this very deprived area of East London an uplifting background for their school lives.*
>
> **Richard Hardie**, *chair UBS Ltd and non-executive director The Learning Trust*

Bridge Academy is set on an inner-city brownfield site. The new school creates a focus for the regeneration of a neglected area. Built to serve the local multi-ethnic community, most students live within 700m of the academy and can walk to school.

Responding to the opportunities of its constrained canal-side site, this innovative vertical academy is a compact school shaped around a three-storey central space. It builds on the idea of a school without corridors. The open-plan structure is designed to provide passive security, maximising social interaction and minimising poor behaviour. Conceived as a multi-level learning environment, the tiered main school building terraces down to the canal, providing magnificent roof spaces for performance, learning and play.

Bridge Academy specialises in mathematics and music education. The school has music, art and dance studios, laboratories and ICT suites, a learning resource centre, a 180-seat lecture theatre, sports and catering facilities as well as classrooms of various capacities.

Three elements

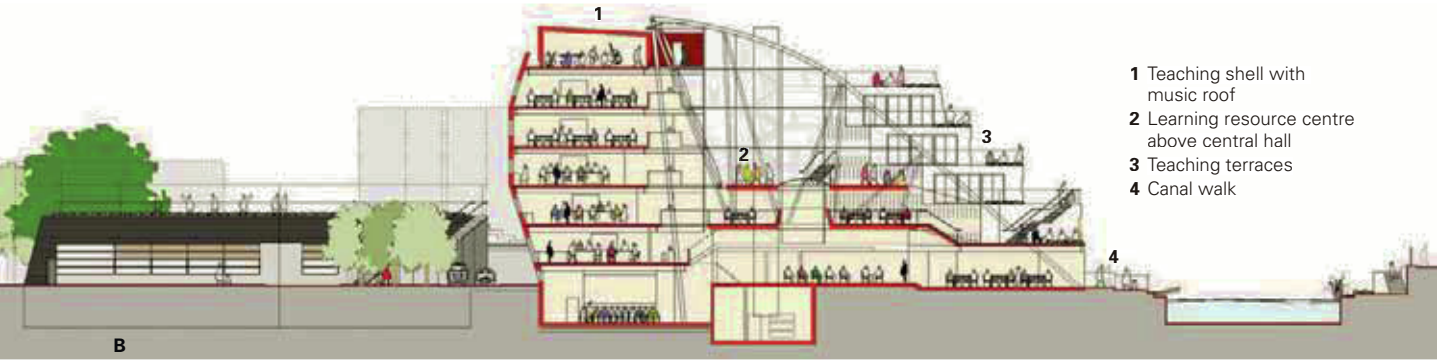
The school is organised into three elements: the sound shell, the music box and the sports hall. These three elements are unified in a multi-level landscape. There is a mixture of social and play space above and between the elements.

The sound shell wraps teaching spaces around the social heart of the school. Designed using the integrated technology of building information modelling to co-ordinate architectural, structural and engineering services, there is a clear floor plate structure: floors and walls can be removed and altered,

ARCHITECTS: **BDP**
CLIENT: **UBS Investment Bank and Department for Children, Schools and Families**
TYPE OF SCHOOL: **Lower and upper secondary**
NUMBER OF STUDENTS: **1 150 (at full capacity)**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **10 250m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **Large city**

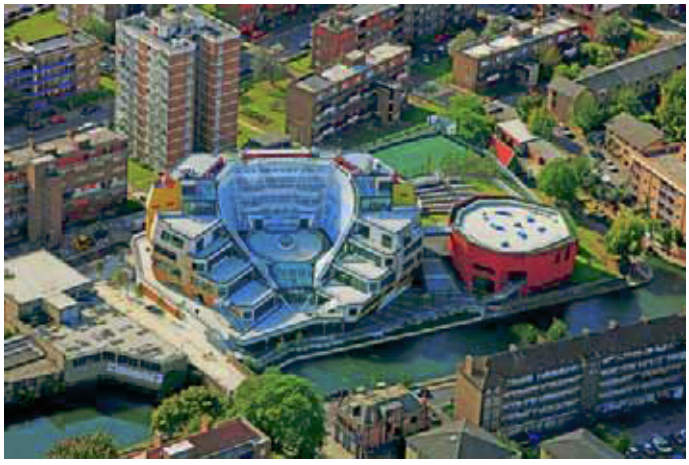
A: The central square at the heart of the main building.

B: Cross section.



1 Teaching shell with music roof
2 Learning resource centre above central hall
3 Teaching terraces
4 Canal walk

© OECD 2011



C



D



E

providing flexibility of use. A curved truss beam suspends the library above the central square, freeing up the ground floor for assembly and social interaction. The steel structure is intended to be visible, so that the school is not just an environment to learn in but an environment to learn from.

The music box, planted to form a living wall, sits by the edge of the canal. It is a theatre for music, dance and drama, which seats an audience of 450. The sports hall has been sunk into the site to minimise its height and allow views from street level into the hall. The sports hall and music box are used extensively by the local community and the academy has a dedicated community liaison officer.

Energy efficiency

The building has been designed to minimise energy use by maximising daylight to the teaching spaces and down into the lower ground floor. The use of ETFE ensures that the building is well lit, with solar shading protecting classrooms from solar gain. Louis Poulsen luminaires designed in conjunction with BDP's lighting designers are used throughout the building. They are daylight linked and respond to the external lighting conditions, making them very efficient and cost effective.

The school is naturally ventilated, utilising the seven-storey space on the canal side of the building to produce a stack effect in the building's central space. Although a steel framed building, the paint used for the slim Holorib composite floor construction ensures that heat absorbed during the day is gently released at night, naturally cooling the building throughout the summer.

The design also allows certain sections of the school to be closed off when not in use so that energy is not unnecessarily expended to heat or light the entire building. This is controlled automatically by a building management system that also allows the monitoring of energy consumption.

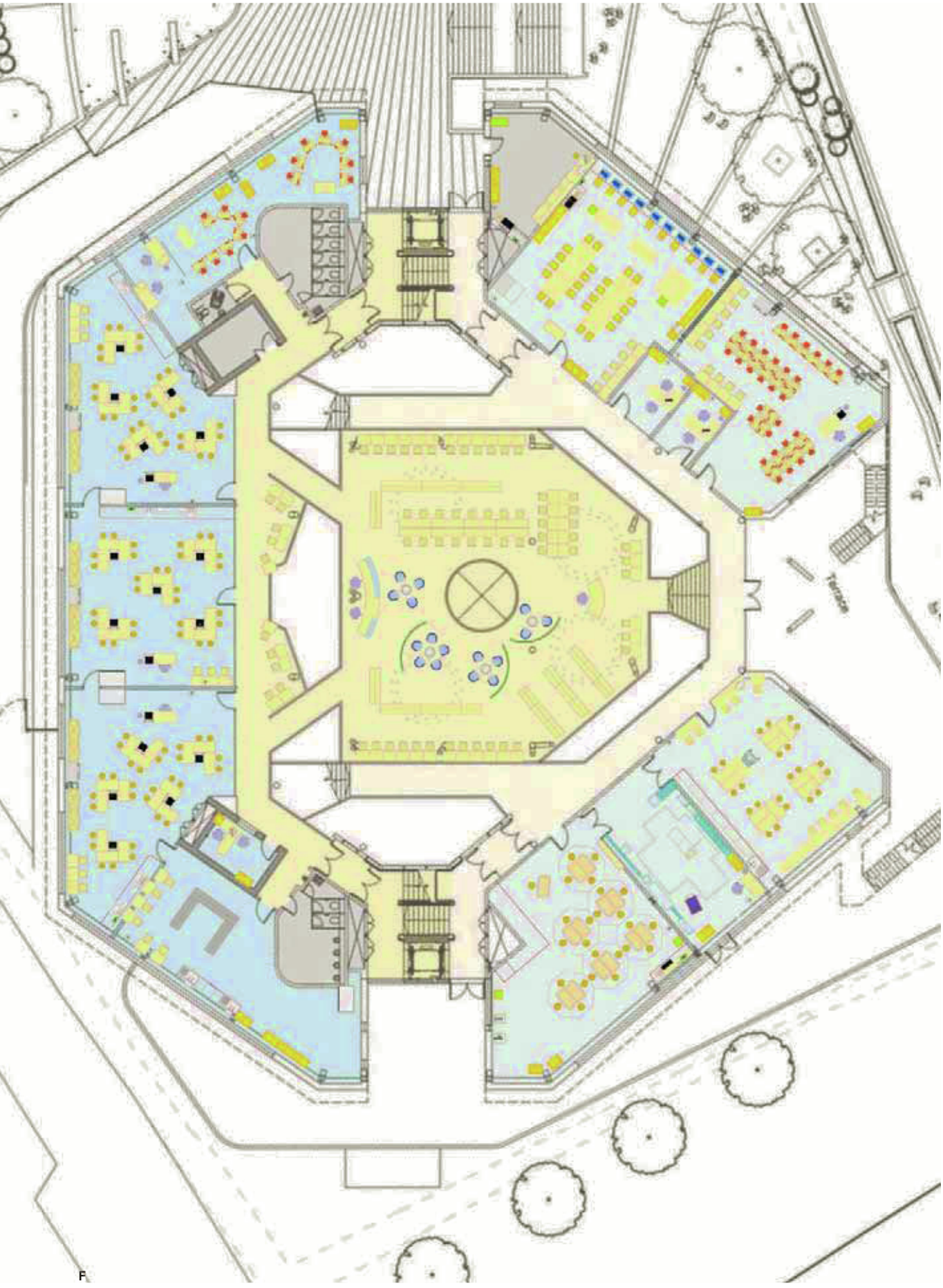
C: The academy opens out onto the canal.

D: The play deck on top of the music box.

E: Workstations in the open circulation spaces.

F: Ground floor plan.

© OECD 2011



F

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Elm Court School

LOCATION | **LONDON, UNITED KINGDOM**

ARCHITECT: **jmarchitects (Matt Tabram)**
CLIENT: **London Borough of Lambeth**
TYPE OF SCHOOL: **Lower and upper secondary**
NUMBER OF STUDENTS: **100**
TYPE OF PROJECT: **Extension and renovation**
GROSS SURFACE AREA: **5 364m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **Suburb of large city**



A

A: The atrium brings light into the heart of the school.

B: The front façade, with the new external stairs.

C: View from the rear; the new teaching block (left) and the sports hall (right).



B

The challenge facing the architects on this project was to convert a school built at the beginning of the twentieth century into a modern facility suitable for students with special educational needs. This problem has been addressed by constructing a sports building and a teaching block at the rear of the site and by substantially modifying the existing school building.

Transforming the old school building

Three main architectural interventions have turned the historic school into a modern educational building. The first intervention was to create an atrium at the heart of the building. Its ETFE roof bathes the space in natural light. It now serves as a new meeting space and has become the heart of the school. It links directly to the school's dining room, which opens via new French doors to a landscaped courtyard beyond.

The second intervention was to construct a new mezzanine floor in the main hall area. This allows the offices and therapy rooms to be clustered around the main entrance of the school and it maintains the open space of the hall, with 5m high soffits above first-floor level. Raising the hall floor has also made it possible to look out of the high hall windows while augmenting internal natural light levels.

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> *The architects surpassed our expectations. It is good to know you don't have to knock down the old to build the new. You can make it work. The new school is in an important historical building steeped in education, which has been adapted specifically to our needs.*

Bill Hutcheson, *headteacher, Elm Court School*



c

A new external glass stair tower provides the statutory second escape route from the front wing. This also works as a mechanism for breaking up the rather dour main façade with a transparent, technologically complex but visually elegant structure. This is suggestive of a contemporary function, and announces a new era of occupation.

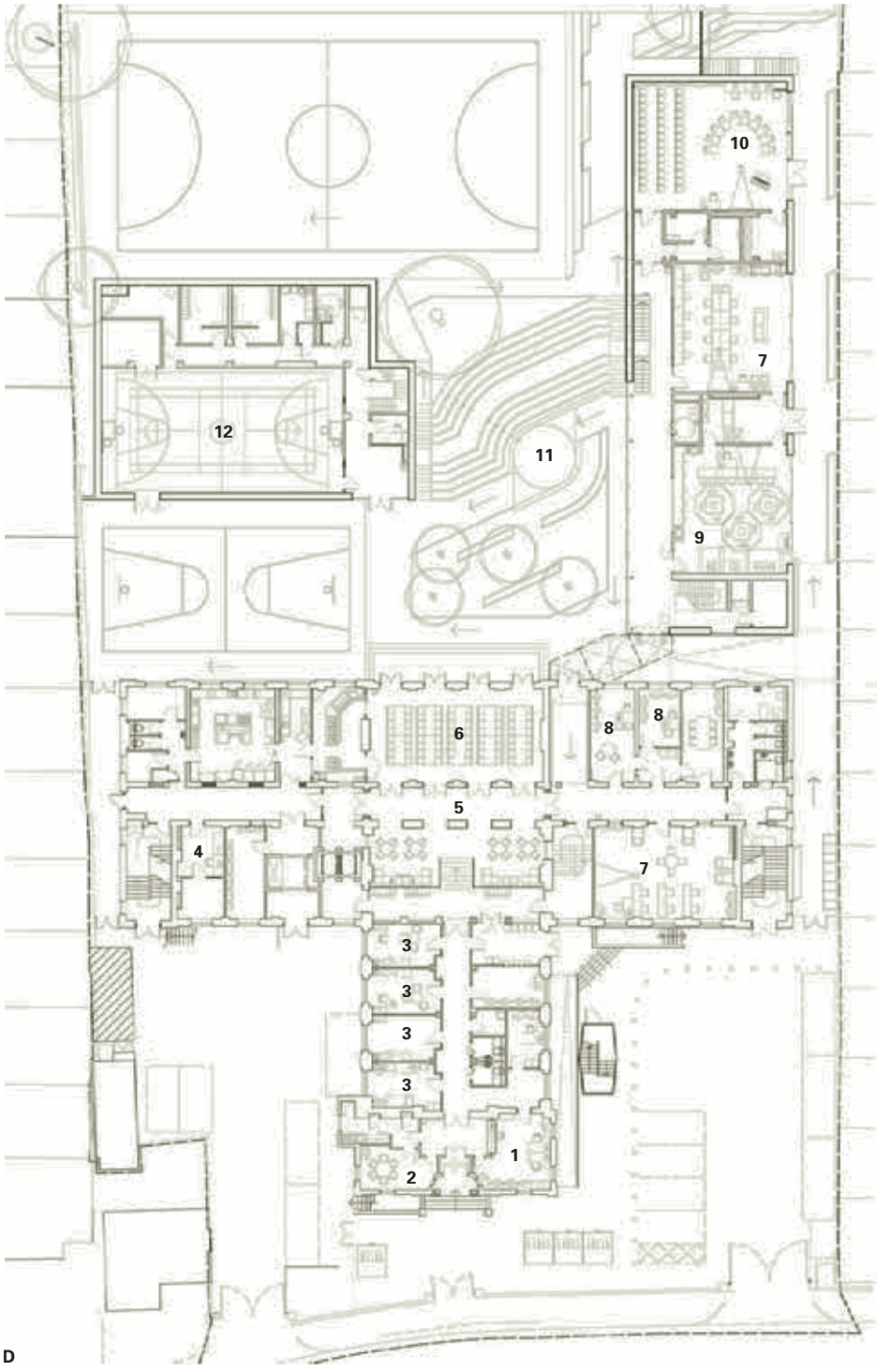
School organisation

The renovated main building now has a series of spaces over four floors. It includes the medical and visiting professional suites, general teaching classrooms, student cafeteria and kitchen, the main hall, the library and ICT suite, and staff offices. The newly constructed teaching block contains the specialist facilities for teaching music, art, food technology and textiles, and the new sports block houses a games hall, changing rooms and a laundry.

The sports block and the practical teaching block are important in delivering the school's curriculum, which is oriented towards vocational rather than academic disciplines. They have been designed to sit within the sloping topography of the site, which rises up by approximately four metres from the lower level to the level of the outdoor all-weather sports pitch. The buildings allow for direct access to outdoor space from both the lower ground and the upper ground levels, and there

© OECD 2011

1 School administration
2 Parents' room
3 Medical and professional rooms
4 ICT office
5 Atrium
6 Dining room
7 Class base
8 Staff offices
9 Design and technology
10 Music room
11 Outdoor ampitheatre
12 Sports hall



D

D: Ground floor plan.

is lift access to the upper level from within the buildings so that the entire site is accessible to all for outdoor activities.

Both the new and the remodelled buildings have been designed for effective passive natural ventilation and daylighting through the use of state-of-the-art roof vents and roof lights. The classrooms have been designed for small classes. The school keeps teaching groups to around eight students to minimise disruption and distraction between students. The classrooms are supplemented by group rooms for "time-out" space, one-to-one work and staff meetings.

By bringing in light, fresh air and a clear circulation strategy, the school inspires a feeling of calm. It provides spaces where children with behavioural, emotional and social difficulties can learn and an environment in which staff can manage the school day with minimal stress.

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Het 4e Gymnasium

LOCATION I **AMSTERDAM, NETHERLANDS**



A

ARCHITECTS: **HVDN architecten**
CLIENT: **Stadsdeel Westerpark Amsterdam and Esprit Scholen**
TYPE OF SCHOOL: **Lower and upper secondary**
NUMBER OF STUDENTS: **535**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **4 160m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **City**

Until the mid-2000s Houthavens, the area of Amsterdam where this new school is located, was a sparsely populated industrial area. It started to change when it became the site of temporary student housing. Now there are growing numbers of artists' workshops and restaurants, and it is set for substantial new residential developments over the next 15 years.

There is a rapidly growing demand for secondary education, but given the quickly changing demographics of the area, it is difficult to forecast long-term demand. This facility has therefore been designed as a temporary school, which can provide a good educational environment while more permanent schools are being planned.

