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Birr Community School – A Case Study in Retrofitting and Conserving Modern Architecture

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Abstract

More than half of the buildings in the world were built in the last hundred years, and the approach to construction of many of them assumed limitless fossil fuels. These buildings represent considerable embodied energy and, in some cases significant cultural and social value. As the limitations on planetary resources became more apparent in the last fifty years insulation began to be introduced into construction, and older buildings started to get basic retrofits. Much of the retrofit work done however damaged the cultural and aesthetic value of the architecture, and there is a need to balance the energy conservation imperative with the cultural value of older buildings. The President of the European Commission, Ursula van der Leyen, recognised this in her recent announcement of a "New European Bauhaus for a Green Transition" to address the need for a "renovation wave" that recognises the importance of sustainability in buildings and the cultural project of making "a bridge between the world of science and technology and the world of art and culture."

This paper will present a case study in the architectural conservation of a nineteen seventies school building in Ireland that received funding under the Getty Foundation's *Keeping it Modern* programme in 2018. The design of the school itself was a response to the changing society in Ireland of the nineteen seventies and represents a pivotal moment of transition in secondary education. The design was selected through a national architecture competition run by the Department of Education and the Royal Institute of Architects in Ireland (RIAI). The building was recognised by the award of a triennial God Medal from the RIAI and featured in the Pavilion of Ireland at the Venice Architecture Biennale in 2014, co-curated by the author. The school stands at the heart of the community in Birr town and many of the students are children of former students.

The research into the architectural conservation and renovation was developed in a subsequent project involving academics from UCC, UCD and QUB. The research methodology developed drew on Stewart Brand's theory of "shearing layers" articulated in his book *How Buildings Learn* (1994). This research formed the basis of a conservation management plan that identified the social significance of the school and used social ethnographic methods to document this through drawings, photography, film, and interviews. An exhibition of this research was held at the Irish Architecture Archive in winter 2019-20. The Conservation Management Plan was finalised and submitted to the Getty Foundation in February 2021.

Introduction

The twentieth century saw exponential growth in the construction of new buildings and cities around the globe. Most of this production was based on an idea of limitless resources and economic growth. In Europe in particular, the destruction caused by World War Two left many cities flattened or badly damaged. In the period of transformation that followed the war the ongoing industrialisation of agriculture caused many people to migrate to cities where the new welfare state built mass housing on an industrial scale. The ongoing democratisation of education led to the construction of numerous schools and universities. The architecture of this age of the masses had been discussed and developed in intellectual circles like the Bauhaus and *Conference Internationale pour l'Architecture Moderne* (CIAM) between the European wars and the model of an architecture based on the industrial scale production associated with factories was ready to be deployed. This architecture celebrated reinforced concrete as a structural material with large areas of steel-framed glazing bringing daylight to interior spaces.

Many modern buildings were designed and built at a time when there was no awareness of the limitations of natural resources and the rising temperatures caused by greenhouse gas emissions, and buildings were very poorly insulated. Additionally, many housing complexes became associated with the social problems caused by concentrations of poverty and were demolished around the turn of the century as acts of regeneration. In these acts no account was taken of the significant energy and resources embodied in these structures nor were they appreciated for the cultural and democratic social vision that they represented. This was the case in many countries and the negative attitude was deepened in France where the *grand-ensembles* housing projects of the nineteen sixties and seventies were populated by people from lower socio-economic groups, a large proportion of whom were African immigrants who were socially segregated to the *banlieues* (suburbs), and "the concrete towers represent a highly visible monument to the social plight of the suburbs and the failure of French integration policy." (Ruby and Ruby 2007).

In the early 2000s, French architects Lacaton and Vassal carried out design research on the potential for refurbishment of these housing blocks for the Ministry of Culture and Communication. The published this work in 2007 in a book called *Plus – Les Grands Ensembles de Logements Territoire d'Exception* (More – Large Scale Housing Developments, An Exceptional Case) where they showed that it would be possible to retrofit and extend these housing developments so that every inhabitant could have fifty percent more living space for approximately half of the cost of demolishing and replacing them (Druot, Lacaton, and Vassal. 2007). Adopting the principle that "The most sustainable building is the one that you have already" they recommended that you never demolish, but rather add to and augment the architectural qualities of what you have already. The first of these projects was completed in Paris in 2012 and was recognised as a landmark in the development of architectural thinking, and a subsequent project in Bordeaux won the European Union Prize for Architecture in 2019.

