



# INTELLIGENT BUILDINGS GROUP

Newsletter Summer 2020



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An intelligent building is one that is responsive to the requirements of occupants, organisations and society. It is sustainable in terms of energy and water consumptions besides being lowly polluting in terms of emissions and waste: healthy in terms of well-being for the people living and working within it; and functional according to the user needs”

Clements-Croome (2010)

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# INTELLIGENT BUILDINGS OF THE FUTURE WILL BE MORE PROMISING



Dr. Amirhosein Ghaffarianhoseini



Dr. Husam AlWaer



Dr. Ali Ghaffarianhoseini



Prof. Derek Clements-Croome

In recent years, many professionals and academicians have drawn more robust attentions to the promising role of Intelligent Buildings (IBs). Nevertheless, the perception on IBs remains highly diverse and can be significantly versatile from a discipline and/or region to another. What we really mean by 'INTELLIGENT' is still a core research question and requires further in-depth technical explorations as well as qualitative analysis to clarify the true essence of IBs and their ultimate benefits. In two recent studies, Ghaffarianhoseini, et al (2016 and 2018) re-defined IBs as ever-evolving entities with attention to 4 key performance indicators (KPIs):

*KPI-1 Smartness and Technology Awareness*

*KPI-2 Economy and Cost Efficiency*

*KPI-3 Personal and Social Sensitivity*

*KPI-4 Environmental Responsiveness*

More recently, in the IB Roadmap 2018, 2 more KPIs were proposed for achieving more inclusive and effective IBs and with particular interest in bridging the existing gap between IBs and smart cities:

*KPI-5 Health & Well-Being*

*KPI-6 Urban-Scale Responsiveness*

Nonetheless, are current IBs really effective? Do their design, construction and operational phases follow the above KPIs and/or do we have a universal system to assess their performance and rate their effectiveness/impact? Even before responding to these raised points, how do we differentiate between IBs, green buildings and other emerging concepts?

These debates bring forward a call to search for re-defining professionalism in relation to IBs. New IBs should become the actual results of new ways of thinking by professionals -

Thus, it is believed that 'new professionalism' can be proposed as a new KPI to serve as an essential component of future IBs towards demonstrating the line of thinking and thought process of interdisciplinary teams of professionals involved in the respective projects.

## KPI-7 New Professionalism

From the UK to New Zealand, there are several recently built architectural projects that claim to be green, sustainable and healthy and in many cases, are also labelled as smart or intelligent. But, are they really intelligent? Based on what measures? Can professionals simply consider a so-called green building an IB? There is no doubt that more consistent research is required for defining key distinctive boundaries for IBs. But more importantly, it is key to remember that IBs should not be considered static and require high rate of adaptability while continuously embracing new targets.

## Reference:

Clements-Croome, D.J. (2013). Intelligent Buildings: Design, Management and Operation. 2nd ed. London: ICE. Ghaffarianhoseini, A., Berardi, U., AlWaer, H.,

Chang, S., Halawa, E., Ghaffarianhoseini, A., & Clements-Croome, D. (2016). What is an intelligent building? Analysis of recent interpretations from an international perspective. *Architectural Science Review*, 59(5), 338-357.

Ghaffarianhoseini, A., AlWaer, H., Ghaffarianhoseini, A., Clements-Croome, D., Berardi, U., Raahemifar, K., & Tookey, J. (2018). Intelligent or smart cities and buildings: a critical exposition and a way forward. *Intelligent Buildings International*, 10(2), 122-129.

Research Roadmap (2018). Intelligent and Responsive Buildings, International Council for Research and Innovation in Building and Construction, CIBSE Intelligent Buildings Group.



# BIRMINGHAM CITY UNIVERSITY UPDATE

In 2009 BCU embarked upon a £260m multi-campus estates and facilities transformation scheme to relocate its main campus into Birmingham city centre to develop an existing presence; and to further develop its Birmingham Edgbaston campus.

An important part of that transformation was to employ technology to benefit students and staff and in how they experience the campuses increasingly integrated, combined and complimentary physical and digital services. In addition, the university is committed to reducing its energy usage to benefit the environment and to achieve optimum operating levels.

It is a matter of opinion on what an 'intelligent building' is, could or should be. In many cases it seems that 'intelligence' in the context of buildings is associated with how automated and integrated the building-management and environmental systems are. As the boundaries between the physical and digital environments blur and amalgamate, previous delineations and narrow definitions of what constitutes an intelligent-building are being rethought.

The opportunities and potential for development are further explored by CIBSE's Intelligent Building Group (Book 2013 Intelligent Buildings: An Introduction, Earthscan); and in CIB's W098 Commission on Intelligent and Responsive Buildings Research Roadmap: [https://site.cibworld.nl/dl/publications/CIB\\_415\\_W098\\_RR.pdf](https://site.cibworld.nl/dl/publications/CIB_415_W098_RR.pdf)

This re-thinking is prevalent in the university sector which has seen many universities undertaking large campus development schemes to expand and improve facilities. The timing of such developments has been interesting in that in-parallel the 'online' environment has expanded and developed exponentially in offering new platforms for reliably delivering educational services and content on-demand.

