Robotic Arms Race in Architectural Education

10 February 2014 | By Michael Abrahamson
Across America, schools of architecture are arming themselves with robots that will forever change the face of architectural education

A robotics arms race is under way. Across the United States’ schools of architecture, workshops are expanding in response to increasing demand for specialist equipment. KUKA, Stäubli and ABB are manufacturers of robotic arms whose names now appear as frequently as the faculty’s in news reports and recruitment brochures.

These machines are challenging professors for more than just column inches, as they have created a hierarchy of technical proficiency within architectural pedagogy. The number of robots is soaring, and their specifications are said to be significant enticements for prospective students, in spite of the fact that only a few may ultimately make use of them. Overcoming these limitations by making robotics more user-friendly – for both students and staff – is undoubtedly the next step in the race.

The latest advance comes courtesy of the University of California, Los Angeles (UCLA), whose new Architecture and Urban Design IDEAS campus opened to students in August. Located 20 minutes south of the department’s base in Westwood, this flexible industrial hangar hosts a growing post-professional Master’s degree programme known as Suprastudio. Enrolled students commit to a year-long research project led by a world-renowned LA architect in close collaboration with an industrial or institutional partner. Current studio heads include Greg Lynn, Thom Mayne and Frank Gehry, each leading a group of around 15 students.

Two of UCLA’s robotic arms boast a 150kg lifting capacity, the largest of any robots currently on a university campus

With support from Toyota Motor Sales, the 6,000 square foot Advanced Technologies Lab at the satellite campus boasts four robotic arms: a pair of Kuka KR 150s and two Kuka KR 6 Agiluses. The former wield the largest carrying capacity of any robots operating on a university campus in the US at 150kg, yet the real leap forward comes from the software installed to operate this powerful machinery. Developed by the Bay Area design and engineering
studio Bot & Dolly, it operates as a plug-in for Autodesk Maya, an animation program widely used in architectural education.

As early as their second week, students were able to program robot movements using keyframes in Maya, setting the location and rotation of each of the arm’s axes, permitting the software to calculate the required movements in-between. For the uninitiated, this means it’s much easier for students to make the robots move, and to coordinate their movements with incredible accuracy. According to IDEAS Technology Director Güvenç Üzel, these machines ‘aren’t guarded by specialists but integrated into the curriculum’, the goal being to move beyond the now commonplace use of robots for modelmaking and fabrication. What faculty and students will actually do with these newfound technological capacities has been left intentionally vague, but they’ll certainly have plenty of space to do it in.
IDEAS occupies part of what was once among the world’s largest wooden buildings, erected by business magnate and aviator Howard Hughes to house the construction of the H-4 Hercules flying boat – known colloquially as the ‘Spruce Goose’. The connection to Hughes is important to IDEAS. He embodied both the positive and negative stereotypes many associate with architects – eccentric and visionary, but also obsessive, uncompromising and egotistical.

The robotic arms are controlled using a plugin for Autodesk Maya, meaning students were able to program movements in just a matter of weeks.

The Hercules Campus, as this commercial park now known, is part of ‘Silicon Beach’, a growing conglomeration of tech start-ups and manufacturers in the neighbourhoods between Santa Monica and Long Beach wherein UCLA counts Google and YouTube as neighbours. Students can rub shoulders with peers in business and industry, fostering hybrids of academic research and industrial development. Such collaborations need not be reduced to simple problem
solving but might instead, in the words of Üzel, ‘explore how architecture can expand its field by collaborating with people who may not be traditional architectural clientele’.

While UCLA may be guilty of the ‘eager guilelessness’ that Reyner Banham decades ago diagnosed as the dominant *modus operandi* of Los Angeles, it is refreshing to see this level of spatial and technical capacity committed to making robots easier to use and more versatile.[1] Unlike the hazard-warning orange paint job of those installed at other schools, the IDEAS robots are a lustrous purplish-blue, visually demarcating UCLA’s grand ambition to set itself apart from its peers. Banham’s diagnosis remains a trenchant and incisive description of the ongoing work at IDEAS, where, one hopes, the future of robotics in architecture will be made more open and accessible. If not, the tech-savvy among us may be the only ones left with a desk.

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