

New Topologies of Practice: the digital object and an evolving critical language addressing notions of authenticity and authorship

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Abstract

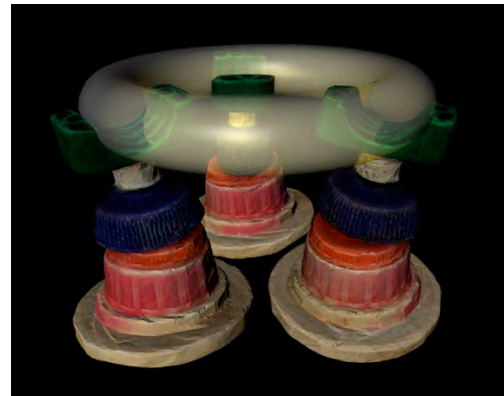
This paper outlines research, which critically engages with recent developments in 3D imaging, object scanning, rapid prototyping and industrial rapid manufacturing technologies. It considers what possibilities exist for new creative conditions to fundamentally challenge current disciplinary domains between fine art and product design practices. By critically reflecting upon the impact these technologies have on our understanding of the 'digital object' resulting from these new manufacturing technologies, this paper attempts to reassess our understanding and perception of act of reproduction and notions of authenticity and authorship resulting from these technologies.

Introduction

The research outlined in this paper draws upon a number of different disciplines from Fine Art print to Product Design and is interdisciplinary in nature¹. The area of research described in this paper is to a large extent a function of a fundamentally multidisciplinary practice, where personal interest in computer-aided design, the impact of the digital on drawing and print (both 2D and 3D), computer-aided manufacture smart materials etc. all figure in a reflective, non prescriptive and critical practice.



Jon Pengelly 2000



Jon Pengelly 2004

Today we have come to expect to freely customise music, photographic and moving images, all from the comfort of a personal portable computer. This ability and expectation to customise and re-mediate our visual surroundings and experiences, now also includes the ability to virtually and physically manipulate and reproduce the objects and artefacts we choose to surround ourselves with. Using 3D imaging hardware, optical geometry processing software: the spatial, colour, and textural information of objects can be scanned, digitised, sampled, and archived.

¹ <http://filemaker.rgu.ac.uk/connectivity/index.html>
<http://www2.rgu.ac.uk/subj/ats/pengelly/index.htm>

The only complete solution for transforming physical parts into manufacturable digital models

Geomagic Studio automatically generates an accurate digital model from any physical part. The world's #1 software for automated reverse engineering. Geomagic Studio is also ideal for emerging applications such as mass production of customized devices, build-to-order manufacturing, and automatic re-creation of legacy parts. Only Geomagic Studio delivers all of this:

- Guaranteed watertight polygon and NURBS models
- Ten-fold productivity increases over traditional CAD software when processing complex or free-form shapes
- Automated features and simplified workflow that reduce training time and allow users to bypass tedious, labor-intensive tasks
- Integration with all major 3D scanner and CAD/CAM software
- Ability to work as a stand-alone application for rapid manufacturing or as a complement to CAD software
- PTB certified surface- and curve-fitting algorithms

It's no wonder more than 2,000 professionals worldwide use Geomagic technology to customize products, automate processes and increase throughput.

Modular Architecture

Geomagic Studio comprises three integrated modules that provide a complete solution for reverse engineering and custom design.

Geomagic Capture

Enables fast, memory-efficient processing of ordered or unordered data, multiple scan point clouds or a single point cloud from any 3D scanner.

Geomagic Wrap

Brings unprecedented automation, speed and accuracy to the process of converting point clouds to polygons that can be edited to create watertight digital models for digital manufacturing, rapid prototyping, and visualization.

Geomagic Shape



Karin Sander

Geomagic (screen image) reverse engineering software <http://www.geomagic.com/>

Persons 1:10, by Karin Sander 1998-2001, 3D body scans of the living people reproduced using Rapid Prototyping

Importantly, this technology when used in conjunction with CAD, CAM, CNC and RP RM devices offers some very interesting creative possibilities. For example:

- The ability to freely translate any digitised object into production - clearly this offers huge potential for designers, architects, manufactures and industry
- The ability to create endless variety or mass-customisation – here the boundary between the client and designer is blurred; the customer in effect becomes the co-designer.
- The ability to reverse engineer without the need for physical contact or measurement – resulting in the possibility to recreate exact facsimiles or track the degradation of delicate museum artefacts over time.
- And the most interesting aspect for me of this technology is its ability to record, scrutinize, and reproduce - an act of celebrating the ephemeral instances of ever-day usage or ware.