The popularity of blended-learning offers that suit the lifestyles of many contemporary students can provide for many the ideal mix of physical specialist facilities and online content. In a similar sense the infrastructure that underpins these technology platforms that deliver university services are a mixed economy of on premise and cloud based.

The practice of segregating building and environmental systems on separate physical networks and servers is rapidly evolving in design

to shared integrated architectures that are increasingly virtualised and 'software defined'. The associated capital and operating costs of building and running technology infrastructure in this way offers the potential for considerable savings over more traditional approaches.

In a university context that is focused upon the 'experiential' this is expenditure that can be invested into creating and developing other services for students. A source of inspiration as to what these new and enhanced student services should be can be extracted from the business-intelligence produced from the aggregated data available from the same integrated technology systems used to manage universities.

It is the quality and interpretation of that same data that will help to enable universities to provide the best and most appropriate services and associated experiences to their students and staff now and into the future. The goal of interpreting changing individual and group needs and wants and matching and exceeding them whilst remaining mindful of being intrusive will become the expected norm; as in other service industries where personalising offers, delighting, retaining and building customers is key.

Intelligent buildings can offer universities and organisations value in more subtle but strategically critical ways. An intelligent building or campus quintessentially should be a very desirable environment to work in. As part of the broader combined attributes and benefits offered by the organisation that attract and retain the best talent the building or campus should also be an inspirational place in which to work, learn, interact, contribute, create and innovate.

In the era of the digital economy and knowledge worker the ability and facility to attract and retain that best talent translates to strategic advantage more than ever. From an operational perspective the significant savings and sustainability advantage of intelligent buildings and sentient environments are paralleled by the savings from stemming absenteeism talent and productivity loss, reputational and associated brand damage and enhancing occupant experiences to promote health and well-being; and in-turn driving value.

**BY STEVEN HIPWELL**

Associate director IT programme management  
at Birmingham City University

# CREATIVE DESIGN & COLLABORATING LEARNING

MDX Living Pavilion on campus

The MDX living Pavilion project (shortlisted for Guardian University Award 2020) introduced the fusion of digital and physical learning-by-doing projects for undergraduate students across disciplines and contribute to the sustainable development of Middlesex university campus.

The Pavilion plays a number of roles including as a flagship for collaboration between departments, a showcase for sustainability and innovation on campus, an events venue and an outdoor classroom. It has planning permission for the next five years and is designed as an easily-adaptable structure so it can continually evolve.

Architectural Technology (AT) BSc Hons. course year-2 and final-year students were jointly supported by industry-academia experts through the journey of a live project on campus from conception to completion. The real life interaction with stakeholders that could only be addressed partially by BIM-enabled digital learning environment in classroom, the dynamic bi-directional (physical and virtual) experience enhanced students' cognitive skills development for effective learning.

AT students as the ambassadors of student communities participated in key stakeholder groups (planners, consultants, university executive board, potential project sponsors, end users and estate management team) meetings, and were included in the communication process of planning and making technical, design and management decisions.

For more information:  
<https://www.mdx.ac.uk/news/2020/03/living-pavilion-guardian-university-award-teaching-excellence>



Regular visits to project site and Q&A sessions with site manager throughout the construction phase enhanced AT students' understanding on their design impacts in real project for campus' sustainable development and engagement with local communities. Several courses across faculties were using the pavilion for connected curriculum learning deliverables.

Being actively involved in campus development to create a legacy, students earned work placement opportunities in some of 20 industry partners, also with insightful guidance by MDX estate management team, students embraced team collaboration, peer and social learning, and interpersonal communication skills with visible impact in their study and satisfaction.

Since MDX Pavilion (phase one) construction completed in the summer, an inventor in the neighbourhood (Dragon's Den winner 2015) got in touch, and would like to share his experience with our students on design and innovation in new multi-disciplinary learning & teaching R&D projects, meanwhile, enhancing our academia-industry collaboration to transform students potential into real life success.

## BY TONG YANG

**Tong Yang is Senior Lecturer at Middlesex University**



# IMPORTANT UPDATES

## CIB PROGRAMME COMMITTEE

### PC Commendation for Derek Clements-Croome



International Council  
for Research and Innovation  
in Building and Construction



It is customary that the CIB Programme Committee in the beginning of the new year selects one or a few CIB Commission Coordinators (or Priority Theme Leaders), who receive a Commendation for extra ordinary performances or accomplishments in the previous year.

The 2018 CIB PC Commendation has been awarded to Derek Clements-Croome for having facilitated the successful cooperation between CIB and CIBSE in general and for having provided a very stimulating leadership to the joint CIB – CIBSE Commission on “Intelligent and Responsive Building” in particular.

In addition for being the Editor in Chief of the CIB Encouraged Journal “Intelligent Building International”.

