The Guardian Wednesday 18 January 2023 G2

*Just add rainwater … the cladding will attract fungi, insects and more*

# It's Monday morning? Great!

Pupils asked for a building without walls that felt like a garden or a spaceship. The dazzling result, which has a living skin, is one of the most inventive schools ever built. **Oliver Wainwright** on a marvel in Madrid

"It looks like a robot made of butter," was one pupil's reaction when they saw their new school for the first time. They were not wrong. Standing on the northern outskirts of Madrid, in the suburb of Encinar de los Reyes, the Reggio school is a surreal sight, rising from its sloping plot like a big, buttery machine for learning.

Lumpy, yellowish blocks appear to be stacked up on a frame of concrete shelves, with rows of beady bubble windows bursting through their gungey surfaces, like eyes emerging from the gloop. Lush gardens sprout between the blocks, while polished metal ducts poke up from the zigzag rooftop, like the chimneys of a cartoon factory. Below, the concrete base is sliced open with gaping arches, stretched wide and squeezed tight, as if the building is flexing its muscles.

There can be few schools that make children look forward to Monday mornings as much as this dreamy multi-storey temple of curiosity. It is the work of Spanish architect Andrés Jaque, whose practice, the Office for Political Innovation, has carved out a niche over the last two decades for provocative, mischievous research projects. Jaque (pronounced "HA-kay") juggles life as the dean of Columbia University's graduate school of architecture in New York with running a small office in Madrid – a combination he balances, "by only ever working on one project at a time," he says, "and putting everything into it." This is the practice's first building of this scale, and it doesn't disappoint.

It began with a period of research, listening to the desires of the pupils (500 of them, aged from two to 18) and their team of teachers, in a collaborative two-year process (including 20-hour meetings about the colour of handrails).

"A school with no walls," was one child's dream. "I want many different routes to get around," said another. "I want it to feel like a garden," added a third. "Or a spaceship. And not be too big, so I can get to know it easily." The teachers, meanwhile, wanted a building that could be used as a teaching tool, and a game, and never feel quite finished. "The architecture should prompt the imagination," as Jaque puts it, "and inspire the students to ask questions about the world."

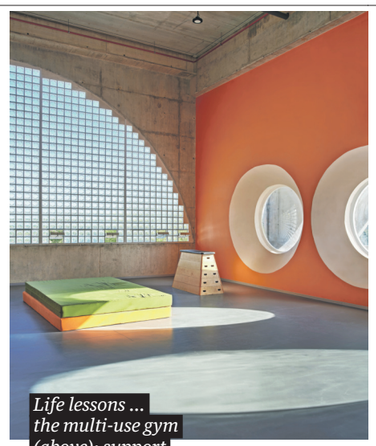
The collaborative process sprung from the school's outlook, as a bastion of the Reggio-Emilia method, an educational approach developed in postwar northern Italy. It follows the principle that children should not be seen as empty vessels to be filled with learning, but active participants in defining their own curriculum. Emphasis is placed on encouraging curiosity, with pupils, teachers and parents engaged in a back-and-forth adventure of discovery. Crucially, the physical environment is imagined as "the third teacher", with spaces configured to encourage interaction, open-ended exploration, and connection with the outdoors.

Built for a modest €8m (about €1,100 per square metre), Jaque's design embodies all of this and more. It is one of the most inventive school buildings of the century, breaking ground in everything from its layout, to the use of materials and its relationship to the natural world.

The theatrics begin at the entrance, where children arrive across a drawbridge-like deck through one of the arched openings, and find themselves in a colossal hall, or "agora". Conceived as a gym, theatre and assembly hall in one, the room has a heroic scale, divided by a curtain and open to the outdoors through a 20-metre wide archway, with a second arch on the shorter end, glazed with glass bricks. The wide opening leads to a covered loggia, with views over the playground and green valley beyond, and connects to the library, imagined as a kind of extension of the playground. Portable seat-desks can be arranged on an outdoor staircase, "so you can sit and read at break time," says Jaque, "and not be forced to play football".