In 2020 the President of the European Commission Ursula van der Leyen, announced in her state of the union speech a project for a "New European Bauhaus for a Green Transition" *to address the need for a "renovation wave" that recognises the importance of sustainability in buildings and the cultural project of making "a bridge between the world of science and technology and the world of art and culture"* (von der Leyen 2020).

The inclusion of culture in this announcement was very significant as it recognises the cultural value of architecture and the need to balance this with the desire to improve the energy performance buildings. In the twenty-first century modern architecture is seen as a significant cultural legacy of the twentieth century, and it is widely recognised that it needs to be preserved with its aesthetic qualities intact for future generations. Because of the nature of the industrial materials that were used in the construction of modern buildings this can lead to tensions between the desire to preserve cultural value on the one hand and the desire to improve environmental performance on the other. The description of the proposed new wave of renovation as a "cultural project" explicitly recognises this issue.

Making Ireland Modern

In 2014 the author and Professor Gary Boyd, then teaching colleagues in Queens University Belfast, were selected to represent Ireland at the Venice International Architecture Biennale which was addressing the theme "Absorbing Modernity" and asked participants to look back at the absorption of modern architecture in their countries over the previous century. We developed an exhibition titled *Infra-Eireann* that showed how in Ireland the newly independent modern state had used modern infrastructures to make Ireland modern after the dark night of colonialism. We researched and displayed ten "infrastructural episodes" corresponding to each decade of the century and we then went on to edit a book titled *Infrastructure and the Architectures of Modernity in Ireland 1916 – 2016* (Boyd and McLaughlin 2015). Following the Venice exhibition, the Arts Council of Ireland asked us to develop an expanded version of the exhibition as part of their 1916 commemoration programme of events and this exhibition titled "Making Ireland Modern" toured Cork, Dublin, and Galway, with a series of associated talks and events. The research project showed the strong relationship between modern architecture, infrastructure, and the social development of the Irish state. One of the key episodes was the democratisation of education that occurred in the nineteen seventies following the Free Education Act of 1967 which led to the construction of many schools and the expansion of universities. In the exhibition this was represented by St Brendan's Community School in Birr, County Offaly which was built as a result of an architecture competition held in 1974 by the new Buildings Unit of the Department of Education, who were charged with the delivery of a major programme of school buildings.

Keeping it Modern

In 2014 The Getty Foundation in California launched a programme of grants called "Keeping it Modern" aimed at encouraging the conservation of Modern Architecture around the globe. The programme recognises that -

"Modern architecture is one of the defining artistic forms of the 20th century. Set free from traditional structural requirements, architects and engineers used experimental materials and novel construction techniques to create innovative forms and advance new philosophical approaches to architecture. Today this modern architectural heritage is at considerable risk. The cutting-edge building materials and structural systems that define the modern movement were often untested and have not always performed well over time. Heritage professionals do not always have enough scientific data on the nature and behaviour of these materials and systems to develop the necessary protocols for conservation treatment."

In 2018 they invited the author and Professor Boyd to make an application for a grant to develop a Conservation Management Plan for a modern building in Ireland and we proposed Birr School. The school

is not only an important building, having won the triennial Gold Medal of the Royal Institute of Architects in Ireland (RIAI) in 1989, but is also representative of a whole generation of education buildings that were built in the nineteen seventies that are now badly in need of refurbishment and upgrade. We consulted the buildings unit of the Department of Education, who as the building's owners were supportive of our proposal and saw the value that this research could bring to a major section of their building stock. The school stands at the heart of the community in Birr town and is central to the social fabric of the town. The school owns a seventy-acre bog from which turf was harvested and burnt in the central heating plant up until 2001. Many of the students and some of the teachers are children of former students. Since part of the assessment of value in conservation of twentieth century architecture is the social significance of the building, we proposed using ethnographic survey methods developed in the social sciences alongside traditional hard science surveys to understand the building. The project team included the author, Professor Boyd of QUB, Aoibheann Ní Mhearain from UCD and Tara Kennedy from UCC, with QUB leading the study.