Modular construction

Although the school looks and feels like a traditional building, it is a modular structure. This is not visible, however, given the innovative design of the façade. Rather than offering a drab uniform exterior, the building displays the technical and aesthetic qualities and level of finishing of a permanent structure.

Several design features make this possible. The joints between the modular units are hidden or disguised. On the external walls, the timber sections, built from narrow horizontal planks, hide the real joints. On the ground floor and in the courtyard, the joints are

A: The main entrance.

© OECD 2011



B

hidden behind coloured aluminium boards of different widths. The external façade is relatively deep, which allows various elements to be incorporated to give visual interest. For example, the windows are set back 20cm from the façade.

The modular construction provides flexibility and makes the entire school recyclable. It would be relatively easy to reconfigure the structure and rebuild it in a different form. More significantly, it is fully transportable. Each module is designed to fit on a standard flatbed truck and can be transported by road. This means that in the future this structure could easily be moved to another location in the city and reassembled as a school or office accommodation.

Practical layout

Built close to the waterfront, the school is often exposed to a strong wind. It has therefore been built around an open central courtyard. This provides a perfect and comforting shelter against the wind and a place for students to gather outside. Benches placed in a wide circle invite students to meet.

A light and transparent interior circulation space surrounds this courtyard. On the first and second floors several bay windows jut out from the corridors. These provide study spots and sitting areas where students and teachers can work quietly outside of the classrooms.

As well as the classrooms and study areas, the school has a large auditorium and media centre. There is a gym, a sports field and an outside schoolyard, and students can also wander down to the beach at the end of the plot.

The school has been designed to be a very approachable building. It is both literally and figuratively a colourful school, attracting students from many different backgrounds.

B: The corridor on each floor overlooks the courtyard and gives access to regular shaped classrooms.

C: The auditorium.

D: Detail of the external façade.

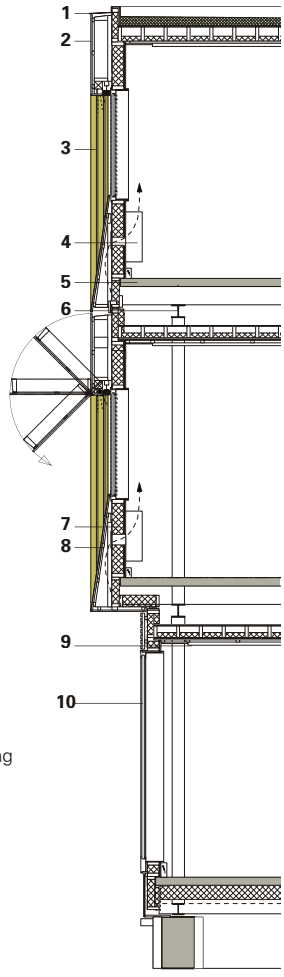
E: The inner courtyard.

F: Ground floor and first floor plans.

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C

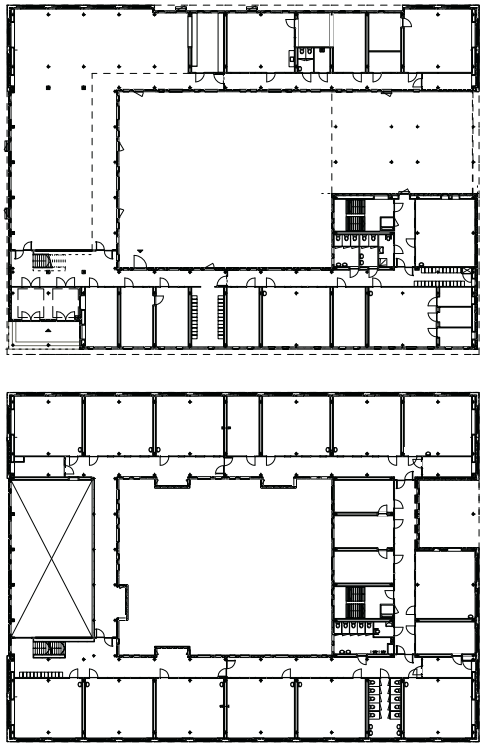


1 Colour-coated aluminium roof
2 Oil-treated hardwood
3 Oil-treated hardwood
4 Ventilation and heating system
5 Floor slab
6 Steel structure
7 Cavity wall and insulation
8 Oil-treated hardwood
9 Acoustic ceiling
10 Aluminium window frame

D



E



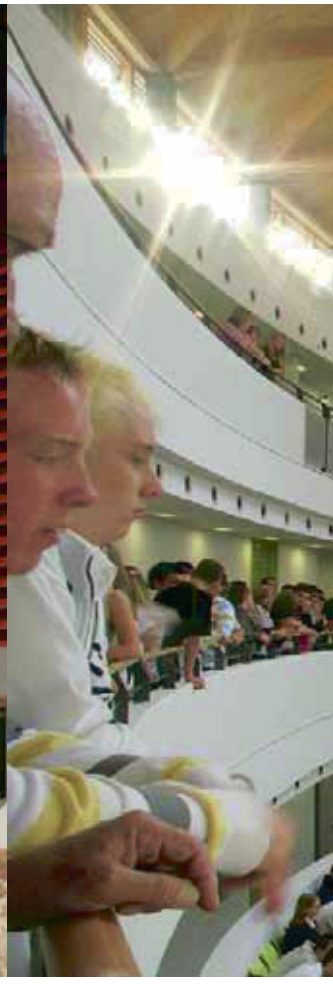
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Marlowe Academy

LOCATION I **RAMSGATE, UNITED KINGDOM**





A

A: The main entrance is between the theatre (clad in yellow panels) and the library and sports hall (clad in russet stained timber).

B: The arena is regularly used for whole-school assemblies.

ARCHITECTS: **BDP**
CLIENT: **Department of Children, Schools and Families, Roger de Haan, Kent County Council**
TYPE OF SCHOOL: **Lower and upper secondary**
NUMBER OF STUDENTS: **820**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **10 320m²**
YEAR OF COMPLETION: **2007**
CONTEXT: **Seaside town**

The brief for this new academy was that it should improve the standards in the former, failing Ramsgate School and provide a catalyst for the regeneration of this part of the town. It has become a new hub for learning and adult education in the area, and provides a resource that is widely used by sports clubs, theatre companies, businesses and other groups.

Innovative form

Set in the flat featureless landscape of eastern Kent, this colourful new academy is more like a campus than a traditional chalk-and-talk school. The building's form derives from the school's academic structure: it has a performing arts specialism and three faculties covering arts, science and humanities. These became three curved teaching wings spiralling around a

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> *The new building has proved to serve peoples' needs well. The facilities are all that you could hope for in a modern secondary school. The communal nature and flexibility of the space on the ground floor has been a major factor in breaking down barriers between youngsters and adults.*

Ian Johnson, *headteacher, Marlowe Academy*



B

sequence of open and enclosed social spaces, including the arena, a restaurant, IT resource areas, library, sports hall and theatre.

The clients' vision of forming a community of learners is achieved through an open learning environment where students and teachers can see and be seen. The sequence of spaces has the feel of being outdoors, with streets and squares formed between the classroom wings and the sports hall and theatre. The sports hall is raised above the library, so that the ground level elevation is animated at all times and is easily accessible from the entrance piazza.

The dramatic central arena space is topped by a timber gridshell roof, and acts as a counterpoint to the external piazza. This arena combines a hall, café, drama studio and circulation space, and it allows the academy to hold whole-school assemblies each week. An inspirational space filled with light, it is more reminiscent of an art gallery than a school assembly hall.

Fitness for purpose

In 2007, Ofsted (the body that inspects schools in the UK) found that "the academy is successfully raising students' aspirations and has demonstrated that social circumstances are not an excuse for low ambition".

The state-of-the-art facilities and open-plan layout encourage an adult approach to learning. Students compare it to a higher education college, with longer class times allowing more engagement in their studies, negligible truancy

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C

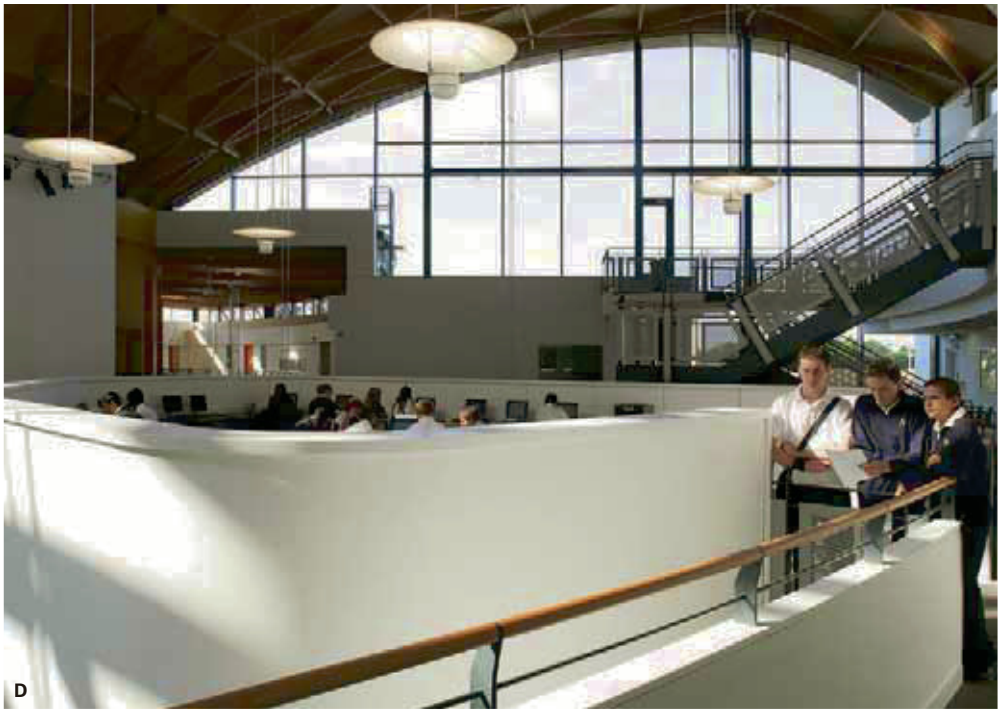
levels and greater self-confidence among students, leading to improved educational performance. Applications for places in the new academy are increasing year by year.

Access to the classrooms completes the feel of a school without corridors, fostering openness and countering the kind of bullying that would traditionally take place in the old school's nooks and crannies. No graffiti has been found on the new building, in strict contrast to the old school.

Energy efficiency

Located in a wide expanse of playing fields, Marlowe Academy lends itself to zero energy natural ventilation. However, Kent Airport is nearby so special measures are needed to suppress the noise of aircraft. There is an elaborate but low-tech system of mechanically assisted fresh-air ventilation, incorporating acoustic dampers and heat exchangers. When the arena and the adjoining auditorium are fully occupied, the ventilation system in the classrooms is switched off to save energy.

Passive environmental controls include exposed concrete frames and floor slab soffits that act as a heat sink. The windows are shaded from the sun by a combination of fixed louvres and retractable external blinds.



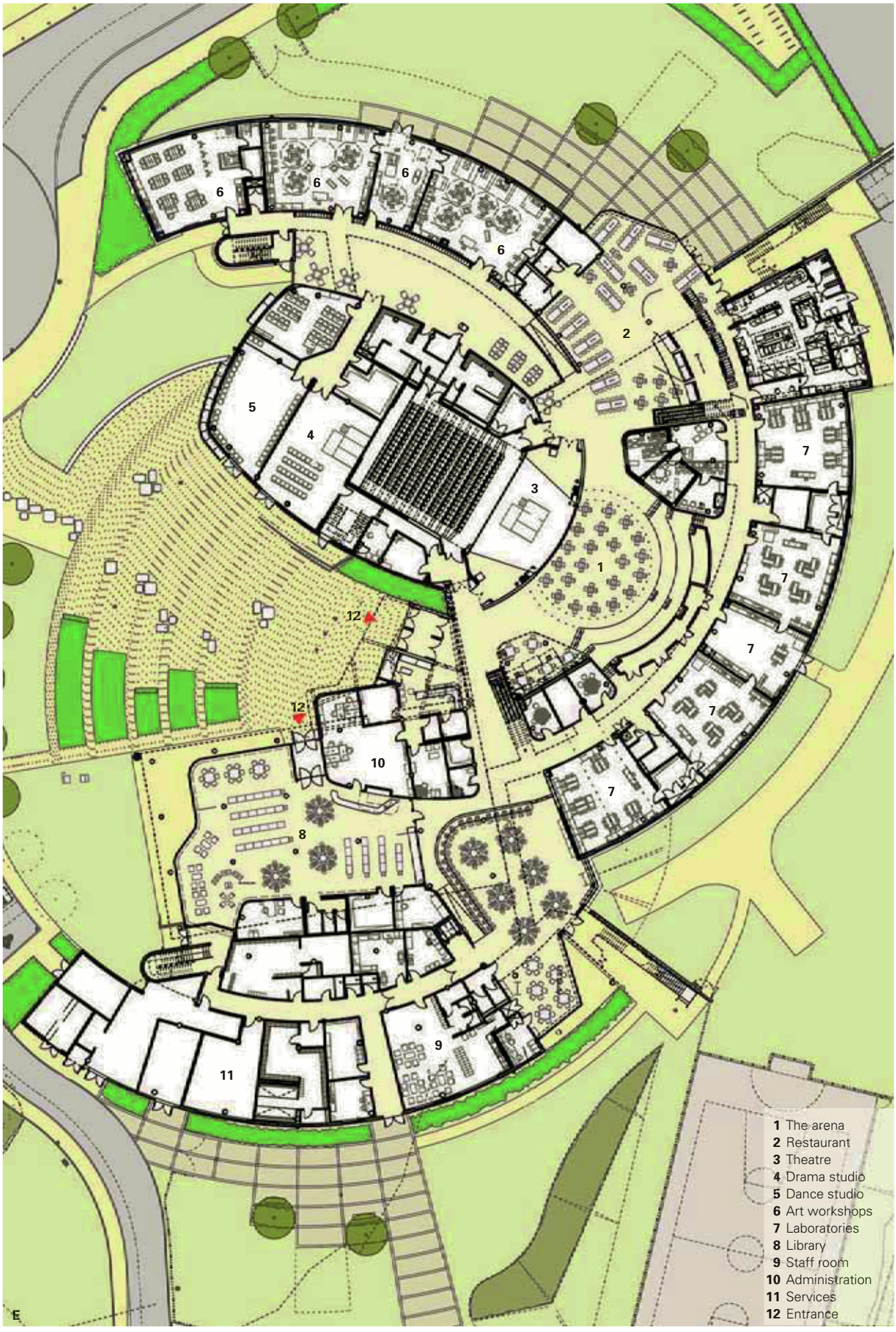
D

C: Skylights bring light into the central arena.

D: An open plan ICT resource on the first floor.

E: Site plan showing the ground floor configuration.

© OECD 2011


1 The arena
2 Restaurant
3 Theatre
4 Drama studio
5 Dance studio
6 Art workshops
7 Laboratories
8 Library
9 Staff room
10 Administration
11 Services
12 Entrance

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Park Hall Academy

LOCATION I **CASTLE BROMWICH, UNITED KINGDOM**



A

ARCHITECTS: **Nicholas Hare Architects**
CLIENT: **BAM PPP and Solihull Metropolitan Borough Council**
TYPE OF SCHOOL: **Lower and upper secondary**
NUMBER OF STUDENTS: **1 400**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **12 425m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **Town**

This new secondary school replaces a sprawling existing set of buildings with a more compact facility. Located at the vantage point of the sloping site, the new three-storey building has been oriented to minimise noise intrusion from the nearby motorway and to take advantage of the long views across the site and over the surrounding area.

Organised in a clear and compact way that allows for passive supervision of students, the building strongly contrasts with the

A: The double-height circulation space in the central spine of the school.

B: On each corridor in the teaching wings there is an open study area.

© OECD 2011

> *The new buildings have had a huge impact on learning, and we have seen student attainment improve at Park Hall. Over 80% of students now gain the nationally expected five A*–C grades at GCSE. The new school gives the community a twenty-first century facility.*
>
> **Tony Morrison**, *principal, Park Hall Academy*



B

fragmented nature of the previous school that was full of nooks and crannies. The building has been designed with careful consideration of the fundamentals: acoustics, ventilation, daylight and ICT. These elements – so vital for education and for creating sustainable buildings – are co-ordinated throughout the teaching and non-teaching spaces.

Layout

The basic plan comprises three teaching wings containing general classroom facilities and science laboratories. The design of the wings is deliberately generic, so that there is inherent flexibility. The frame structure and the arrangement of the windows will allow partitions to be relocated in the future. The configuration allows easy timetabling for varying group sizes on a day-to-day basis. There is a mix of classroom sizes, with an ICT-rich room on each floor as well as smaller rooms for group work. On each corridor there are faculty open areas to support personalised learning and breakout teaching.

© OECD 2011



C

The teaching wings are connected by a cranked spine that houses the more public areas and the specialist facilities for music, drama, art, and design and technology. At ground and first floor levels, the spine is hinged by three double-height spaces: the entrance hall, the assembly hall and the dining hall. Forming the heart of the building, these are a series of dramatic spaces, visually and physically linked to each other, to the external courtyards with their overhanging canopies, and to the landscape beyond. Bench radiators along the perimeter of the ground floor central spaces provide natural gathering spots.

Circulation

Care has been taken to design the pathways to avoid long, dark and disorientating routes. This is achieved by a variety of devices. At the heart of the school, circulation routes run through the large double-height entrance and café areas. In the teaching wings, corridors exploit views and receive daylight from the windows at their ends. These corridors also open up midway into light-filled harbours or faculty open areas. Internal windows between corridors and classrooms or staff spaces enhance the spatial quality of the corridors, as well enabling effective passive supervision. Lastly, and importantly, colour has been utilised to aid navigation as well as to enliven the spaces.