From here, you get a good view of the building's blobby surface, which turns out to be a natural cork mixture, sprayed on to the walls to form a thick insulating jacket. Specifically developed for this project, it is unlike any other cladding around, with a texture somewhere between gritty, earthen plaster and sponge. It has an alluring, tactile quality, covering the building in globular lumps, forming creases and folds as it splurges around the corners, with the look of supersized Play-Doh.

Beyond providing insulation, this coat is intended to take on a life of its own, becoming a habitat for fungi, insects and other organisms. Rainwater will follow the clefts in the cork, nourishing whatever microbial lifeforms take hold. "I hope it will become like the surface of a tree," says Jaque, "full of life."



*Life lessons … the multi-use gym (above); support structures left exposed, and the mini rainforest (below)*

> The two-year consultation included 20-hour meetings about the colour of handrails

The idea of the building as an armature for "more than human" life (an ongoing theme in Jaque's work) recurs throughout the school. On the landings, windows look out into recessed gardens designed to attract a different form of wildlife, from butterflies to birds and bees, in spaces that are inaccessible to humans, so the creatures can be observed undisturbed.

The third floor, meanwhile, is home to a mini temperate rainforest, which rises two storeys in a covered courtyard, with labs and workshops accessed off a deck around the edge. There is something poetic about coming out of a biology class to be confronted with a lush botanical garden and it serves an environmental purpose, too. As an enclosed greenhouse space, it helps to heat the classrooms in winter and cool them in summer, with ventilation hatches in the roof. Younger pupils have already begun to colonise the forest floor, building a model cardboard city between the ferns. "This is a collaborative project initiated by a second-grade student," notes a sign. "Together, the pupils discussed the buildings their city must have, elected a mayor and organised a collective management strategy." Will the next step be unleashing their skills on the building itself?

It could certainly take it. Throughout, the architecture operates as a didactic tool, with the structure and services left exposed, so you can see how it all works. Pleasure has been taken in the artful composition of foil-wrapped ducts and pipes, their housings painted in cheerful colours and assembled in a playful industrial bricolage. The lower concrete levels are left raw, like an ancient Roman foundation, while the lightweight steel framework of the upper stories is exposed, the diagonal white struts creating an inverted mock-Tudor effect against the green walls. "It is a literal stack of architectural traditions," says Jacque.

The much agonised-over colour palette ranges from an olive-cream dining room, offset with bright yellow window frames, to terracotta walls with fleshy salmon handrails (a nod to Jim Stirling's postmodern Clore gallery at Tate Britain), and pistachio-hued science labs. It all feels unusually grown up, intentionally avoiding the usual infantilising school colour palette: Jaque says the teachers "wanted colours that would be difficult to name".

Elsewhere, there are walls of glass bricks and hollow terracotta blocks – an everyday building material in Spain – but laid on their sides, covered with plaster, then ground back to reveal the blocks' internal pattern. The effect is striking, creating a fine-lined herringbone pattern, and a texture that helps with acoustics, as well as revealing how the walls are made. Similarly, the porridgy fireproof coating, required to protect steel columns and beams, is left exposed, but smoothed at child height to avoid grazing, creating a subtle line that echoes around the building.

The concrete might represent a high level of embodied carbon ("it was the only economical choice," says Jaque), but efforts have been made to reduce the amount used, with the arched openings and porthole cutouts allowing more slender walls and lowering the quantity of steel reinforcement needed. By ditching plasterboard linings and suspended ceilings they reduced the overall amount of building material by about 40%. "Nakedness became our religion," says Jaque. "We are unapologetically enjoying the hidden parts of architecture." Much of the school is open to the elements too, reducing the need for heating and cooling, with just the labs requiring air conditioning.

A less obvious form of sustainability comes in the fact that these architects enjoy using materials that others do not. The office has a knack for exploiting surplus supplies, sourcing things that might have been lying in a warehouse for years as dead stock. The bubble windows, for example, were originally manufactured as roof lights for trailers. "We always adapt the design to what we can find," says Jaque. "It's like mining new materials – and celebrating the potential of quotidian things."

The result is that these ordinary parts, lovingly assembled with meticulous care and childlike imagination, have created one of the most extraordinary schools around.

PHOTOGRAPHS: JOSE HEVIA BLACH