Methodology

The stage one research methodology brought together historical, fabric, social and environmental analysis to understand the school's daily performance, programmatically, socially, and environmentally, within the context of its architectural significance and its material vulnerabilities. Mapping and recording this broad

picture of the school was necessarily complex. It included archival research, oral histories, condition surveys and opening up work, considerable environmental data modelling and monitoring, and social surveys of behaviour and use. Typical classroom and breaktime spaces were monitored with temperature, relative humidity, and air quality monitors to understand the daily fluctuations in use. In addition, sound analysis, thermography, air pressure testing, and thermal bridge and condensation risk analysis help us understand the performance of the spaces. This layered approach surveys how the school is used, and also critically how the building is perceived by its users. The school had been recognised as an important building when it was first built and was featured in the British magazine *The Architect's Journal* with photographs by John Donat. One of the first surveys that we conducted was to commission another photographer, Ros Kavanagh, to take pictures from the same viewpoints as Donat had in 1980 and these pairs of images were featured in a commissioned article by the author and Aoibheann Ní Mhearáin in the international *Architectural Review* in June 2019. (McLaughlin and Ní Mhearáin 2019)) The photographs highlighted many of the changes that had been made to the building since its construction especially in 2001 when the building's services were upgraded, and the roof was replaced. Increased rainfall as a result of climate change had led to additional rainwater pipes and guttering being added which changed the appearance of the building.

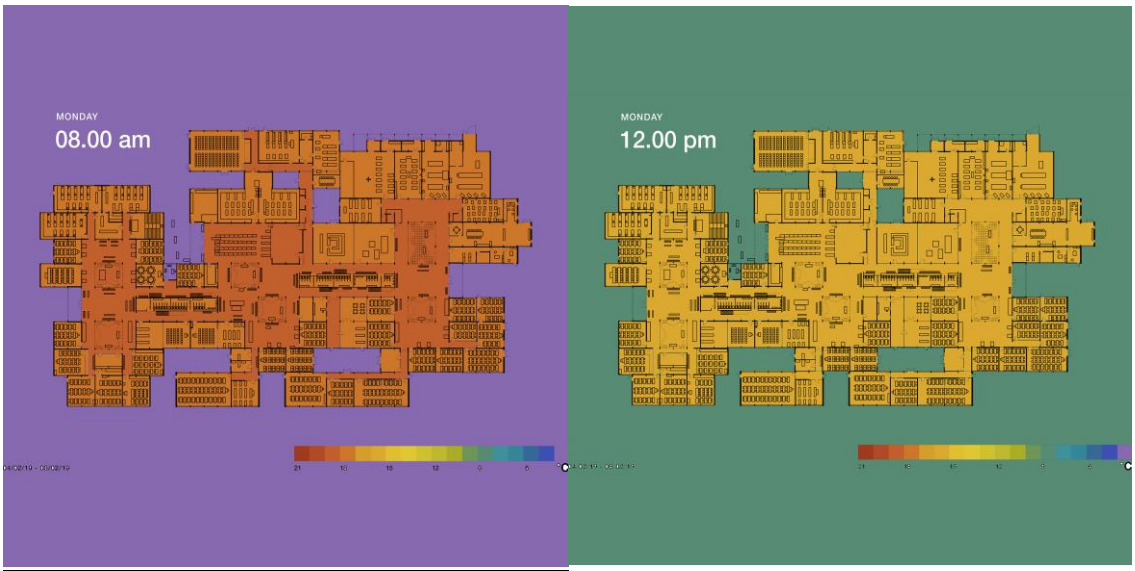


Photographs of the school entrance by John Donat in 1979, and Ros Kavanagh in 2019.

Stage 2 'Interpretation' involved assimilating the range of information collated in Stage 1 'Understanding the Place' and beginning to gather meaning and findings from these. Where Stage 1 was about setting a baseline of information, Stage 2 is about developing meaning from the findings that can lead to outcomes in Stage 3. The aim of this process was to reveal otherwise unseen relationships in the school, to create connections between, usually separate, practices of social, historical, and environmental analysis. This is important in particular in this school because of the social and technological values that formed the basis for its design in the 1970s. This deepened understanding gained from this analysis informed the development of the statement of significance, policies, and intervention strategies in later stages.