Regeneration

The new school presents a calm and welcoming face to the community. It contributes to the wider regeneration effort in North Solihull, the more disadvantaged part of a rather polarised borough. Community access is rationalised with clear lines of security. The sports hall, changing areas and external pitches can be separately accessed without giving access to the rest of the school and provide a valuable facility for the area. The school also makes the teaching areas, meeting rooms and ICT provision available for community use.

C: The new school commands good views over the surrounding area.

D: Ground floor plan.



D

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Collège de Wazemmes

LOCATION I **LILLE, FRANCE**

Built to replace two other schools that have subsequently been closed, this college is a model of sustainable development. It was the first college in France to receive HQE (*haute qualité environnementale*) certification. HQE is a French rating tool for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions.

ARCHITECTURAL FIRM: **Cabinet de Alzua Architecture**
CLIENT: **Departement du Nord**
TYPE OF SCHOOL: **Lower secondary**
NUMBER OF STUDENTS: **500**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **8 099m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **City**

Sustainable design

Several measures have been taken to reduce the college's energy usage and lower its environmental impact. The south-facing façades are shaded to stop the building becoming too hot in the summer. Rainwater is collected to supply toilets, and solar energy is used to produce hot water.

Green roofs have been installed on some parts of the college. These not only provide effective insulation, they also have an aesthetic value. The roof of the single-storey dining hall has a 70cm layer of top soil. This has been planted with shrubs, and when these mature, the roof

A: The central courtyard of the school.



A

© OECD 2011



B

will provide an attractive prospect from the upper floors of neighbouring buildings.

The construction of the school was used to provide a learning experience for future students. They were allowed to visit the site in groups and discuss the plans. All stakeholders in the college – students, teachers, parents – are encouraged to engage with environmental ideas and exploit the college's HQE features.

Harmonious development

One of the HQE criteria is that new buildings should have a harmonious relationship with their immediate environment. This has been achieved at the Collège de Wazemmes. The height and shape of the new college is in keeping with the surrounding residential buildings, many of which date back to the early twentieth century.

The front of the school retains the old character of the area. Rather than being demolished, the building that was formerly the Hôtel de Montigny has been renovated and extensively refurbished. It now provides offices for the school administration. Immediately adjacent to this building is the historic garden, which forms the main pedestrian access into the school.

College organisation

The new buildings are organised around the perimeter of the rest of the plot. A two-storey block behind the old hotel completes the rectangular structure and encloses a large recreation area. This is the heart of the college, a protected space for play and social interaction, reflecting the architects' vision of a convivial and cosmopolitan institution.

The façades of the new college buildings are enlivened by swathes of vivid colour and a range of textures and finishes. One of the concrete structures has been clad in wooden laths to create a tight lattice effect. The main teaching block that runs along the rue d'Esquermes is clad in stainless steel, punctuated by a series of brightly coloured protruding blades. This block reflects the colours of the street and provides a changing backdrop as its catches the sun.

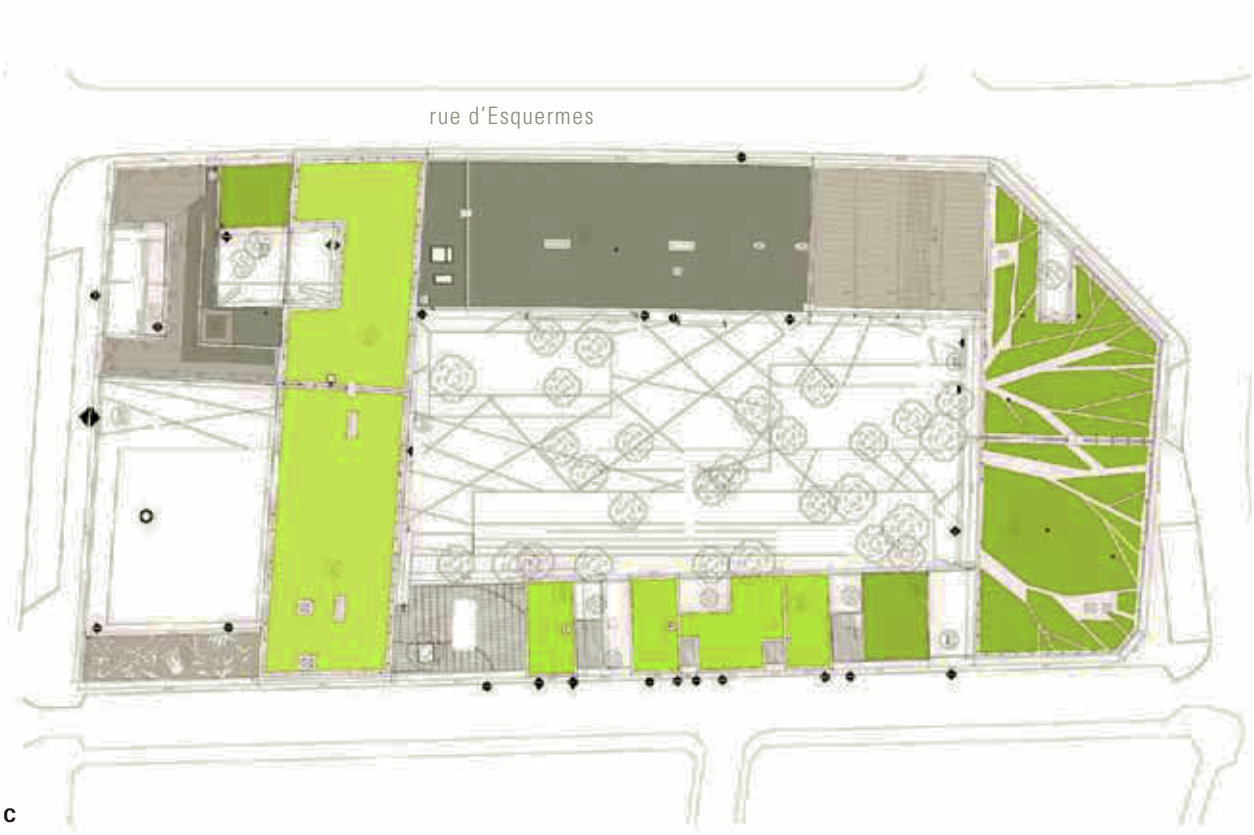
Inside the interior spaces are bright, with natural daylight in all classrooms. The school is designed to accommodate 600 students, and incorporates specialist facilities for science, art and technology as well as general education classrooms. There is a gym and a dining hall, which occupies the far end of the campus.

B: View over the recreation area towards the dining hall at the end of the college.

C: Site plan showing the roof configurations.

D: The entrance to the college with the former Hôtel de Montigny (left).

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C



D

© OECD 2011

Escola Secundária Passos Manuel

LOCATION | **LISBON, PORTUGAL**

ARCHITECTS:	**victor mestre	sofia aleixo, arquitectos**
CLIENT:	**Parque Escolar, EPE**
TYPE OF SCHOOL:	**Lower and upper secondary**
NUMBER OF STUDENTS:	**1 150**
TYPE OF PROJECT:	**Renovation and extension**
GROSS SURFACE AREA:	**16 400m²**
YEAR OF COMPLETION:	**2010**
CONTEXT:	**City**



A

> *The new features are very suitable for the school population, providing spaces and modern facilities that are excellent for students. The multipurpose pavilion is a beautiful and modern space. Students very much enjoy the renovated school as well as the outside spaces.*
>
> **Emília Cruz**, *assistant (operational), Escola Secundária Passos Manuel*

This school has historical significance in both an educational and an architectural context. Situated in the historic centre of Lisbon, it was the first lyceum to be built in Portugal in the context of a broad educational reform promoted by Passos Manuel in 1836.

Inaugurated in 1910, the compact school was modelled on a typical French lycée of the time. It has two enclosed courtyards reminiscent of old monastic colleges. It displays several period and relatively recently introduced architectural features, such as metal structures, steel beams, cast iron columns and concrete floors.

Renovation work

Over its 100 year history the school has remained largely unchanged, accommodating all the changes in educational practice that took place in the twentieth century. Now a listed building, the task facing the team renovating the school was to introduce twenty-first century learning environments while preserving the architectural heritage. They also had a further challenge: the renovation was to take place while the school was in use.

The main building was reorganised during a series of discrete interventions. Rather than removing the old elements, an effort was made to restore, renovate and structurally reinforce them. New infrastructure and IT networks were integrated into the structure using non-intrusive methods.

Work was undertaken to ensure that the building complied with current environmental quality and energy efficiency standards. This included introducing new renewable energy sources (solar and photovoltaic panels) to ensure thermal and acoustic comfort and energy self-sufficiency. The renovated school now fully complies with recent legislation for buildings regarding thermal performance, energy and acclimatisation systems, and noise and energy performance.

New extensions

It was not possible to meet all the needs of a modern school within the physical constraints imposed by the old one. Some facilities had space or technological requirements that could not be accommodated without substantial modifications. These facilities were therefore relocated to strategic parts of the site in order to limit their impact on the existing school and more space was created by excavating under and beside the historic building.

A: The front elevation of the school.

B: A refurbished classroom.

C: One of the auditoria.

D: The new canteen and outdoor eating area is an unobtrusive addition to the school.

E: The sports pavilion: underneath the outdoor sports court there are two gyms.

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B

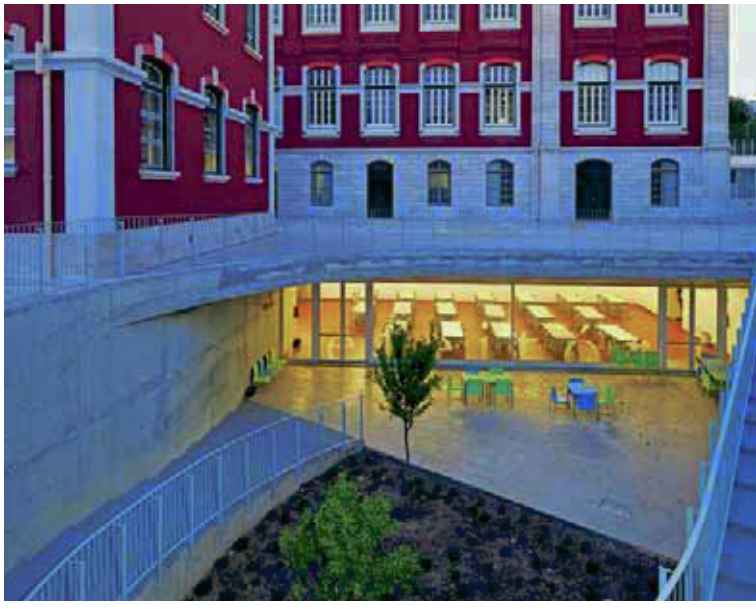


C

New laboratories and a canteen have been created in the basement levels. The canteen opens out onto a new patio at the southern end of the school. This is at a lower level than the surrounding ground, and therefore does not visually intrude on the historic façades. The sports facilities have been substantially enhanced as two gymnasiums have been built below the level of what used to be the playing field. A new outdoor sports court has been installed on the roof of this new structure.

The school now has the facilities to support a modern curriculum, with laboratories for experimental science classes, ICT rooms, workshops, rooms for the fine and performing arts and general classrooms. There are also two auditoria for lectures and performances. Social areas for students and teachers as well as the canteen provide multipurpose spaces where informal learning can take place.

Although the historic laboratories and library have been fully restored to preserve evidence of the school's educational heritage, a new resource centre has been built. It is fully equipped with areas for study and for consulting information and space for exhibiting school collections.

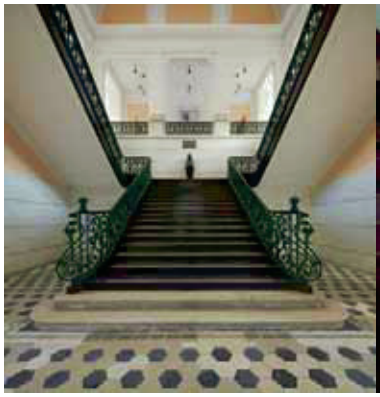


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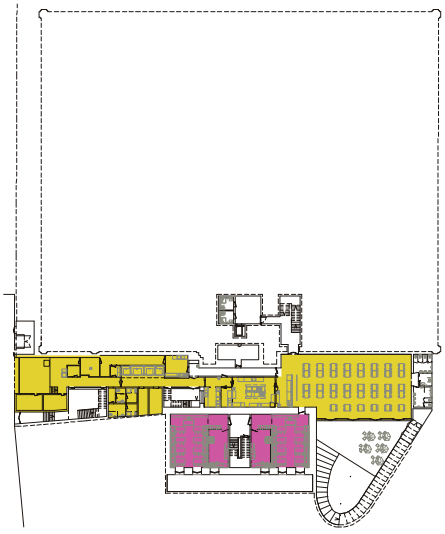
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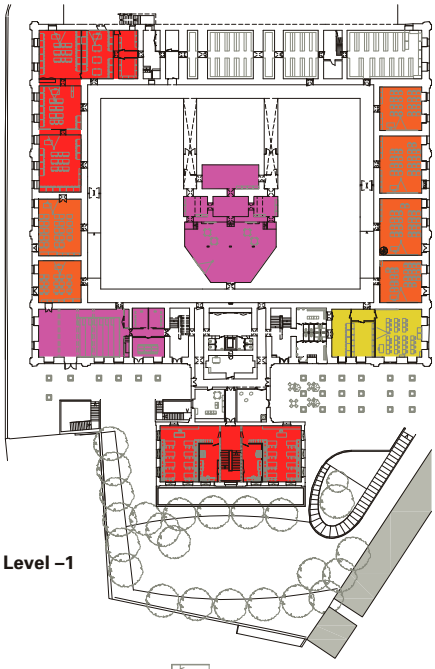
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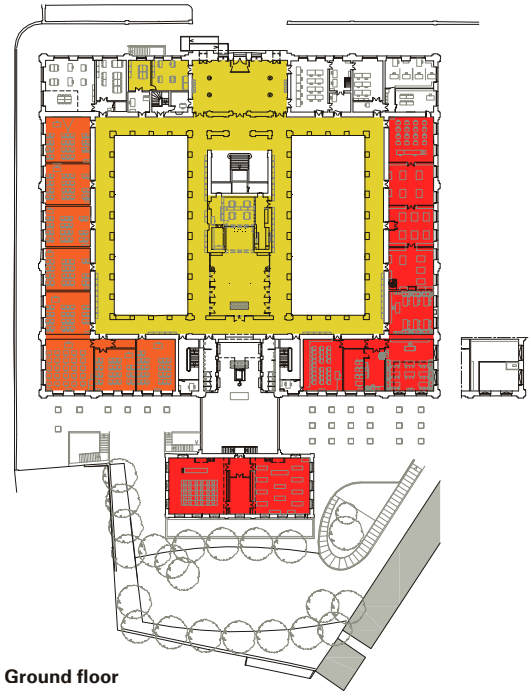


New level –2

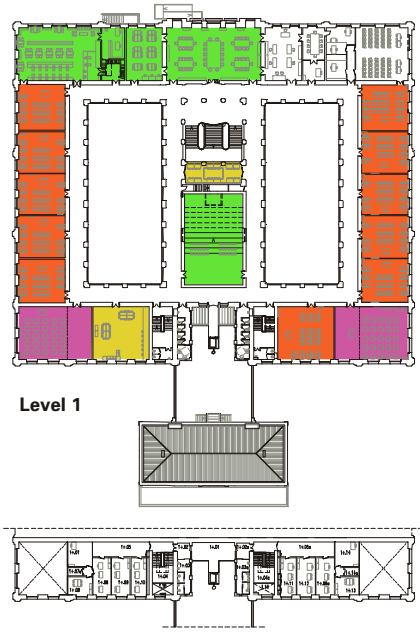


Level –1

- Restaurant and social areas
- Classrooms
- Science and technology labs
- Art classrooms
- Library, learning resource centre and auditorium



Ground floor



Level 1

New intermediate level 1+

H

F: The historic building has been carefully restored.

G: The school has a new learning resource centre but has preserved its original library.

H: Furniture and floor plans.

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The Lilley Centre, Brisbane Grammar School

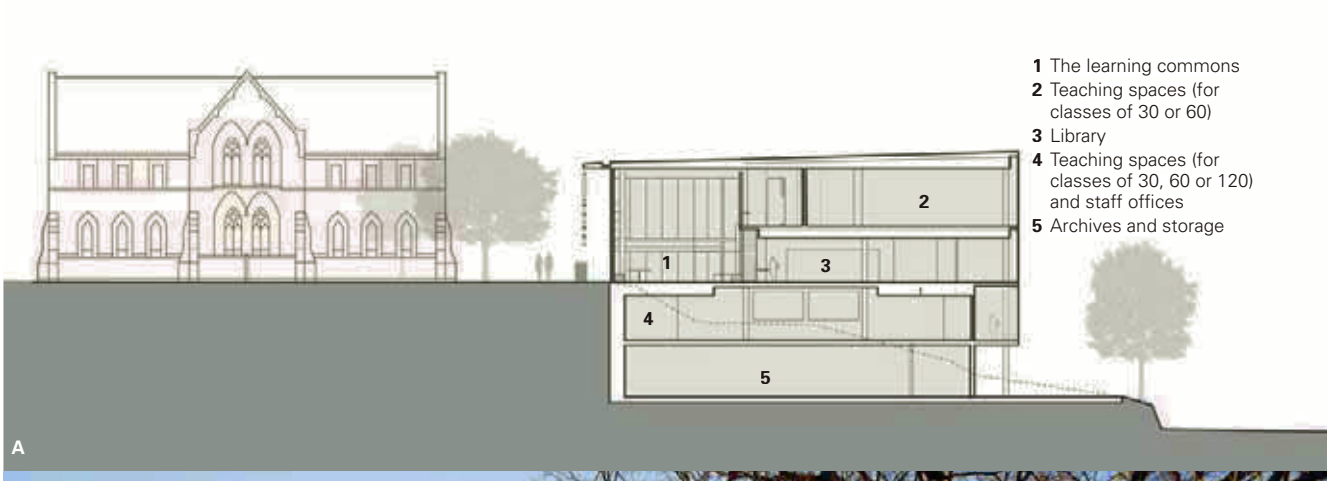
LOCATION I **BRISBANE, AUSTRALIA**

The Lilley Centre is the hub of Brisbane Grammar School's academic infrastructure, incorporating the library and an information technology centre, as well as counselling, advisory and professional development services in a learner-centred environment. It has many flexible and technologically enhanced learning spaces, providing learners with immediate access to knowledge and information in multiple formats and combinations.

