Karl Marx recognized the epistemological conundrum of the tool. In their writings on commodity fetishism, Marx and Engels argued that the things that people produce take on a life of their own to which humans and their behavior adapt.

“The creation of new needs in people spurs them on to find new ways of satisfying their needs, to expand their productive capacities and even to change their social relations in order to facilitate the cooperative exercise of these new powers.” In other words, the tool is not designed for a user. Rather, the tool produces a user.

The questions that arise upon reading these six papers are indeed epistemological. Are our digital tools creating problems that need new digital tools to solve? Or do new tools solve problems and generate new problems to be solved?

The authors of the papers in this section effectively support Brett Steele’s claim that “the single greatest change in architecture today from its recent past, in the shaping of what is taken to be architectural knowledge (let alone expertise)” is the need for “multidisciplinary expertise within design teams, and from the very beginnings of young architects’ working lives.” The expertise of these authors fall into the realms of statistics, new media animation, robotics, mathematics, machine operation, and behavioral psychology. It is not simply a matter of the difference between specialized knowledge versus generalized knowledge. The question posed by the topics of these papers is in fact epistemological: what is architectural knowledge? How is this knowledge acquired? How do we, as architects, know what we know? And can our tools help us to know what we know?

While each generation of new architects considers itself an agent of radical change within the profession, the implementation of digital tools has not changed the primary role of the architect. Architects remain, above all else, communicators, synthesizers, team builders, and spatial visionaries. These authors have little interest in the traditional architectural realms of geometry. Neither form nor performance are of primary interest to these authors; information is.

Informing Information

Digital tools in architecture fall into four broad categories: generative design tools, representational tools, information management tools and fabrication tools. The authors of the papers in this session share an interest in managing design choreography throughout the design process, from conception through fabrication. The common thread in these papers is an interest in workflow, in process rather than in results, and in the way in which knowledge is disseminated, shared and applied. These authors recognize the productivity of understanding the process of design, including the collaboration and communication between the different participants, and seek to develop tools that support these activities.

With the development of new tools come questions of knowledge and its dissemination. I would ask these authors how they might define the knowledge that an architect must have. Is knowledge of the limitations of particular tools, and hence their possibilities, enough? Or must the user of the tool be an expert?

Who designs and develops these tools? Who learns and operates these tools? How long does it take to learn to use these tools effectively? And does the a priori assumption of particular tools during the concept phase narrow the possible outcomes?

Knowledge or Simulation

The projects described in these papers allow us to envision and simulate information and to translate this information into a usable form throughout the design process, from conception to fabrication.

The authors of both Comparing Immersion in Collaborative Ideation Through Design Conversation, Experience and Workload and Tangible Tools for Architectural Design are interested in evaluating process rather than results early in the design process, in both cases reexamining the design ‘sketch’. The first paper describes a method of physically immersing oneself into sketches and models in life-size and realtime representations. In the second paper, Gerhard Schubert and his co-authors describe a process whereby the
“boundary between sketch, simulation and analysis blurs into a continuous creative design process”. Their statement that ‘the simpler the tool is to use, the less it gets in the way of the actual process of designing’ is a direct challenge to the computational complexities described in other papers.

Burak Pak, Ivo Vrouwe and Johan Verbeke, authors of Low-Cost Portable Immersive Spaces, are developing an immersive environment that combines textile structures, gesture-recognition tools and multiple projections in order to interface between web-based geographic virtual environments, experts and lay people. In Informing Architecture and Urban Modeling with Real-world data on 3D Tangible Interfaces and Augmented Displays Flora Salim and her sixteen co-authors describe ‘augmented displays [that] provide theatrical settings for designers to visualize real-world data and experience realtime feedback while manipulating physical and digital models on the table.’

Kermin Chok, an engineer, describes in his paper, Progressive Spheres of Innovation, the development of tools that enable interoperability and automated workflows in order to provide rapid and non-linear structural feedback throughout all phases of the design process. In Parametric Robot Control, Johannes Braumann and Sigrid Brell-Cokcan seek ‘to design a new user interface that allows intuitive control of parametric designs and customized robotic mass production’, recognizing that the industry standard software does not allow for a seamless integration between the design process and the fabrication process.

All of these papers describe cross-disciplinary interfaces. These authors are not simply developing tools that augment the design process, but developing tools that analyze it.

Summary

As an educator, I inevitably want to know what the new expectations are for the dissemination of specialized computational instruments in schools of architecture. Digital technology and digital fabrication expand (an arguably narrow portion of) our repertoires. An educator is responsible for enabling students to work at the cutting-edge of the profession. More precisely, our role is to provide the knowledge of the possibilities of our toolsets and to evaluate their worth and value.

As an administrator, I seek to meet the challenge set by philosopher José Ortega y Gasset as paraphrased by David Leatherbarrow, “the good architect is the one who knows more than an architect knows.” An over-emphasis on skills-only-based courses risks turning our architecture programs into vocational schools. When architecture becomes solely about how, rather than why, it becomes devoid of intellectual and educational content. How do we ensure that the knowledge required to develop the tools can be taught without an overemphasis on the operation of specific tool-sets? As a practitioner, I want to know the advantages we gain from the application of these tools in the design process and in the design outcome. How are the users of the buildings affected by new design instruments? What is the effect on building performance, construction time and cost? What are the intentions and values that drive the design of the tool? How and who defines the expectations for the design and the tools.

It’s not enough to simply learn about, develop and implement tools that augment the design process. We must also be able to measure, analyze and understand the value of our design processes and what we produce. Without this knowledge, we cannot call ourselves architects. We remain users produced by our tools.

Notes