The means of exploring connections between the 4 separate surveys of stage 1 was through interpretative and exploratory maps, including: A network map; a location map; chronomapping; social heat map; photography map; and environmental mapping. In most instances these maps use the spatial dimension of a map or plan, and connect it to interpretative information relating to time, networks, experience,

temperature etc. In this way the many layers of life of the building are made apparent, making connections between parts that are usually separate. In addition to the drawings a series of films by Ros Kavanagh were commissioned developing on the understanding of the building developed in stage one.

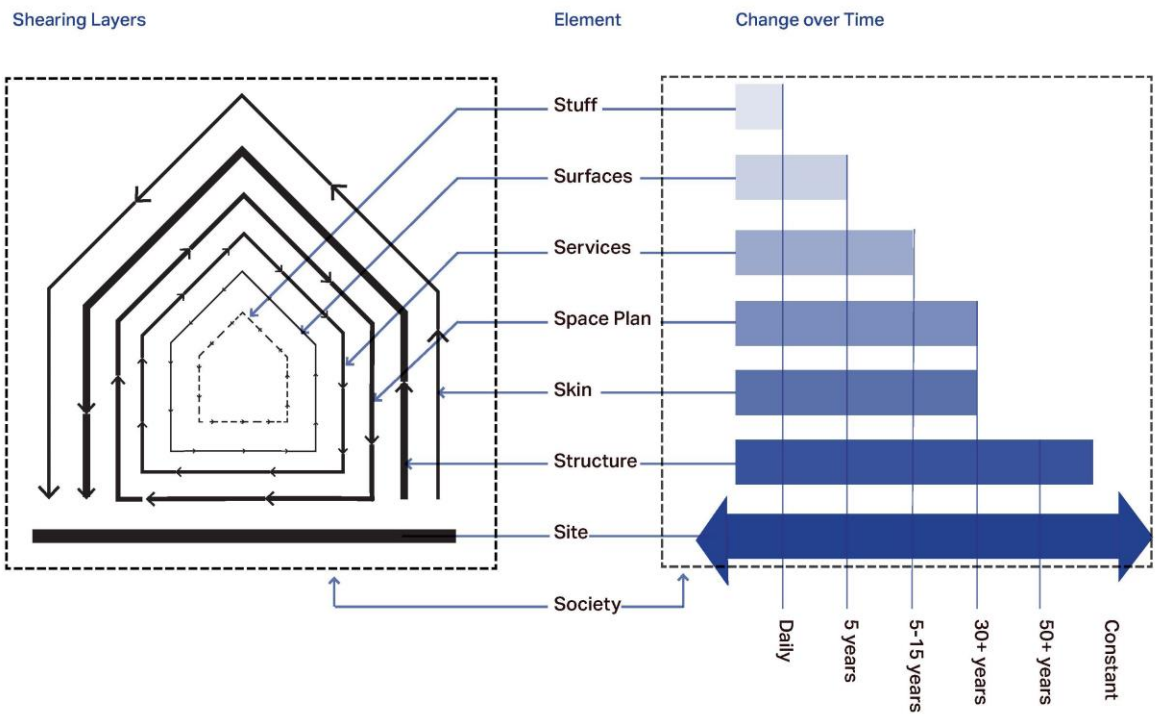


Spring Equinox Survey showing Temperature variations during a morning.

At the midpoint of the process, we organised a symposium on the conservation of modern architecture with a panel of international experts and we exhibited our research in an exhibition at the Irish Architectural Archive. This contributed to the dissemination to professional architects in Ireland of the emerging practice of conservation of modern architecture, and it provided us with a panel of mentors who gave us critical feedback on our proposed evaluation methods.

Evaluation

To isolate the elements of the building we used Stewart Brand's theory of shearing layers developed in his book *How Buildings Learn: What Happens After They are Built*, respectively: site, structure, skin, space plan, surfaces, services, and stuff (Brand, S. 1995). The shearing layers are represented in separate planimetric drawings and these planimetrics were used to show values. While shearing layers represent the physical layers, they also relate to the aspect of time in buildings, ranging from 'site' as the most enduring element of a building and 'stuff' being ephemeral, often changing daily. If we consider the elements of the building in relation to their longevity, this forms part of the consideration of their value. We added an eighth layer for "Society" to Brand's seven others to reflect a combined layer that represents the ethos of the project as it embraced social change in Irish life in the twentieth century, and continues to include the everyday social life of the school's staff and students. The term 'society' here relates to the original design intention as well as the socially historical significance; it also points the direction for the future of the school.