ARCHITECTS: **Wilson Architects**
CLIENT: **Brisbane Grammar School**
TYPE OF SCHOOL: **Lower and upper secondary**
NUMBER OF STUDENTS: **1 417 (whole school)**
TYPE OF PROJECT: **New building on existing campus**
GROSS SURFACE AREA: **6 200m² (The Lilley Centre)**
YEAR OF COMPLETION: **2010**
CONTEXT: **Large city**

A: Section looking east.

B: Positioned between two solid flanking walls, the mirrored wall reflects the image of the Great Hall.



A

1 The learning commons
2 Teaching spaces (for classes of 30 or 60)
3 Library
4 Teaching spaces (for classes of 30, 60 or 120) and staff offices
5 Archives and storage



B

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C

Architectural features

The building is sited so as to link, spatially and visually, the traditional gothic architecture of the school to the urban streetscape of central Brisbane. Materials have been selected for their quality and longevity, and tailored for their particular solar orientation or historic context. Brickwork tempers the scale and mass, stitching the various elements back to the Great Hall. The use of zinc cladding references back to the slate roofs. Different types of glass are used to modulate the level of transparency, which is determined by adjacent alignments. A mirror is used as a cinematic set piece, reframing and reflecting the image of the Great Hall. The mirror appears to be held in space between two solid flanking walls and it is positioned for maximum theatrical effect.

Learning spaces

All areas in the centre are designed to support learning. Spaces, furniture and technology have been tailored to suit specific learning modalities, including didactic, active, discursive and reflective modes. Teacher-led spaces have been organised to accommodate multiples of



E

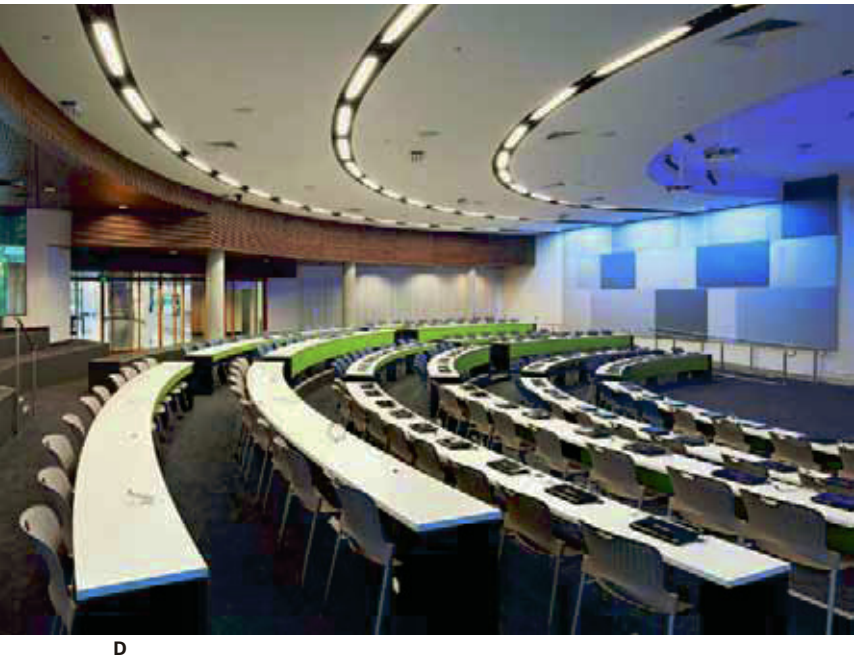
C: Furniture is arranged for groups of six students. The spaces can be partitioned for different class sizes.

D: Modelled on a traditional lecture theatre, the forum is also designed to allow students to work in groups and discuss outcomes.

E: The learning commons.

F: Ground floor plan.

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D

a standard class cohort. Informal study areas allow students to move seamlessly from structured to unstructured learning.

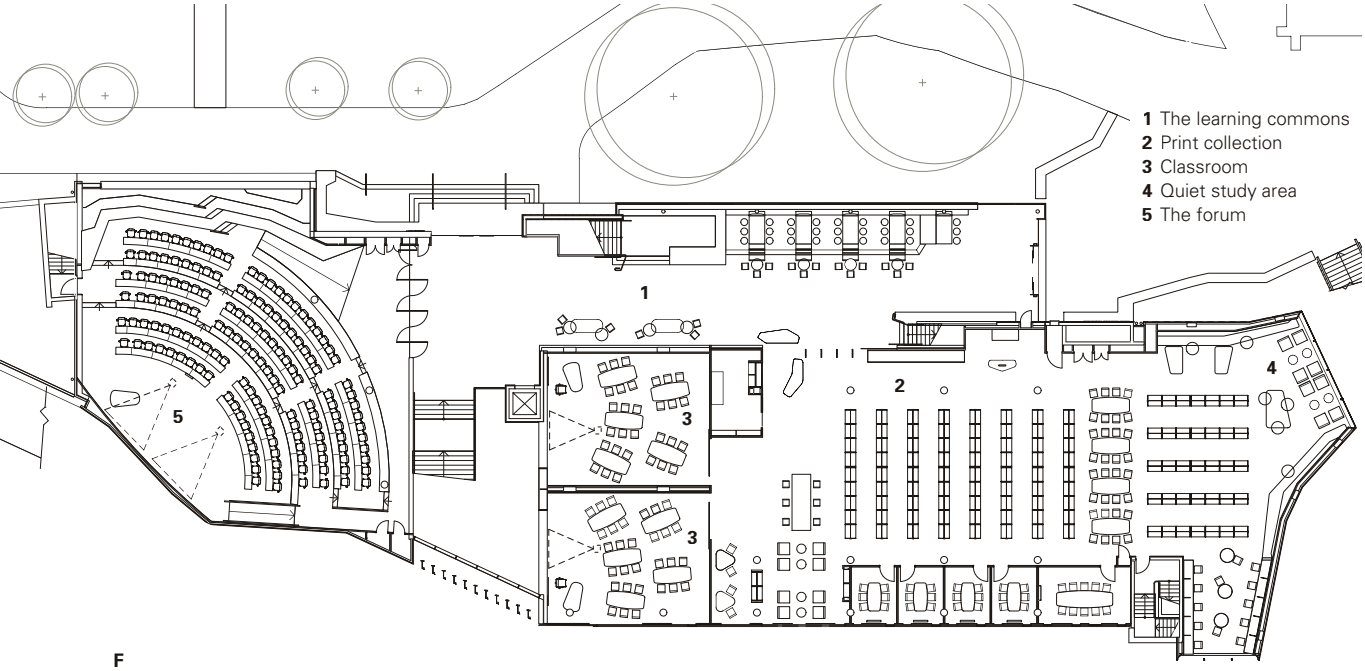
The forum can accommodate a group of 150, and provides informal seating for a further 80 students. Each tier supports two rows of students. It is designed to allow students to break into and work in small groups and then discuss their findings as a whole group. Tablet computers for each student are addressable, and the teacher can pull up their work and share it with the whole 150-student cohort.

The learning commons is a two-storey space at the confluence of all circulation. It spatially organises the building, and was conceived as an extension to the historic Boarders' Lawn. Students are encouraged to work collaboratively in groups, using furniture and technology tailored to replicate and extend classroom learning.

Diversity of study behaviour is encouraged. Noisy active spaces are grouped around and near circulation areas and quiet reflective study is supported at either end of the book collections. In the quiet areas students enjoy views of the Great Hall and are reminded of the school's heritage.

Other spaces in the centre allow teachers and students to switch easily between learning modes. The furniture and technology supports a base cohort of six students, and rooms can be partitioned to accommodate classes of 30, 60 and 120 students.

The centre is proving popular with teachers and students. It is being used for team teaching, with up to four classes being taught by a single teacher in the flexible learning spaces and up to five classes in the forum. The other teachers can view a colleague's pedagogy and offer informal support to students. The transparency of the informal spaces in the library and the learning commons has resulted in engaged learning. As one student noted, "it is a place where you feel like you want to work".



F

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Victorian College of the Arts Secondary School

LOCATION | **MELBOURNE, AUSTRALIA**



A

ARCHITECTS: **Williams Boag architects**
CLIENT: **Department of Education and Early Childhood Development**
TYPE OF SCHOOL: **Lower and upper secondary**
NUMBER OF STUDENTS: **324**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **5221m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **Large city**

With its specialist music and dance facilities, the Victorian College of the Arts Secondary School is one of the most unusual educational buildings in Australia. The facility operates at two levels: as a government secondary school delivering a generalist curriculum and as a specialist performing arts academy. The design marries these two aspects in a facility which embodies all the flair of the creative arts yet works as an academic secondary college.

Design challenges

Located in Melbourne's lively arts precinct, the site presented significant design and construction challenges. Confined to an area of just 3500m², the location is affected by traffic noise and pollution as well as adverse ground conditions deriving from a legacy of river silts. To deal with noise and vibration, the building has robust foundations and pre-cast concrete cladding complemented by sealed double-glazed windows. All air-handling units are fitted with filters to assure internal air quality.

Natural daylight was also an issue due to site constraints, as windows could not be placed along two sides of the building. This problem was solved by installing highlight windows above the dance and recital studios, and by the extensive use of internal glazing to channel natural light deep within the building. Windows have been sized to achieve a balance between maximising daylight and minimising noise. Where noise is not an issue, large picture windows allow views of the city skyline.

School organisation

The majority of spaces within the school have been designed around a central corridor that rises over two levels and is lit from above by a series of skylights. This provides a central focus and helps orientation to all parts of the building. Specialist teaching and performance spaces are located adjacent to circulation

A: Façade and front entrance.

B: The large dance studio and performance space.

C: Skylights bring light into the internal corridors.

© OECD 2011



B

areas and provided with appropriate glazing. This is intended to promote the connection between the school's specialist curriculum and its general teaching activities. This holistic theme is continued through into the learning commons, library, general purpose classrooms and other studio spaces.

The school's specialist facilities provide students with the teaching and rehearsal environments essential to the pursuit of performance careers. These include four dance and two recital studios, and a large suite of acoustically designed music practice and ensemble rooms. The main dance and recital studios double up as public performance spaces and incorporate fixed-tiered seating for 205 and 130 people respectively. The school also has multipurpose classrooms, ICT laboratories, science rooms, seminar spaces and other amenities supportive of a generalist secondary education. There is a well-resourced library and reading area as well as a canteen and kitchen.

The school enables specialist staff to pursue teaching strategies consistent with the requirements of their profession as



C

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D

1 Foyer cafe
2 Small recital space
3 Large recital space
4 Dance studio
5 Drama
6 Ensemble percussion
7 Practice room
8 Ensemble brass
9 Harp room
10 Ensemble improv
11 Music tech
12 Staff office
13 Staff workspace
14 Staff lounge
15 Conference room
16 Reception

both teachers and arts practitioners. The integrated provision of flexible learning spaces supports ongoing curriculum development and enhanced learning outcomes. This shift from traditional classroom environments and pedagogy is in keeping with the school's specialist nature and provides opportunities for interactive and collaborative learning.

The building has been designed to enable the community to make use of various specialist teaching and performance spaces. The establishment of a "hire zone" permits the bulk of the school to remain securely locked down after school hours while primary performance spaces and dance studios are available to external groups.

D: Ground floor plan.

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Hilde-Domin-Schule

LOCATION I **HERRENBURG, GERMANY**

ARCHITECTS: **Behnisch Architekten (Stefan Behnisch, David Cook and Martin Hass)**
CLIENT: **Landratsamt Böblingen**
TYPE OF SCHOOL: **Vocational college**
NUMBER OF STUDENTS: **150 (in the annex)**
TYPE OF PROJECT: **Extension to existing campus**
GROSS SURFACE AREA: **1 200m² (new extension)**
YEAR OF COMPLETION: **2007**
CONTEXT: **Small town**

Hilde-Domin-Schule is a vocational college in Baden-Württemberg, south-west Germany, that specialises in nursing and health care, agriculture, home economics and nutrition, and teacher education.

The original school complex was designed by Behnisch & Partner in 1983. Behnisch Architekten was commissioned to design a new annex to allow the school to expand.



A: A view through the lobby to the covered recreation area.

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B

Designed to be independently accessible and to function autonomously, the new building comprises workshops, classrooms, small group rooms, offices for staff and the students' council, a first aid room, a small assembly hall and a room for meetings with parents.

Situation

The annex is sited immediately to the south of the main college building. The new structure respects the style and character of the existing building without simply copying or imitating the original architecture. The proximity to the original building creates a series of differentiated interstitial spaces. Subtle landscaping has brought the two structures together.

Through the main entrance, visitors enter a generously glazed lobby. This gives beautiful views across meadows and orchards. From the lobby, students can access a recreation yard sheltered by the projecting edge of the roof. The lobby separates the assembly hall from the classrooms, allowing the hall to be easily used for events outside school hours by the local community. The hall is oriented towards a small biotope.

Architectural features

The extension is meant to be identifiable as an annex to the existing building. It is smaller and not as high as the neighbouring building, but it displays the same qualities of openness and flexibility. The beautiful surroundings foster respect for nature and the environment.

It is primarily a timber structure. The timber-clad façade is constructed from locally sourced larch, a reference to nature and a practical choice given that the wood was to be left untreated and larch weathers well. With its projecting horizontal forms, the building appears to almost hover above the ground.

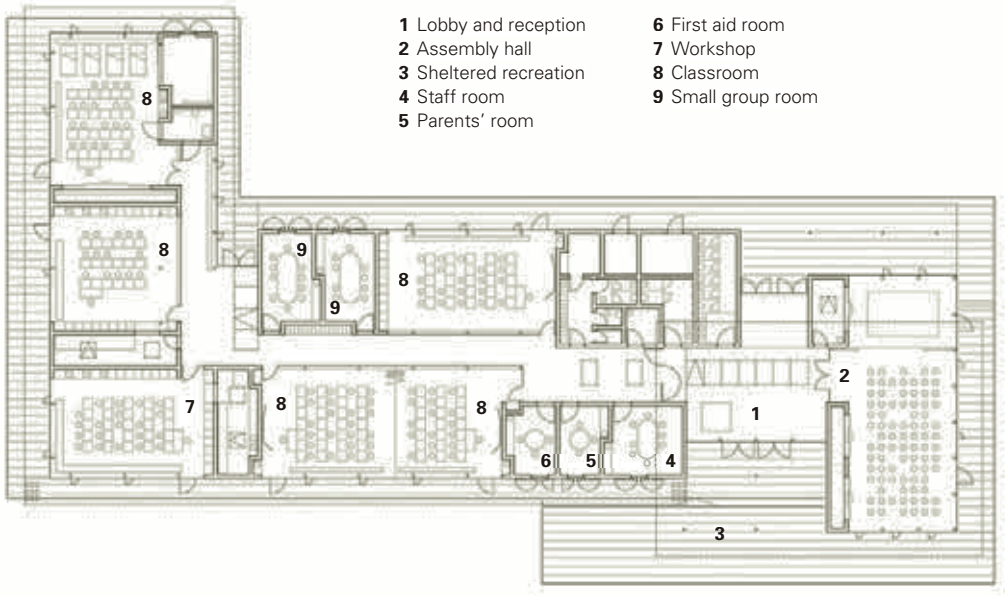
The interior is characterised by open forms in the classrooms and workshops. Both the façade and the corridor are extensively glazed, creating airy, open perspectives. This allows almost permanent visual contact with other

B: The new annex is unobtrusively situated in the rural landscape.

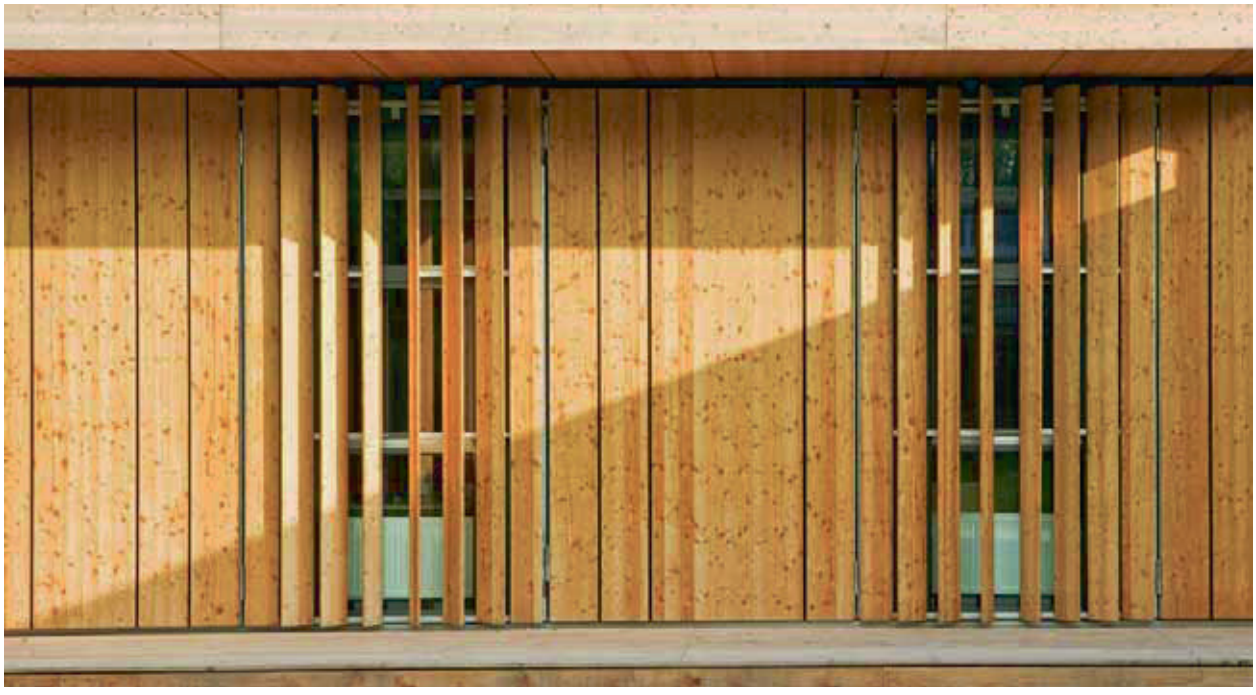
C: Floor plan.

