

Making space on the workbench – the methodological implications of Computer Aided Design on art and design practice.

This paper explores the implications of integrating Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) system and processes with conventional fabrication practices in the context of contemporary art and design practice. It seeks to explore the constraints and affordances of these technologies and identify methodological challenges they present.

Once the domain of engineering and manufacturing companies CAD/CAM has made its way onto the workbench of artist and craftspeople to take a seemingly permanent place along side the array of conventional fabrication tools. Enabled by the maker community and DIY movement 3D printers, laser cutters and CNC machines are now no more expensive than table saws and MIG welders and have become standard workshop equipment in universities and tertiary institutions.¹

Drawing on specific examples of work by students and researchers at Colab - AUT Universities' interdisciplinary research centre procedural parallels and conflicts are identified and critiqued. The recent evolution of AUT's Art and Design workshops into *3D labs* that have embraced fused deposition modelling, laser cutting and CNC fabrication processes has raised fundamental question about the role of traditional processes and knowledge in art and design practices.

To a generation more conversant with CAM than with hands on fabrication techniques the significance of understanding material attributes and the acquisition of manual skills has been rendered almost redundant by the “print” command of the laser cutter and 3D printer. Rather than heralding a “dumbing down” of craftsmanship and a loss of tacit knowledge parallel to that which was seen in the industrial revolution (Lewis, 1996) it will be argued that the ubiquity of this technology and its uptake by the DIY community signals a resurgence of craft not tied to mass production (Anderson, 2012).

However while the freedom of virtual design and the fluidity of parametric modelling appear to democratise design it is in fact dictating design decisions and leading to a mannered aesthetic that is prescribed

¹ Up printers ship from US\$1099 <http://www.up3dusa.com/#!/shop/ch1c> while instructables.com carries CNC machines DIY instructions that can be made for as little as \$20. <http://www.instructables.com/id/20-CNC-Machine/>

by embedded extrude/loft features CAD software. The paper will argue that such software determinism is fundamentally different from the affordances of other tools and is effectively arresting design intent and homogenising aesthetics.

Further to this having adopted interface metaphors such as “sketch” and “cut” CAD software’s ownership of this terminology has caused a methodological shift in established practices that fundamentally alters the way form is conceived of, resulting in a re-conceptualisation of physical procedural processes.

While online 3D print-on-demand services such as 3DrapidPrint and Shapeways are proliferating and promise to revolutionize production systems, greater understanding of methodological impact of CAD/CAM technologies on art and design practice is needed.

Anderson, Chris (2012). [*Makers: The New Industrial Revolution*](#). New York: Crown Business.

Lewis, T. (1996). Studying the impact of technology on work and jobs. *Journal of Industrial Teacher Education*, 33(3), 44-65. Retrieved from <http://scholar.lib.vt.edu/ejournals/JITE/v33n3/lewis.html>

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