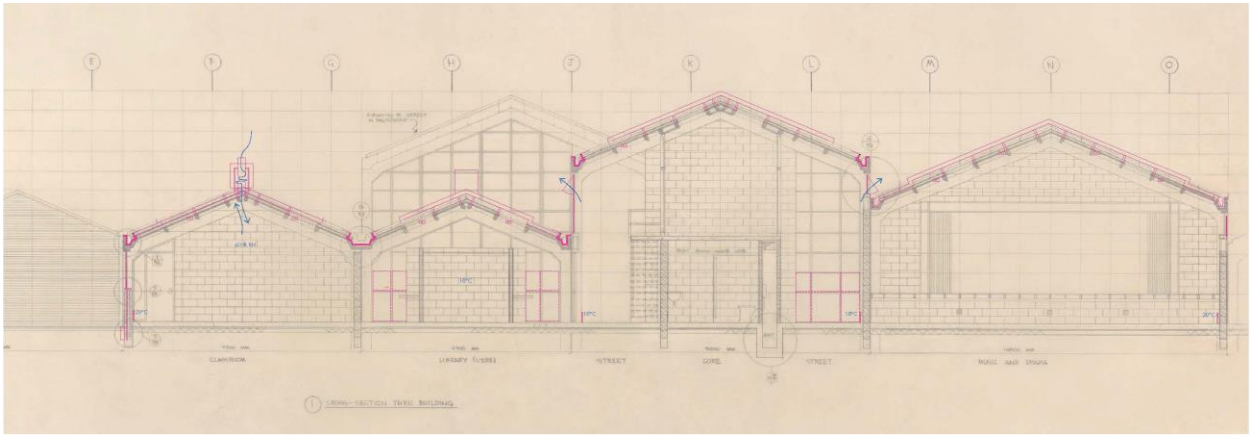
Significance

The school is an internationally recognised exemplar of post-war architectural modernism in Ireland and exhibits many of the hallmarks of this period. These include: the development of an innovative concrete portal frame system that provides a flexible and adaptable plan; technical detailing that expresses the means of construction and individual components; the use of off-the shelf, ordinary and inexpensive industrial materials; the qualities of transparency, created by the significant amount of glazing and the internal courtyards deep within the plan that blur the relationship between outside and inside. Intimately connecting the programme of the school with the structural system the plan realises a building that reflects the social agenda of the period, politically and architecturally. This is achieved through a sophisticated programming of teaching, social and courtyard spaces along with the concrete portal frame system that allows flexibility and variety. Together the social ambition and technical innovations create a democratic, non-hierarchical plan that accommodates a vibrant school. The school design was one of the premiated entries in the 1974 Department of Education school's competition, it is considered the most significant, successful, and progressive commission resulting from the competition. Significantly, it remains largely intact. The building received the RIAI's gold medal in 1989, the highest honour awarded by the institute, awarded 10 years after a building's construction.

Evaluation Matrix

While the statement of significance states *why* the building is important, the value matrix established *what* is important in the building. We examined, element by element, what was significant and located those in the building. Starting with the shearing layers as the core elements to be assessed, we ascribed values to these to create a value map for the building. Through more granular analysis we were then able to develop a matrix of the tolerance of the different layers for change along a scale of 1 to 5. This map in turn led us

to categorise vulnerabilities and opportunities for intervention within the building. On the basis of this assessment, we were able to develop a series of policies to guide future interventions into the building along with its ongoing expansion as a thriving school. Finally, from these policies, we drew up a series of strategies for intervention in the fabric to upgrade the environmental performance of the building while conserving its architecturally significant features.



Archival section of Birr School overlaid with interventions highlighted in pink.

Impact

The first impact of this research has been on the school itself where our Conservation Management Plan (CMP) is guiding the development of proposals for refurbishment and expansion. Beyond that the research has already been exhibited in Ireland and has been the subject of articles in a number of international reviews. The Conservation Management Plan has only just been submitted to the Getty Foundation and it is hoped that our methodology will contribute to the developing discipline of retrofitting modern buildings which is expected to become a major part of architectural practice in the current century. The research methodology provides a model that will be used in the author's teaching of architectural design to students in the Cork Centre for Architectural Education as well as by the research partners in UCD and QUB.

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