D: Timber lamellas cladding the façade.

© OECD 2011



C



D

parts of the school and creates a space largely free of constraints. Green linoleum floor coverings in the corridors accentuate the rural character of the building, while the workshops have parquet flooring.

Learning environment

The way the annex is organised, and its unobtrusive shape with distinctive overhanging eaves, are architectural expressions of a desire to provide shelter and to create a homely and familiar atmosphere. The materials and furnishings give students the impression that it matters to the community where they spend their time.

All of this contributes to a friendly learning and working atmosphere, which supports communication and builds confidence in learners. As the school's former director wrote in 2007: "The annex fulfils its basic requirement, that users must feel good. In my experience, this not only has a positive influence on working attitudes, but also encourages users to be much more careful with the building itself."

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Albany Senior High School

LOCATION I **AUCKLAND, NEW ZEALAND**

ARCHITECTS: **Jasmax Ltd (Roy Blok)**
CLIENT: **Northern Regional Office, Ministry of Education**
TYPE OF SCHOOL: **Upper secondary**
NUMBER OF STUDENTS: **203**
TYPE OF PROJECT: **New temporary school**
GROSS SURFACE AREA: **2 500m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **Large city**



A

> *[The aim is] to be a twenty-first century school typified by teamwork, collaboration, exchange of ideas, and the breaking down of separate silos of knowledge. Even in its temporary building, the school is already living this vision, [and] we could not have done that without the spaces provided by the architectural design.*

Barbara Cavanagh, *principal, Albany Senior High School*



B

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1 Administration
2 Resource centre and staff lounge
3 Gymnasium
4 Music
5 Science
6 Soft technology
7 Workshop
8 Hard technology
9 Learning commons
10 Food technology
11 Art
12 Library
13 Concourse

C

The project featured here is the temporary school that provided accommodation while a permanent senior high school was being planned and built on a nearby site. Although this building was only a one-year stopgap, it provided the school with a facility that allowed it to deliver its educational vision and embodied its ethos and values.

Albany Senior High School is New Zealand's first purpose-built state school for upper secondary education. Located in northern Auckland, its design is based on the design principles established in the temporary school.

The brief

Central to the school's vision was the idea of student-centred learning that could be supported and delivered by interdisciplinary teaching teams. Learning and teaching should be public activities and not be shut away in closed spaces. Teachers should be learners too, and this should be visible to the students. Teachers should be able to work in front of other members of staff, supported by, and accountable to, their colleagues.

The design brief, therefore, was for an open facility where learning could happen everywhere. The challenge was to design temporary facilities at modest cost in which the school's ambitious vision could be realised.



D

Learning commons

To support a learning community, it was decided to build the school around learning commons. These are large open-plan spaces that can accommodate up to five classes of students.

Each learning commons comprises a large teaching space (360m^2), together with smaller more self-contained spaces for group work and individual study and a room for students to watch video presentations.

A: The entrance, which leads into the concourse.

B: The concourse links every teaching and learning space in the school.

C: Floor plan of the temporary school.

D: Teachers work in teams in the open-plan learning commons.

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E

A learning commons has space for seven or eight teachers, and can support a variety of pedagogical approaches. Furniture can be easily moved around. It is a technology-rich environment, with many workstations and wireless access for students' laptops.

The two learning commons in the temporary school run along the length of a wide and open central concourse (or "learning street"). This core teaching space is supplemented by specially equipped rooms for science, art, technology and music. There is also a resource centre, gymnasium and open-plan office for the principal and school administration, all linked to the concourse.

Outcomes

The low-cost relocatable temporary facility has proved to work extremely well. The mix of very large open teaching spaces with attached break-out rooms for group work and the concourse, plus copious computer access, has helped to foster the enquiry-based learning community the school wanted for its students.

Learning did take place everywhere and could be seen in action. Teachers collaborated in mixed teams of mathematics, science and English specialists and became supportive of each other as well as the students, setting up their teaching station with a group of students wherever it was needed.

The success of this prototype for supporting the vision of a community of self-managing, adult-style learners confirmed the design of the permanent school. All the main features of the temporary facility have been incorporated in the new permanent school, which opened in 2010. Accommodating 1500 students, this school has been built around 10 learning commons developed from the template established and tested in the temporary school.

E: The science room has a central area for practical work and demonstrations.

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Incheon International High School

LOCATION I **INCHEON, KOREA**



A

This new international high school is part of a larger educational complex on Yeongjong Island off the west coast of the city of Incheon. It complements the existing science high school and science institute on the site.

The international high school is a residential institution. At full capacity, the school will provide education for 600 students. There is dormitory accommodation for over 400 students on the site.

Site layout

The school campus is located on an undulating site surrounded by woodland. The buildings have been sited to harmonise with the natural environment and to cluster teaching, residential and sports facilities in separate zones.

The teaching block, the dormitory and the gym are arranged in a L-shaped formation around two sides of the site perimeter. These buildings enclose a football pitch and a basketball court.

ARCHITECTS: **Sun Architects & Engineers (Lee Yong Sun)**
CLIENT: **Incheon Metropolitan Office of Education**
TYPE OF SCHOOL: **Upper secondary**
NUMBER OF STUDENTS: **200**
TYPE OF PROJECT: **New school**
GROSS SURFACE AREA: **5 495m²**
YEAR OF COMPLETION: **2007**
CONTEXT: **City**

Throughout the campus, promenades provide easy access between the various facilities on site and offer spaces for relaxation. A "green axis" runs through the campus, providing a pedestrian route. It starts in a small area of woodland at the upper end of the site, goes through a patio containing an open-air circular theatre and finishes in a courtyard between the teaching block and the gym. Vehicle access is by a service road that runs beneath the wings of the teaching block and round to a parking lot and the dormitory accommodation.

A: The dormitory block.

© OECD 2011



B



C

© OECD 2011



D

Overall there is a sense of openness on this campus. There are good views across the site, and effective use has been made of the natural contours to create a variety of well-defined spaces. Clear circulation routes exist between and within the blocks, and there is a sensible arrangement of relaxation areas such as the cafeteria and gymnasium.

Facilities

All teaching facilities are housed in a six-storey block, comprising a central spine and three wings. These buildings have been carefully planned to maximise natural light and ventilation. Most teaching rooms face south. There is sufficient distance between each wing to ensure the privacy of each classroom.

The building is capable of supporting a variety of learning styles and modern educational technology. There is an integrated configuration of regular classrooms, study rooms, a multimedia room and teacher workrooms.

The space is well suited to the delivery of the government's new (seventh) curriculum.

As well as 15 general classrooms, there are two science laboratories, two classrooms and subject rooms for music, art, dancing, home economics, mathematics, and Chinese and Japanese languages. Other facilities include a library, computer laboratory, broadcasting room, conference room and accommodation for the student council and for club activities.

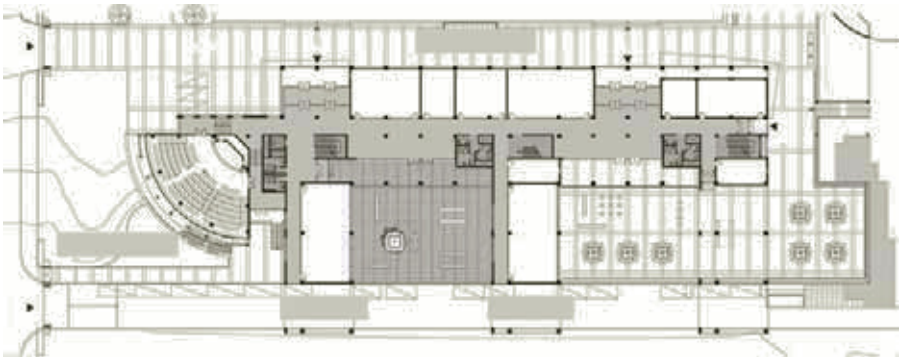
The dormitory block is also oriented to maximise natural lighting and ventilation. It is built around a central courtyard, and the contours of this part of the site are used to segregate the male and female accommodation. Each student bedroom is for four people, and there are 44 rooms in the male block and 60 rooms in the female block. There are also 10 apartments for teachers. Common facilities, such as laundry rooms, are housed in the centre of the block.

B: A service road runs under the three wings of the teaching block.

C: Open promenades surround the teaching block.

D: The teaching block viewed from the south.

E: Ground floor plan of the teaching block.



E

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A



B

Schulanlage Falletsche

LOCATION I **ZÜRICH, SWITZERLAND**

This new educational complex forms part of Schule Falletsche-Leimbach. It is located in Leimbach to the south of Zurich, surrounded by detached houses, low-rise residential buildings and extensive swathes of woodland.

Great care has been taken to integrate the new buildings into these surroundings. The architectural language respects the nearby built environment and the landscape. It harmonises well with the existing school infrastructure: a 1900 schoolhouse and two rows of buildings designed in the 1950s and 1960s. The dimensions and proportions of the new construction are adapted to the adjoining buildings and the site. The materials used are context-sensitive.

ARCHITECT: **Rolf Mühlethaler**
CLIENT: **Immobilien-Bewirtschaftung, Stadt Zürich and Amt für Hochbauten, Stadt Zürich**
TYPE OF SCHOOL: **Upper secondary**
NUMBER OF STUDENTS: **166 (upper school only)**
TYPE OF PROJECT: **New buildings on existing campus**
GROSS SURFACE AREA: **5 861m²**
YEAR OF COMPLETION: **2006**
CONTEXT: **City**

Architectural features

The shape of the complex has developed out of the hillside topography of the site. A large base construction containing a sports hall, media lounge and auditorium has been embedded into the terrain. A classroom block rises above

A: A corridor in the classroom block with its characteristic red flooring.

B: Longitudinal section.

C: The east façade.



C

© OECD 2011



D

D: Large sliding doors can open out the classrooms to the circulation area.

E: The concrete walls and angular design references 1960s architectural styles.

this base, anchoring the facility firmly in the urban setting and the topography of the town. This shape of the block is irregular: its structure is determined by the boundaries of the site, giving it a slight kink. As a consequence, the internal spaces are non-conventional.

The levels have different widths, creating a cascade effect. The polygonal geometry of the terraces on the different levels and the shapes described by the pathways running through the site are strongly inspired by 1960s architecture. This determined not only their shape, but also their materialisation through the extensive use of concrete. The building volumes break and turn to create dynamic spaces and vivid spatial transitions.

The existing and new buildings are characterised by transparency and openness, and have a clear and uncluttered feel. All spaces are visible both day and night, and this creates a sense of security. This is enhanced by the fact that the whole area is well illuminated at night.

Spatial organisation

The design inside the building is intended to inspire both users and visitors. The interiors are light, with brightly-coloured red linoleum floors and simple concrete finishes on the walls. Each room has its own identity. The internal spatial organisation is flexible and can be adapted to different uses, including whole-class teaching, group working, and leisure and social activities.

Wide sliding glass doors separate the classrooms from the corridors and the courtyard. They allow the classrooms to expand into the corridors and the courtyard,



E

dissolving the borders between inside and outside. An innovative concept for the fire escape allows the circulation areas to be used as working and meeting zones.

School resources

There are nine classrooms in the new complex, three group rooms, technical training suites (*Fachunterrichtszimmer*), multipurpose rooms (*Mehrzweckraum*), an auditorium, a library, a meeting room and a staff room. There is a double gym with room for training equipment and five dressing rooms, together with outside sport courts. The library, youth centre, outside spaces, auditorium and gym can be used by local residents.

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Escola Artística de Soares dos Reis

LOCATION I **PORTO, PORTUGAL**

Soares dos Reis is a secondary school specialising in the arts and technical education. It offers training in diverse fields including jewellery, fashion and textiles, ceramics, product design, graphic design, photography, video and fashion design. Before moving to its current campus, the former premises of the Oliveira Martins secondary school, the existing buildings were extensively refurbished and new buildings were added, creating a modern facility.

ARCHITECTS: **Carlos Prata with Nuno Barbosa**
CLIENT: **Parque Escolar EPE**
TYPE OF SCHOOL: **Upper secondary**
NUMBER OF STUDENTS: **970**
TYPE OF PROJECT: **Renovation and extension**
GROSS SURFACE AREA: **14 385m²**
YEAR OF COMPLETION: **2008**
CONTEXT: **Large city**



A: A courtyard enclosed by the refurbished teaching block and one of the newly built extensions.

All of the work was carried out under the school building modernisation programme launched by the Portuguese government in 2007. Soares dos Reis was one of four institutions selected for the pilot phase, which was designed to fine-tune the intervention strategies and to create buildings that would serve as exemplars for other schools being remodelled under the programme.

Key interventions

The former school was built in the 1960s, and consisted of a classroom and administrative block linked by an external walkway to a second block housing the gym, canteen and assembly hall. The space between these two volumes has been used to add two new buildings, which house teaching rooms and workshops, the library, a multipurpose room and the cafeteria.

The new buildings and the refurbished premises have been linked by an internal circulation route. Its design is based on the "learning street" concept, and connects all areas of the school to the main entrance. It allows parts of the institution to be accessed by the public outside normal school hours. An extension has been added to the entrance, creating a covered outdoor area at the front of the school.

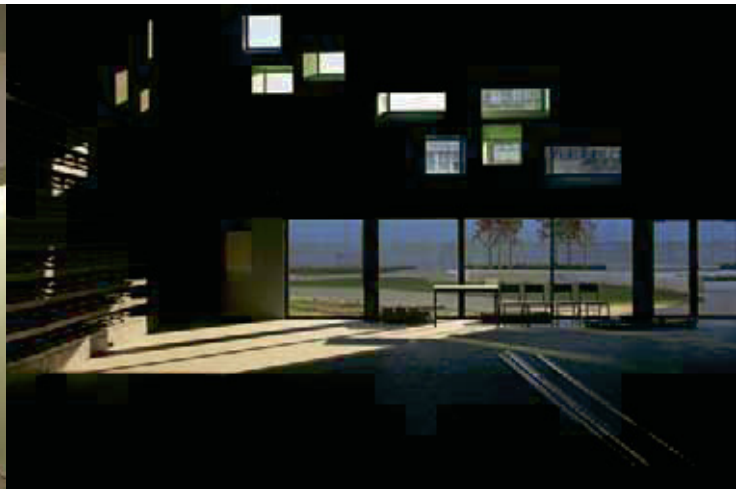
Spatial layout

The school now has all the facilities needed to deliver the curriculum, and its spatial layout is well organised. The reception area, the school offices and facilities such as the cafeteria, auditorium, library and sports hall which are open after school hours are situated to allow

© OECD 2011



B



C

convenient access for all users. The teaching and learning areas are located deeper within the school. Offices for staff are interspersed among the classrooms and studios. This means that although learning and non-learning areas are interconnected, they are organised with functional autonomy.

Formal learning spaces include both general-purpose classrooms and specialist facilities, including science and multimedia laboratories, workshops, art studios and ICT rooms. These spaces can be easily adapted to the different types of pedagogical practice. As the school provides some of the regular upper secondary curriculum, workshops and classrooms have been located close together. The studios and workshops are situated near classrooms, making it easy for students and teachers to meet to discuss projects and review work.

Informal learning is encouraged throughout the building, and the school ethos is that education should not be confined to the classroom. The indoor and outdoor social and recreational spaces support informal encounters, the sharing of ideas and extracurricular activities.

The circulation spaces are wide, and every room is acclimatised and soundproof. The school has wireless broadband access throughout. Access roads for suppliers enable deliveries to be made without disturbing classes or going through the corridors. The materials used for interior finishings are washable, so the school looks always clean.

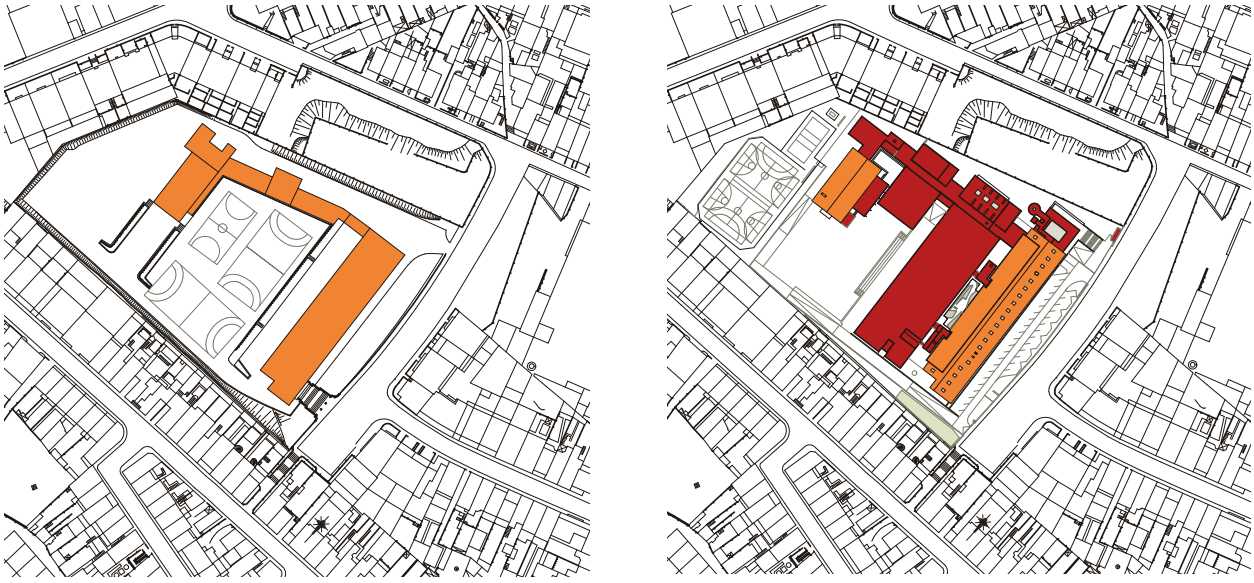
B: The main corridor (or "learning street") linking all the elements of the school.