More information about the CIB Commission W098 – Intelligent and Responsive Buildings can be obtained [here](#).

More information about the CIB Encouraged Journal Intelligent Buildings International is to be found [here](#).



#### TV Appearance

A CNBC TV segment on sustainability dated October 17th 2019 features Derek is available on the network's website.



#### New Report

INBI has published a special issue on transdisciplinary workplaces



# PREVIOUS NOTABLE EVENTS

## Designing & Operating Buildings for PEOPLE

a CIBSE-CIB technical symposium



### Event Description:

People spend over 85% of their time in buildings, and therefore it is extremely important for buildings to provide healthy and flourishing indoor environments. In this one-day symposium the challenges of meeting the zero carbon journey together with achieving health and wellbeing objectives will be addressed with new approaches based on occupant-centric building design and operation aided by innovative technologies. These challenges will be explored and discussed by experts from both industry and academia, to summarize current achievements and propose directions for future developments.

#### Presentation



#### Discussion



#### Networking



### Speakers:

**Marylís Ramos**, PRP

**Joyce Chan**, UK Parliament

**Geoff Prudence**, Chair CIBSE FM Group

**Tong Yang**, Middlesex University

**Minna Sunikka-Blank**, Cambridge University

**Shuli Liu**, Coventry University

**Guy Battle**, The Social Value Portal

**Lars Hesselgren**, PLP Architecture

**Kerstin Sailer**, UCL

**Richard Buswell**, Loughborough University

### Agenda:

**Date:** 17 October 2019 (Thursday)

**Time:** 9.00am – 5.00pm

**Registration fee:** £20 (Non-student), £10 (Student)

**Venue:** Saint-Gobain Multi Comfort Visitor Centre, 95 Great Portland Street, London, W1W 7NY.

**Book tickets at:** <https://www.eventbrite.co.uk/e/cibsecib-symposium-designing-operating-buildings-for-people-tickets-71796853321>



### Organization Committee:

**Dr. Shen WEI:** University College London

**Dr. Tong YANG:** Middlesex University

**Prof. Derek CLEMENTS-CROOME:** Reading University, Chair of CIBSE Intelligent Buildings Group

**D'Souza EVA/LON:** Jacobs



**Middlesex  
University  
London**



**University of  
Reading**

# UPCOMING EVENTS + RESOURCES

EVENT TOPICS	ORGANISER	PROPOSED DATE AND VENUE
<b>Biophilic Design Brings Value</b>	<p>There is a rapidly expanding knowledge base evidencing the value of biophilic design. Stress is a major factor that causes absenteeism and presenteeism in offices and other building types. The value of designing to connect with Nature cannot be over-estimated. This seminar presents hard evidence about the value gained by environments with greenery.</p> <p>Joyce Chan-Schoof – Evidence about value of biophilic design            Ankita Dwivedi — Stress Recovery in the Workplace            Younma Dmour —Case study at Second Home            Clare Bowman — Putney High School for Girls: Case study Biophilic Classroom            Alexander Bond — Biophilia examples worldwide</p>	10 June 2020, Online, CIBSE Website
<b>Intelligent Building Rating Method</b>	<p>Matthew Marson            Looking at how we can assign a score to the intelligence of building.</p>	2020
<b>The Fourth Industrial Revolution and thinking outside construction bubble</b>	<p>Topics:</p> <ul style="list-style-type: none"> <li>- Graphene</li> <li>- Blockchain</li> <li>- Nano materials</li> <li>- Robotic Process Automation</li> <li>- Cognitive Computing</li> <li>- New materials—Angela, AHMM, AKT II, DEREK</li> </ul> <p>Speakers:</p> <ul style="list-style-type: none"> <li>- Philip Ross on a review of current developments leading to the future</li> <li>- Matthew Marson on Technological futures</li> </ul>	1 <sup>st</sup> July 2020, Online, CIBSE Website
<b>Growing talents through placemaking</b>	<p>Tong Yang</p> <ul style="list-style-type: none"> <li>- Multidisciplinary learning, teaching and upskilling -lessons learnt</li> <li>- People engaged HE estates &amp; facilities</li> </ul>	2020



## **Building Design for People: Sustainable Liveable Buildings**

by Derek Clements-Croome published by Crowood Press  
Released: late Spring 2020



## **Smart Places Blog**

A developing guide of Intelligent Buildings commentary and key learnings  
[www.smartplaces.group](http://www.smartplaces.group)



## **Digital Buildings Bootcamp**

A kick-start training programme for built environment professionals wanting to learn digital. [www.digitalbuildingsboot.camp](http://www.digitalbuildingsboot.camp)



Together with AHMM, the University of Reading and the British Council for Offices we published the research paper 'Making the Future Workplace – Materials & Methods towards a Circular Economy'. Rob Partridge and Chris Blust coauthored the paper with Ed Harris and Stephen Taylor of AHMM and Derek Clements-Croome, Emeritus Professor at the University of Reading.