C: One of the new buildings houses the auditorium.

D: Location plans, before (left) and after (right). The new build is shown in red.

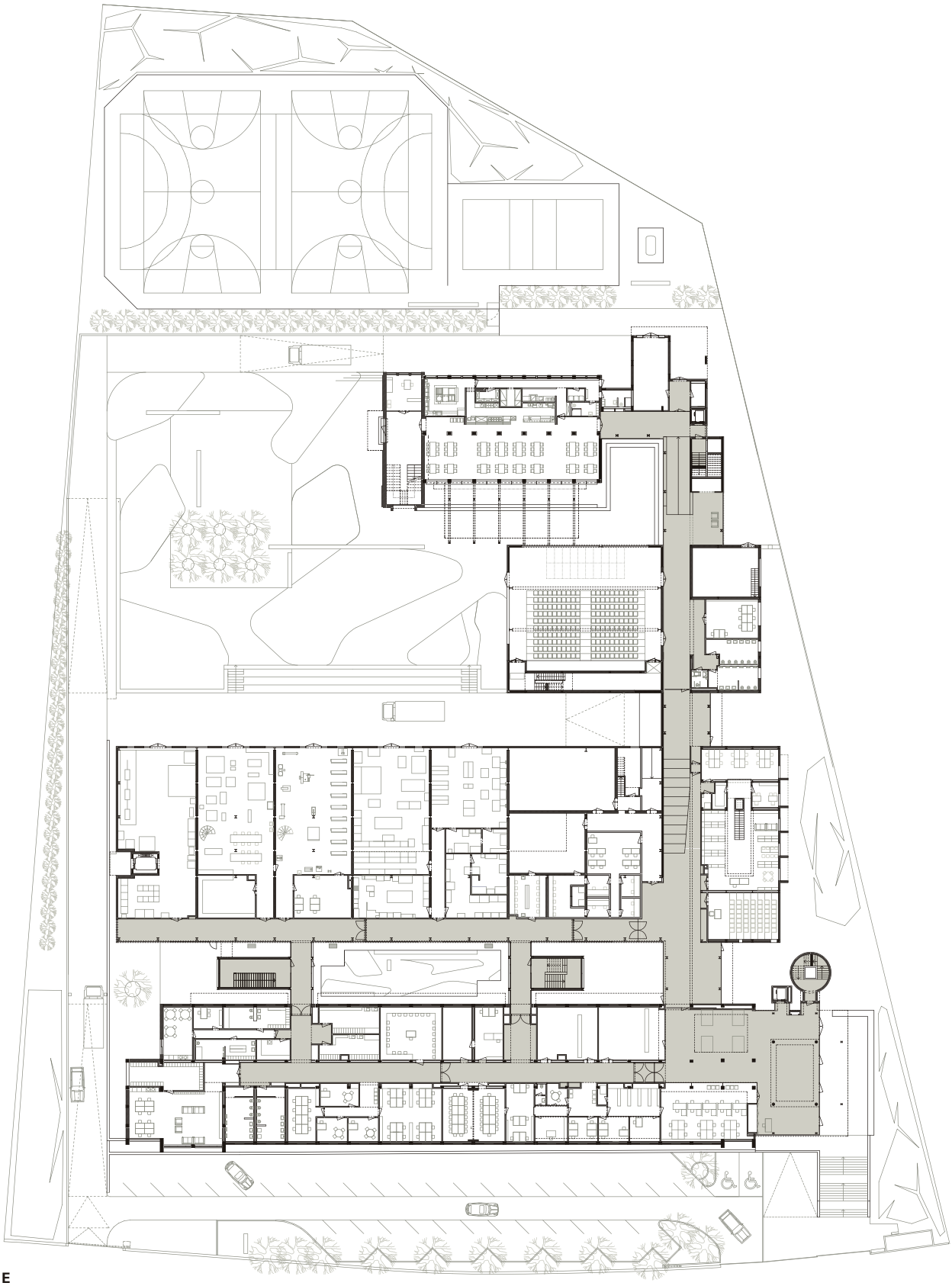
E: Ground floor plan.

F: The atrium.



D

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E

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F

Chapter 10: **Tertiary level**


222 Cork Institute of Technology
Ireland


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Cork Institute of Technology

LOCATION I **CORK, IRELAND**

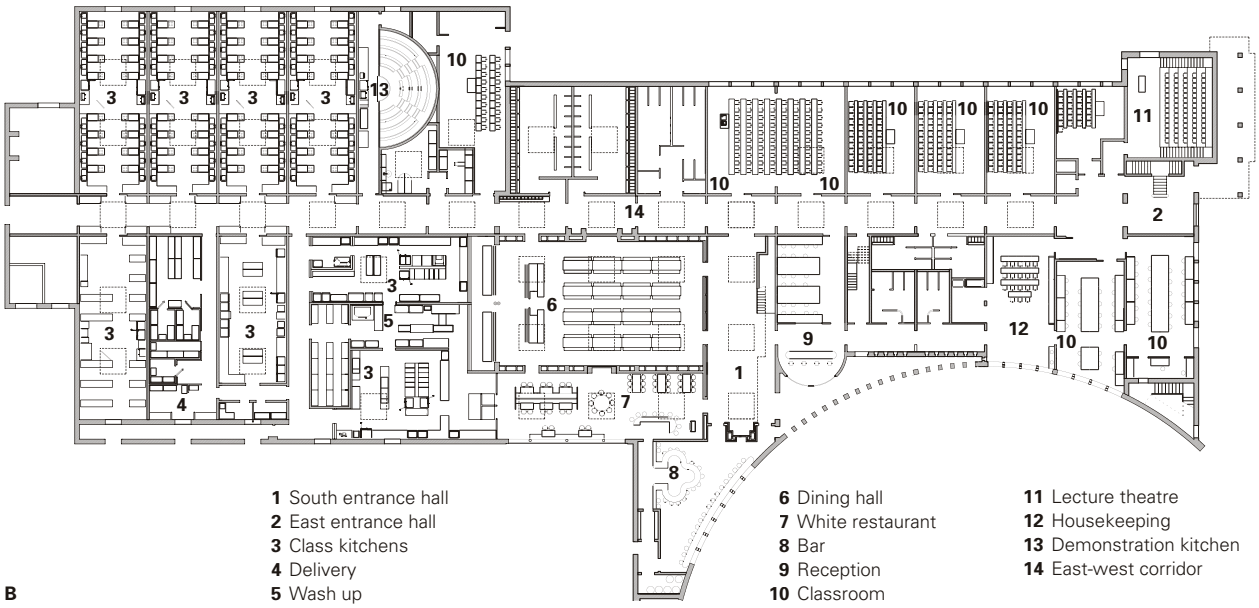
ARCHITECTS: **de Blacam and Meagher (Shane de Blacam); Boyd Barrett Murphy O'Connor Architects**
CLIENT: **Cork Institute of Technology**
TYPE OF SCHOOL: **Institute of technology**
NUMBER OF STUDENTS: **12 000**
TYPE OF PROJECT: **New buildings on existing campus**
GROSS SURFACE AREA: **10 015m² (new buildings)**
YEAR OF COMPLETION: **2006**
CONTEXT: **City**

A: Looking across the circle to the tourism and hospitality building (left) and the administration building (right).

B: Tourism and hospitality building floor plan.

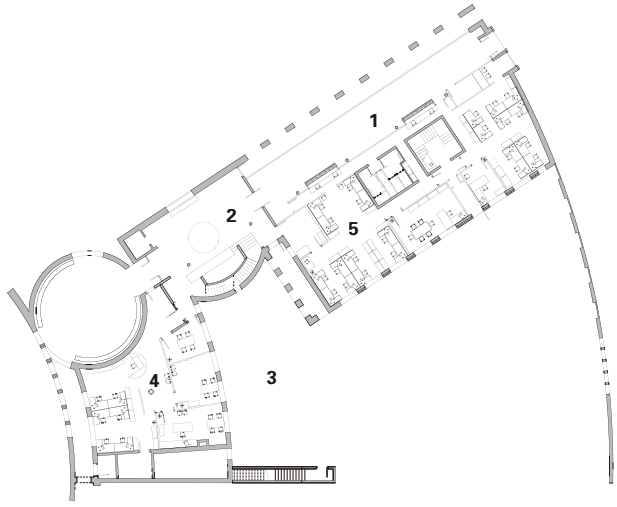


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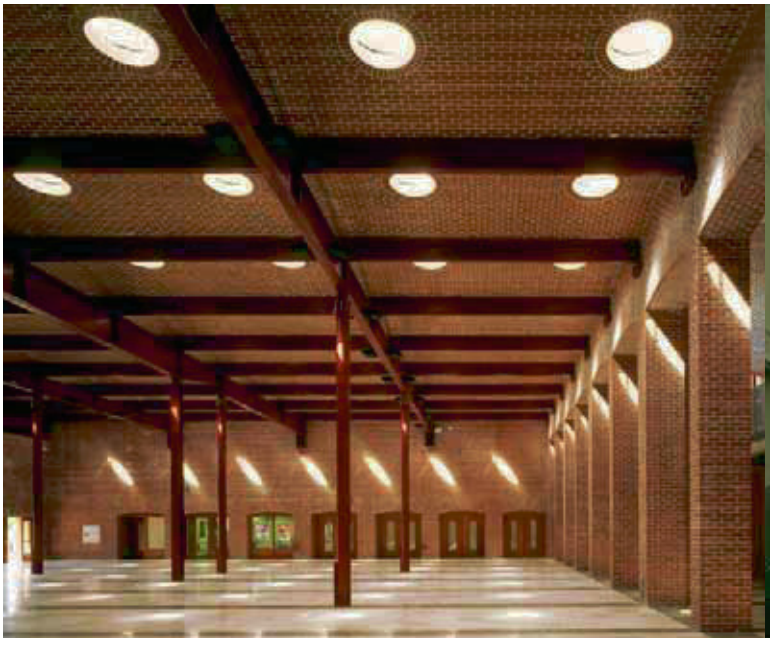
B

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C

1 Entrance hall
2 Reception
3 Director's garden
4 Offices
5 Public offices



D



E

This extension forms the new main entrance of Cork Institute of Technology's Bishopstown campus. Referencing historic university campuses such as Trinity College Dublin, three new buildings have been built around a circular green. They not only provide an upgraded facility for higher education – one that serves the educational process and inspires learning – but give the campus a distinctive character, gravitas and sense of place.

The new complex comprises a student centre, an administration building and a tourism and hospitality studies block. The complex is predominantly constructed in brick for reasons of longevity and durability. The high quality of the materials gives permanence and a sense of solidity to the campus.

The administration building and the tourism and hospitality building are located on a rock outcrop, a phenomenon of the local karst limestone. This higher ground allows a ramped and stepped approach to the administration building's ground floor reception and the east entrance of the tourism and hospitality building. It is the inspiration for the south-facing rotational steps and ramps leading to the rest of the campus. The grass lawn is displaced off centre to vary the width of the steps.

Student centre

The student centre accommodates a bar, café, student union, art gallery, common room and bookshop, as well as banks and the college radio station. It surrounds a large internal courtyard, designed for every sort of activity

C: Administration building ground floor plan.

D: The covered courtyard in the student centre.

E: A demonstration kitchen in the tourism and hospitality building.

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F

from leisure activities to graduation. This acts as a forum or village square. The ceiling of the courtyard is penetrated by circular vents, bringing sunlight into the space.

Administration building

The administration building has public access accommodation on the ground floor; the registrar's department is on the first floor; and finance is on the second floor. The north and south façade designs reflect concerns with orientation and natural ventilation. The focus of the plan is the circular council room and director's suite on the third floor, with the independent external stairs leading down into the director's garden.

Tourism and hospitality building

The tourism and hospitality building has two entrances to accommodate both academic classes and hotel training. The first entrance leads from the front circle through a small arcade and into a double height top-lit hall. The bar, dining hall and restaurant (a public restaurant which showcases the standard of training at the institute) are located off this hall.

The second entrance leads from the triangular lawn to the east side of the circle into a long corridor off which the academic departments, classrooms, lecture theatres and kitchens are located. A minor axis for housekeeping and reception training runs parallel to this corridor.

A class kitchen accommodates 16 student work places. All kitchen furniture is either cantilevered from the walls or on caster wheels to facilitate cleaning. The more significant elements – the demonstration kitchen, class kitchen chimneys, dining hall and large lecture theatre volumes – are employed externally to articulate the hierarchy of the plan. Rooms and corridors are naturally ventilated and day lit with roof-mounted cubes of opening glass lanterns.

User response

Staff and students have universally praised the scale and design of these buildings, and the work environment. A view endorsed by Dr Brendan Murphy, CIT's president: "The institute is proud to possess buildings which will mature with age and which are positive and inspiring manifestations of its role and status."

F: Kitchen ventilation chimneys, the tourism and hospitality building.

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A

MAD-faculty, KHLim – PHL

LOCATION I **GENK, BELGIUM**

This faculty provides courses in the audiovisual and plastic arts and in product design. It is a collaboration between KHLim (Katholieke Hogeschool Limburg) and PHL (Provinciale Hogeschool Limburg). The building featured here forms part of a new educational and cultural cluster on the C-mine site in Genk, the site of a former coal mine, where symbols of the former industrial heritage remain in evidence. The area is slowly being transformed into a new urban environment with cinemas, cultural centres and residential housing.

An architectural competition was held to choose the architect and the design concept. This had to reflect the mission of the academy and meet the specific challenges of the site, including its location immediately above an underground car park.

ARCHITECTS: **VBM Architecten; Bogdan & Van Broeck Architects**
CLIENT: **Katholieke Hogeschool Limburg vzw**
TYPE OF SCHOOL: **University**
NUMBER OF STUDENTS: **450**
TYPE OF PROJECT: **New building**
GROSS SURFACE AREA: **7 000m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **Town**

A: Winding gear from the disused mine reflected in the façade.

The "study landscape"

A key objective of the academy is to stimulate and support creativity and innovation. To do this, the central feature of the new building is the "study landscape". This is a vast space in the core of the building for meetings, interactions, experiments, social contacts and

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B

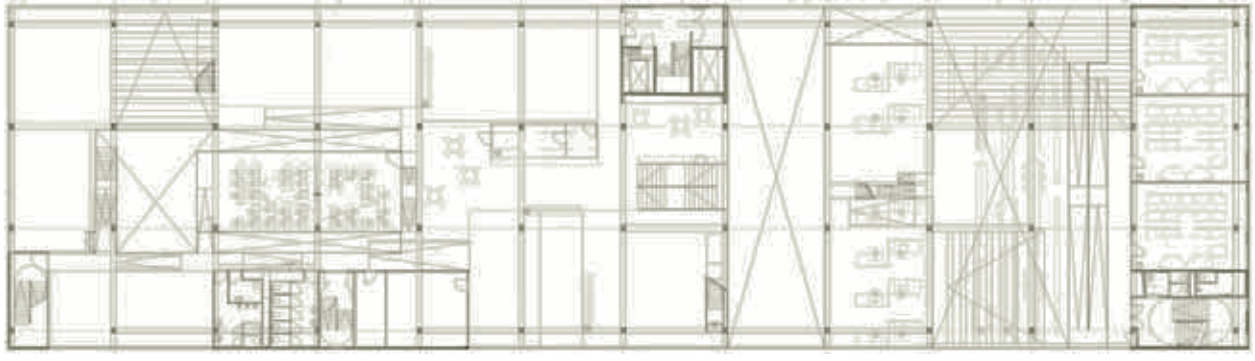
dialogue between students and teachers. The space contains nine open plan classrooms, open studios and circulation zones.

The study landscape determines the structure of the entire academy. Other functions are organised around this space. These include further classrooms, computer rooms and workshops for art, design, video, photography and product design, sound and movie studios, and mechanical workshops for prototype manufacturing. There is also a library, auditoria, meeting rooms and offices, and student facilities with a bar and restaurant. There is an informal area that functions as a speakers corner, somewhere to relax, and a place for improvised or unscheduled courses.

The whole building has been designed and organised to meet current and future needs



C



D

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E

efficiently. The load-bearing structural frame allows great flexibility, and the academy has been fitted out with lightweight elements that will make it easy to adapt the space in the future to meet new educational needs. Light transparent structures, such as thin nets on steel railings and thin polycarbonate walls, act as discrete space dividers. This provides spatial continuity, binding the interior of the academy.

Circulation zones within the building are an important part of the didactic environment. This not only encourages exchange and interaction between different disciplines, it increases the building's flexibility and achieves savings in terms of surface area and budget.

Architectural language

Externally, the building's façades are covered with black foam glass and perforated plates of galvanized steel that act as sunshades and as mechanical protection for the underlying insulation. By arranging the plates randomly and with a certain amount of overlap, the façade's surface has a scaled texture.

This striking translucent skin resembles lace, and looks subtle and delicate. It maintains a dialogue with the historical steel winding shafts of the coal mine, and reflects the industrial character of the buildings on the mine site. It also references the microscopic structure of coal and the colour of miners' headgear. The glazed parts of the study landscape enable this spatially binding central element of the academy to be expressed on the exterior of the building.

In keeping with its context, the interior of the building also has elements of industrial architectural language. The concrete structure and all the mechanical and technical infrastructure are open rather than hidden away. The design expresses the faculty's mission statement and the building acts as a genuine teaching and learning factory.

B: Longitudinal section.

C: Part of the "study landscape".

D: First floor plan.

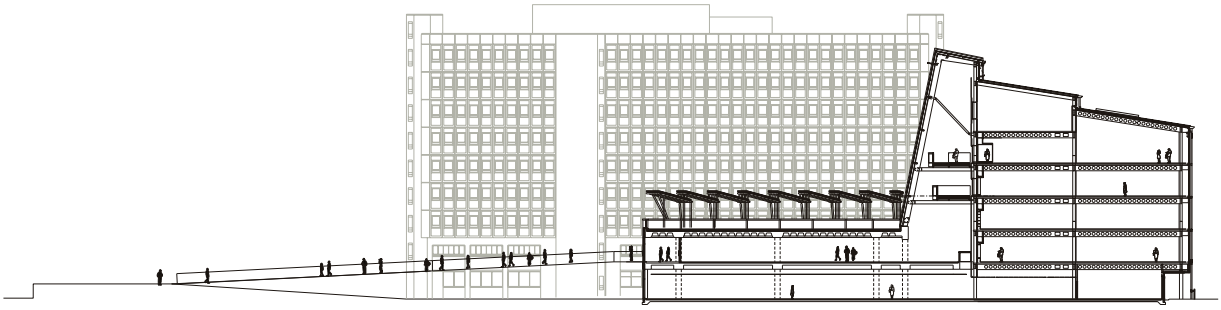
E: The main entrance.

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A

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B

The Saltire Centre, Glasgow Caledonian University

LOCATION I **GLASGOW, UNITED KINGDOM**

ARCHITECTS: **BDP (Colin Allan)**
CLIENT: **Glasgow Caledonian University**
TYPE OF SCHOOL: **University**
NUMBER OF STUDENTS: **Up to 1 800 at anyone time**
TYPE OF PROJECT: **New building on existing campus**
GROSS SURFACE AREA: **10 500m² (new centre)**
YEAR OF COMPLETION: **2006**
CONTEXT: **Large city**

The brief for Glasgow Caledonian University's new learning centre called for a building that would cater for both individual and group learning, and provide a range of spaces from the monastic cell to the mall. The building had to include the university library, resource centre, student services centre and a café. It should be a resource that would become the major social space within the university.

A: Open circulation routes crisscross the atrium.

B: Cross section showing the new building in relation to the existing structure.

C: Looking into the open plan areas at the front of the building.



C

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D

D: A view down into the "big space".

The Saltire Centre is inspired by the educational mantra of Les Watson, pro-vice chancellor, learning and information services, that "all learning starts with conversation". This building innovatively provides a rich variety of opportunities for conversation and group learning as well as silent spaces for focused individual study. Users are encourage to think differently about their patterns of learning. With wireless internet access throughout the building, flexible space and movable furniture, students are free to reorganise their environment to best suit their learning needs.

Open learning environments

The building is designed without walls to encourage flexibility and adaptability as learning spaces evolve in the future. It is an open learning environment spread over five storeys, both welcoming and easily navigable, with open circulation routes and an atrium bringing light into the heart of the building.

The "big space" is at the heart of the project. This is a dynamic flexible space for group and individual learning, student services, social learning, events and performances. It also houses the café, and the space is adorned with a massive triptych, one of several works commissioned from young artists for the centre. Although not part of the original brief, the big space has significantly added value and created a place where students want to be. As well as the large flexible space that supports group learning, there are many other spaces including quiet study carrels for individual learning. The building can accommodate 1 800 students, which is over 10% of the university student population. It is fitted out with a range of furniture, including upright chairs, carrels, platforms, igloos, sofas, barstools and beanbags. The aim is to provide flexibility and choice.

Although the project relates more to the iPhone than the textbook, with wireless technology throughout, books have not been ignored and remain an essential part of the building. Much of the existing book stock is contained within 8km of motorised compact shelving freeing up valuable space.

External environments have also been designed for social interaction. An external landscaped south-facing roof terrace incorporating an aromatic herb garden provides a tranquil green "oasis" for students and staff. It is a space for outdoor reading and contemplation where students in search of peace and quiet can relax.

Already proving popular with students, staff and the wider community – the general public has unrestricted access to the building – the Saltire Centre is becoming the physical and social heart of university life. It is also seen as a success by the university. As Les Watson acknowledges: "BDP have met our aspirations to provide twenty-first century facilities for our students in an imaginative way."

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Sino-French Centre, Tongji University

LOCATION I **SHANGHAI, CHINA**



A

A: View from the south east, with the college sector (foreground).

ARCHITECTS: **Atelier Z+ (Zhang Bin and Zhou Wei)**
CLIENT: **Tongji University**
TYPE OF SCHOOL: **University**
NUMBER OF STUDENTS: **300 (new centre)**
TYPE OF PROJECT: **New building on existing campus**
GROSS SURFACE AREA: **13 575m² (new centre)**
YEAR OF COMPLETION: **2006**
CONTEXT: **Large city**

The Sino-French Centre is a new building on Tongji University's Siping campus. It houses the Sino-French Institute of Engineering and Management, a joint initiative between Tongji University and ParisTech (a consortium that brings together 12 prestigious university-level colleges). The institute offers a range of postgraduate programmes at centres in China and France.

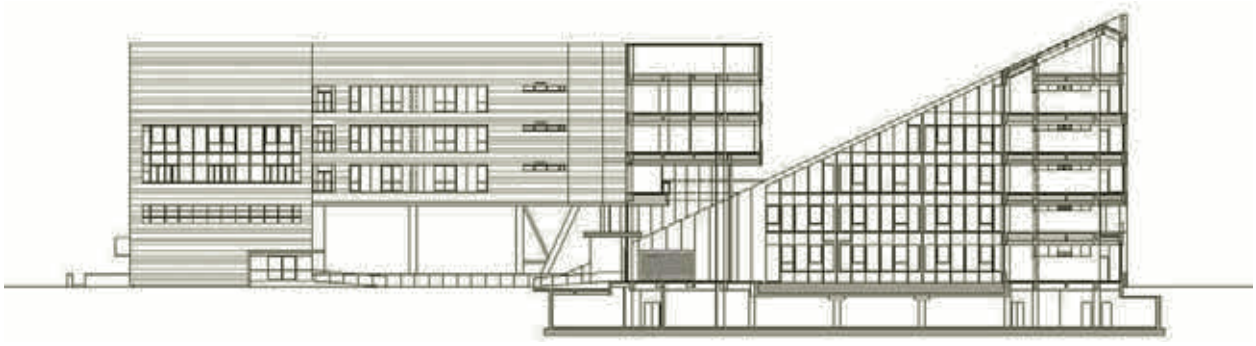
Located at the south-east corner of the campus, the centre has been built on a compact site. It is bounded to the east by a road, and to the north and west by existing university buildings, two classroom blocks, the Xuri Pavilion and a memorial park.

The new building has been positioned to complement and enhance this environment. The main entrance opens out onto a plaza to the west. This leads through a small grove of mature trees to the memorial park and the internal access roads on the campus.

Architectural concept

Designed to promote educational and cultural exchange between China and France, the architectural concept is that of "hand in hand".

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B



C

Two similar but non-identical angular volumes overlap and interlace each other. These create a series of interesting and non-uniform interior and exterior spaces. In order to emphasise the juxtaposition of two different cultures, contrasting materials are used for the different components of the complex.

The teaching block (or college sector) has a sharply angled profile. It is clad in weathering steel (Cor-ten) panels, creating a burnt orange finish. This houses the lecture theatres, classrooms, amphitheatre and library. The office sector has a flat roof and is clad in white-grey precoated cement panels. It provides office accommodation for 200 campus academics and the researchers and support staff at the institute.

The overall effect is that the institute can almost be read as two buildings, and the striking contrasts between the college and the office sectors are maintained in the interior stylings. The college sector is furnished in rich wood that lends a warm glow to the interior spaces. There are several vibrant flourishes, such as the conical volumes that bring daylight into the building from skylights in the sloping roof. In contrast, the office sector, with its white walls and simple materials, is more subdued.

Public spaces

There are also several public spaces in the building. The north end of the building is designated as the public space sector. This

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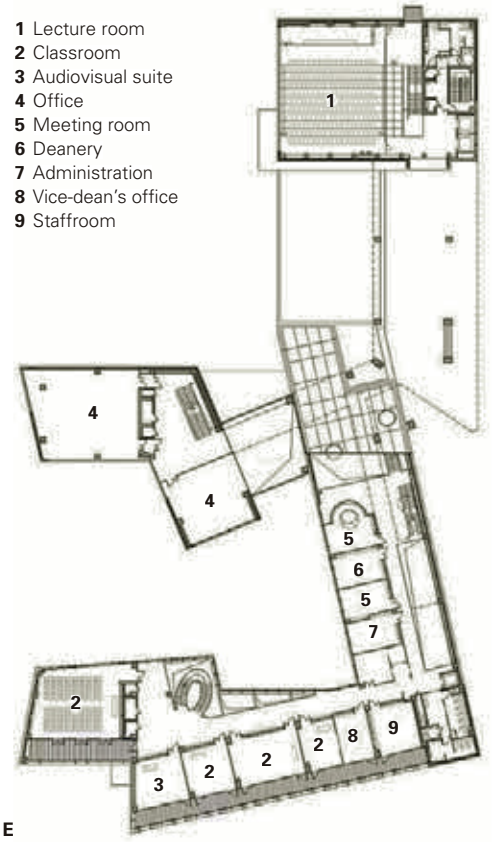


D

houses an exhibition hall, a lecture theatre, two multifunction rooms and a multimedia suite. At basement level, in addition to the exhibition hall, there is a coffee shop opening out onto a partially-covered sunken garden.

Outside, the site has been carefully landscaped. In addition to the grove of trees by the entrance plaza, other mature trees have been retained on the plot, including metasequoias, deodar cedars, plane trees, Japanese pagodas and willows.

The object of this project was to create an architecture that integrates – and is sensitive to – the academic programme, the culture of the institute and the context of its site. By applying different geometries, materials, colours and tectonics, a bold and unique building has been created that stands as a symbol of cultural exchange between China and France.



E

B: North-south section.

C: The sunken garden.

D: Skylights and fittings in the college sector.

E: First floor plan.

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Bâtiment Atrium, Université Pierre et Marie Curie

LOCATION I **PARIS, FRANCE**

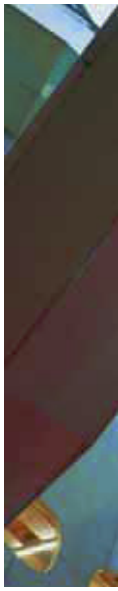
ARCHITECTS: **Périphériques Architectes (David Trottin, Emmanuelle Marin-Trottin and Anne-Françoise Jumeau)**
CLIENT: **Etablissement Public de Campus de Jussieu (EPCJ)**
TYPE OF SCHOOL: **University**
NUMBER OF STUDENTS: **3500**
TYPE OF PROJECT: **New building on existing campus**
GROSS SURFACE AREA: **16895m²**
YEAR OF COMPLETION: **2006**
CONTEXT: **Large city**

A: A view across the central atrium.

B: A translucent ceiling in the atrium brings daylight into the building.

C: Distinctive study pods are placed in many areas.

D: Second floor plan.



B



A

Bâtiment Atrium is a new addition to the Université Pierre et Marie Curie's Jussieu campus. It enhances this renowned university complex in the centre of Paris by slotting into the grid plan designed in the 1960s by the architect Eduoard Albert. It seeks to respect and perpetuate this plan, while establishing a smooth transition between the campus and the esplanade near the Seine and, away from the river, the Sorbonne and the botanical gardens.

Built on a similar scale and volume to the adjacent buildings, Bâtiment Atrium completes Albert's grid to form a large open courtyard. It also features the same pattern of windows as the neighbouring buildings. However, the façades are radically different, as the building is enveloped in eight panels of perforated aluminium that produce a set of random patterns. This panelling forms a fine but robust skin that acts as sun visor and gives the façades interest and depth.

The façade stops above the main entrance on the ground floor. Here, a bright orange ramp, folded origami style, provides a dramatic entrance to the building. This rises over three

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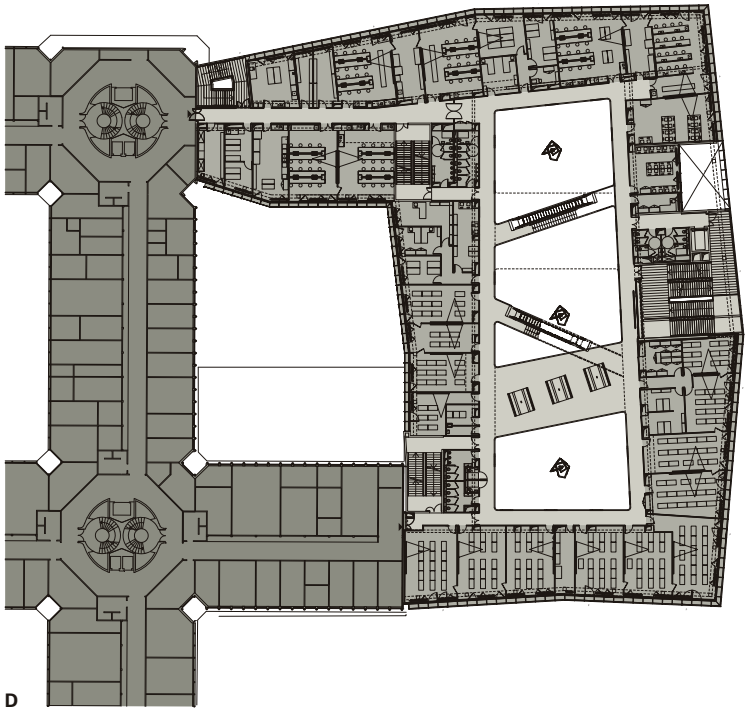
C

storeys, and smoothly bridges the different levels on the site in a fluid movement.

Despite its striking external appearance, the architects have adopted what they describe as a "low-tech" approach. The building has been designed on industrial production principles, using conventional materials and standard construction products.

Spatial organisation

Inside, the building is organised around an extremely large, covered central atrium. Crisscrossed by circulation routes, stairs

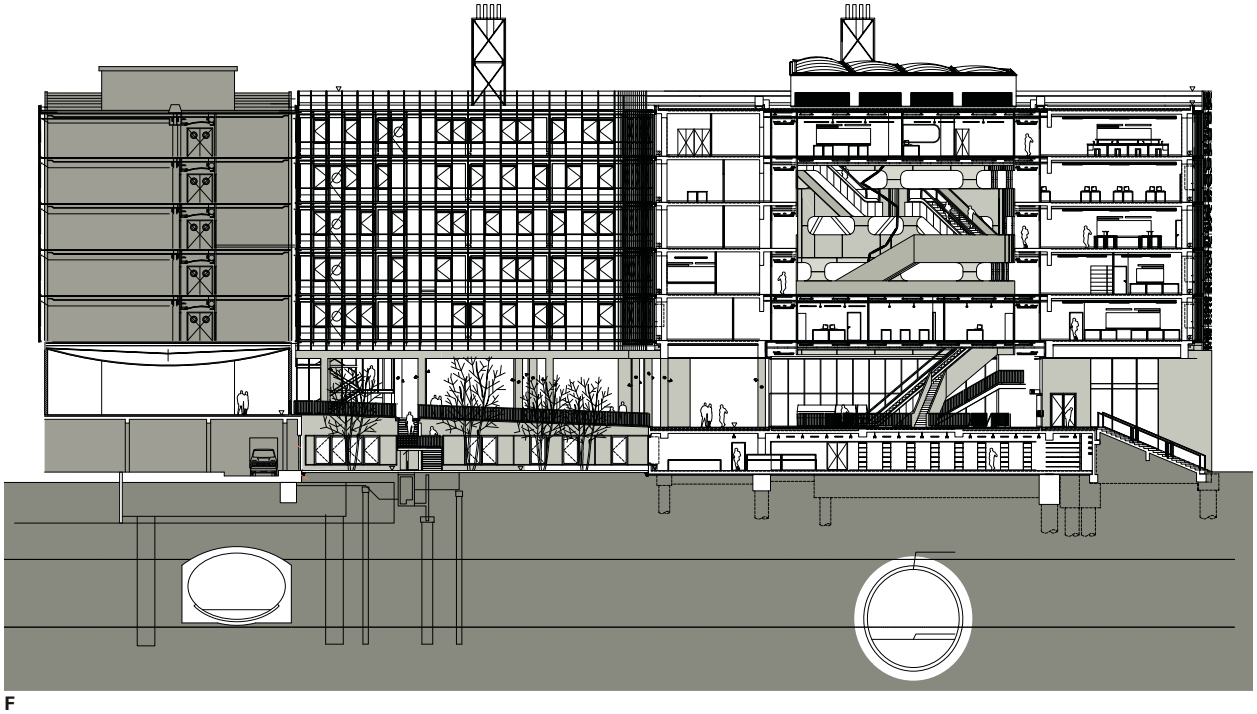


D

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E



F

and escalators linking the different floors of the building and flanked by balconies, this spectacular space is designed to evoke a "vertical urbanity". By creating an internal environment without enclosed corridors and cul-de-sacs, the internal organisation is based around the hypothesis that ideas and knowledge can be shared more readily where people are able to circulate freely.

Bâtiment Atrium is primarily a facility for first-year undergraduate studies. All teaching rooms are organised on the upper five storeys of the building around the atrium, together with laboratories, computer rooms and study areas. For ease of navigation, the building is colour coded, with bold colours on floors, walls and doors denoting the different disciplines – physics, chemistry, information technology and multimedia studies – that are taught within the building.

Other services are located on the lower floors of the building. These include the library, a large examination hall, a dissertation hall, a print laboratory and the administrative offices. Throughout the building there are several areas for informal interaction, study and meetings outside of the classroom. Specially designed study pods, suitable for four to six people, have been placed in the crossways in the atrium and in the lobby.

E: Bâtiment Atrium completes a section of UPMC's Jussieu campus.

F: Section showing how Bâtiment Atrium links to the neighbouring buildings.

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Stephen M. Ross School of Business, University of Michigan

LOCATION I **MICHIGAN, USA**

ARCHITECTS: **Kohn Pedersen Fox Associates PC**
CLIENT: **University of Michigan**
TYPE OF SCHOOL: **University**
NUMBER OF STUDENTS: **2 914**
TYPE OF PROJECT: **New building and redevelopment of campus**
GROSS SURFACE AREA: **27 000m²**
YEAR OF COMPLETION: **2009**
CONTEXT: **City**



A

As a business school within a university, the Ross School is an academically free-standing unit and, as such, requires a mix of academic spaces for teaching, faculty and administrative purposes, as well as amenity and social areas for students and staff. In redeveloping the campus, a primary challenge was to create a heart for the school, in which the life of the school would be evident to the business school community and to outside visitors.

By demolishing existing buildings around one of the courtyards and creating a winter garden at the centre of the new building, the development links the new and existing buildings effectively. It is also an environment that blends sensitively with neighbouring properties. This has been achieved by setting the building back from the property line, by using massing strategies that reduce its scale, and by carefully selecting materials.

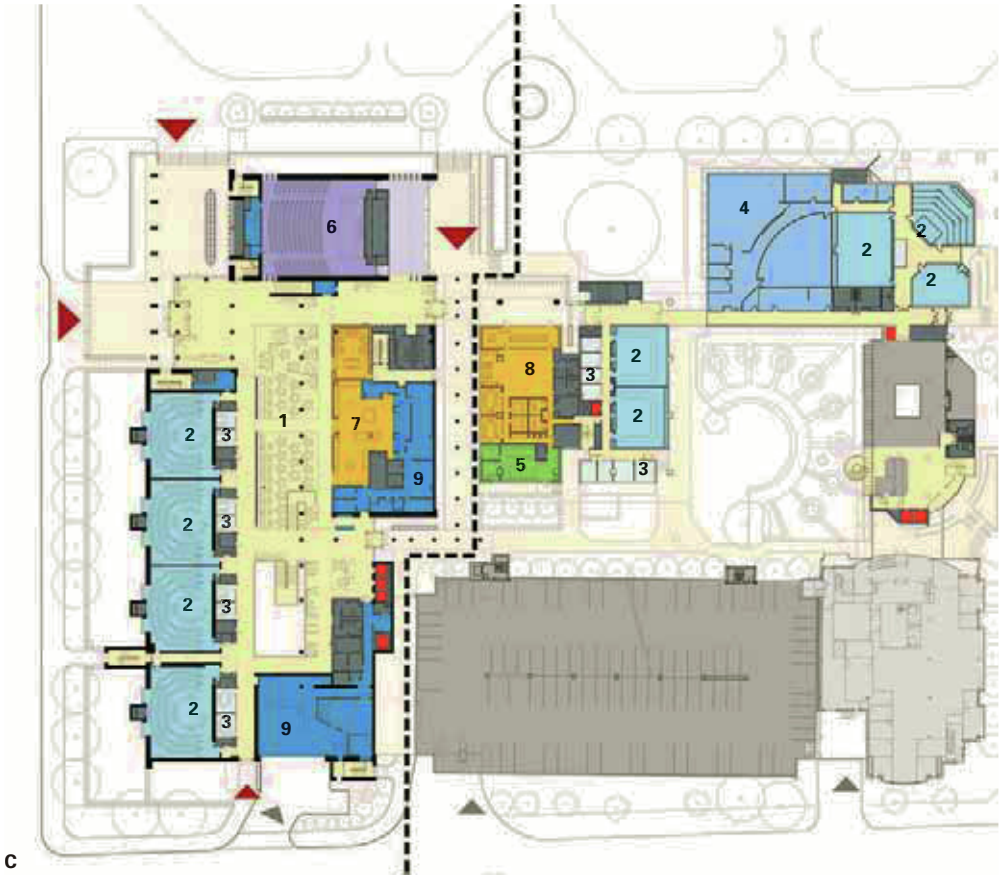
A: Aerial view of campus showing green roofs.

B: One of the tiered classrooms in the new building.



B

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C

1 Winter garden
2 Classroom
3 Group study room
4 Trading floor
5 Office
6 Auditorium
7 Servery
8 Student organisations
9 Building support



C: Ground floor plan: the new building is to the left of the dotted line.

D: Students working in the winter garden.

Internal spaces

Conceived in the context of Michigan's action-based learning curriculum, formal and informal group work spaces are provided in a variety of locations. These can accommodate half of the student population at any one time. Within the lower three floors of the complex there are 42 group study rooms, casual study areas and the multifunction winter garden.

Tiered classrooms, the fundamental building block of a business school, have been designed with extreme care, and offer integrated technology, good sight lines and comfort. A uniform system of same-size faculty offices with optional furniture layouts defined in "office neighbourhoods" inspired the massing and design of the upper levels of the building.

The winter garden is instrumental in creating a sense of community. It incorporates a student lounge, study lounge and café, and it is animated by major circulation routes, both vertically and horizontally, and campus through traffic. This new interior gathering space introduces daylight into the centre of the building.

Energy efficiency

The project achieved LEED silver certification. The winter garden is one of the energy conservation showpieces of the project. This space is conditioned using displacement ventilation, which requires less fan energy, cooling and heating usage. Heat is allowed to stratify upward, so that only occupied portions are conditioned in the summer. In the winter, this heat provides a buffer between the outdoors and the occupied space.

Classrooms are conditioned using underfloor air distribution, which uses less energy than conventional overhead cooling, while providing superior indoor air quality. They are equipped with high efficiency lighting systems, and occupancy sensors control lighting to further reduce energy consumption. Daylight sensors on the exterior and in the winter garden tailor lighting loads according to demand and allow for natural lighting. The building includes three green roofs which provide for a decreased heat island effect, storm water retention and increased roof insulation. Non-green roofs are provided with a highly reflective roof to reduce the heat island effect and energy consumption.

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D

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Akademia Muzyczna im. Karola Szymanowskiego w Katowicach

LOCATION I **KATOWICE, POLAND**



A

ARCHITECTS: **Barysz Konior Architekci**
CLIENT: **Akademia Muzyczna im. Karola Szymanowskiego**
TYPE OF SCHOOL: **Higher education music school**
NUMBER OF STUDENTS: **920 (whole institution)**
TYPE OF PROJECT: **Extension to existing campus**
GROSS SURFACE AREA: **10 700m² (whole institution)**
YEAR OF COMPLETION: **2007**
CONTEXT: **City**

The Karol Szymanowski Academy of Music in Katowice was founded in 1929. Notable alumni of this higher education institution include Górecki, Kilar and Zimerman. Located on a small campus, its main building is a beautiful 1870s neo-Gothic structure. The academy's new extension opened in 2008, and it has allowed the institution to expand its artistic and educational activities.

Sensitively blending with the existing buildings, the new extension comprises two main volumes of a similar height to the existing buildings. Their reddish-brown façades match the brickwork of the 1870s building. The extension houses a concert hall, a library and reading room, a sound laboratory, a music therapy room and a computer suite as well as additional lecture rooms.

Concert hall

The centrepiece of the development is the new state-of-the-art concert hall. This has a

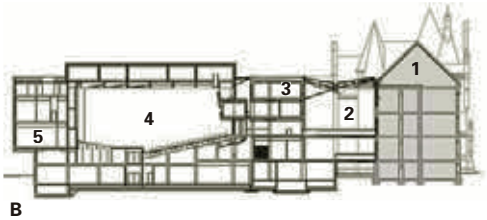
A: The new extension (left) complements the existing buildings (foreground).

B: Cross section.

C: An atrium connects the historic and modern parts of the academy.

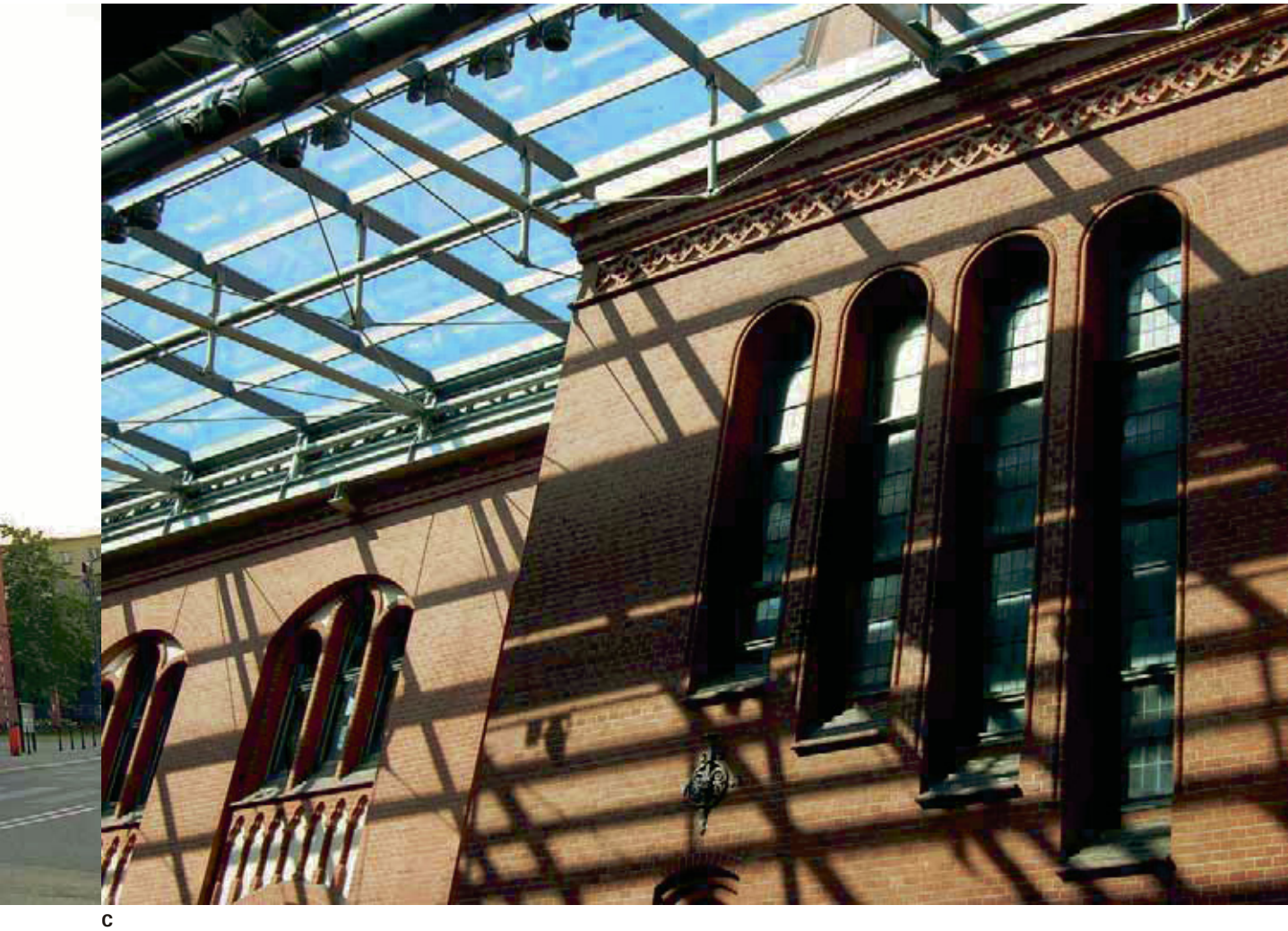
D: Site plan and ground floor layout.

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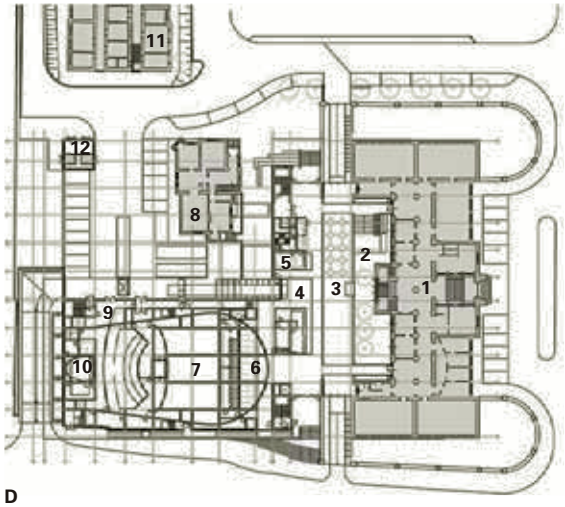


1 Main building
2 Atrium
3 Library and teaching space
4 Concert hall
5 Backstage area and studio

B



C



1 Main building
2 Enclosed garden
3 Atrium and foyer
4 Shop and box office
5 Buffet
6 Cloakroom
7 Concert hall
8 Rector's office
9 Artists entrance
10 Studio
11 Instrumentation faculty
12 Services building

D

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480-person capacity, with a stage that can accommodate 190 singers and musicians. It has separate entrances for artists and audiences, which allow the hall to be easily accessed and to be used independently without disturbing other activities.

The hall's design creates good acoustics for a wide range of music. It is wrapped in a double layer, with the two skins enclosing a reverberation space. Adjustable panels in the ceiling of the hall can open up this space, and this allows the natural reverberation time in the auditorium to be altered to suit the type of music being performed.

Music library

Between the concert hall and the academy's main building, a new longitudinal block has been added to accommodate further teaching rooms and offices. This block also houses the academy's new library, which has study areas for 70 readers. It provides suitable space for one of the largest collections of music and musical literature in Poland.

An atrium connects the new block with the main building, enclosing a foyer and a small indoor garden. Outside, the extension has been aligned to create a sheltered courtyard between the concert hall and the building housing the rector's office. This also serves as a walkway between the main facilities and the building housing the academy's instrumentation faculty.

Community resource

Many of the new facilities are open to the wider community. Students and academics from other music schools and higher education institutions can use the concert hall and the new library. Modern music therapy is offered for children with special needs, particularly those with hearing difficulties.

Regular artistic and scientific events are held in the new buildings. Around 300 free concerts are now held every year in the hall. These provide an opportunity for young artists – and especially students of the music academy – to improve their skills and to get stage experience. These concerts, together with workshops and master classes, also promote music education more widely in the area and allow local people to experience high-quality live music.



E

E: The new extension opens out to a courtyard.

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ANNEXES

Annex 1: **Classification of levels of education**

The classification of the levels of education is based on the revised International Standard Classification of Education (ISCED-97). ISCED is an instrument for compiling statistics on education internationally. The following levels of education are presented in this publication:

Pre-primary education (ISCED 0) is defined as the initial stage of organised instruction, designed primarily to introduce very young children to a school-type environment, that is, to provide a bridge between home and a school-based atmosphere. ISCED level 0 programmes should be centre- or school-based, be designed to meet the educational and developmental needs of children at least three years of age, and have staff that are adequately trained (*i.e.* qualified) to provide an educational programme for the children.

Primary education (ISCED 1) usually begins at age five, six or seven and lasts for four to six years (the mode of the DECO countries being six years). Programmes at the primary level generally require no previous formal education, although it is becoming increasingly common for children to have attended a pre-primary programme before entering primary education. The boundary between pre-primary and primary education is typically the beginning of systematic studies characteristic of primary education, *e.g.* reading, writing and mathematics. It is common, however, for children to begin learning basic literacy and numeric skills at the pre-primary level.

Lower secondary education (ISCED 2) generally continues the basic programmes of the primary level, although teaching is typically more subject-focused, often employing more specialised teachers who conduct classes in their field of specialisation. Lower secondary education may either be "terminal" (*i.e.* preparing students for entry directly into working life) and/or "preparatory" (*i.e.* preparing students for upper secondary education). This level usually consists of two to six years of schooling (the mode of OECD countries is three years).

Upper secondary education (ISCED 3) corresponds to the final stage of secondary education in most OECD countries. Instruction is often more organised along subject-matter lines than at ISCED level 2 and teachers usually need to have a higher level of, or more subject-specific, qualifications than at ISCED 2. The entrance age to this level is typically 15 or 16 years. There are substantial differences in the typical duration of ISCED 3 programmes both across and between countries, typically ranging from two to five years of schooling. ISCED 3 may either be "terminal" (*i.e.* preparing the students for entry directly into working life) and/or "preparatory" (*i.e.* preparing students for tertiary education). Programmes at level 3 can also be subdivided into three categories based on the degree to which the programme is oriented towards a specific class of occupations or trades and leads to a labour-market relevant qualification: general, pre-vocational or pre-technical, and vocational or technical programmes.

Tertiary education (ISCED 5/6) programmes have an educational content more advanced than those offered at other levels. Programmes can be largely theory-based, with a minimum cumulative theoretical duration of three years' fulltime equivalent and designed to provide sufficient qualifications for entry into advanced research programmes and professions with high skill requirements, such as medicine, dentistry or architecture; provide practical, technical or occupational skills for direct entry into the labour market, with a minimum duration of two years' full-time equivalent; or lead directly to the award of an advanced research qualification, *i.e.* Ph.D.

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DESIGNING FOR EDUCATION

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Designing for Education: Compendium of Exemplary Educational Facilities 2011 showcases over 60 recently built or refurbished educational facilities from 28 countries. Collectively, these projects demonstrate state-of-the-art design in this field and each one is lavishly illustrated with colour photos, plans and descriptions.

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