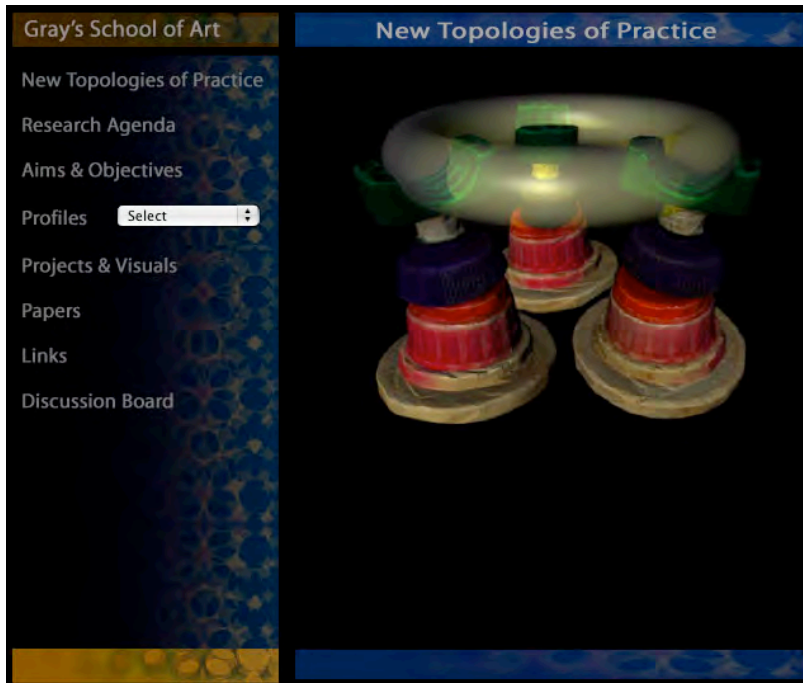
This technology has blurred the boundaries and circumvents distinctions we might choose to apply between industrial manufacture (as an inherently economically driven process) and traditional craft making skills (innately intuitive and reflective in nature). Callicott² clearly points to this fact by suggesting that the removal of formal complexity, as a constraint within the production process, has already taken place, with the result that the economics of variety and novelty has been re-written for the practitioner: artist, designer, engineer or architect.

For affirmation consider:

- Vogt & Weizenegger PLAN-A Factory³ (www.vogtweizenegger.de/sinterchair.html),
- Sixteen*(makers) (www.sixteenmakers.com),
- William Mitchell research at MIT, *Building Blocks in the Mass-Customized Era* (www.media.mit.edu/research/index.html),
- Freedom of Creation (<http://www.freedomofcreation.com/index2.html>)
- Future Factories and the work of Lionel Dean
- Greg Lynn – FORM (<http://www.glform.com/>)

The *New Topologies of Practice* research underway at Gray's School of Art (<http://www.newtopologies.org/>) seeks to explicitly examine the creative opportunities 3D object scanning, CAD, CAM, CNC manufacturing and RM, offer the interdisciplinary artist in creating diverse transformations, modifications and/or alternative iterations of the 'everyday'. The research in this sense

engages these industrial manufacturing technologies potential in blurring the boundaries between design and artistic agenda's.



<http://www.newtopologies.org/>

Argument

However, the focus of this paper critically examines a subtext to this research, namely the nature and very particular spatial legitimacy of the objects [virtual or actual] resulting from these new modes of production and reproduction afforded by these reverse engineering and rapid prototyping technologies. The argument presented touches on, 'use verses value' issues, and 'function verses meaning' relationships of these artefacts resulting from these technologies.

Firstly for the purposes of this argument we might consider what our understanding or definitions of reproduction and/or notions of authenticity and authorship are, by examining the nature of this relationship from the perspective of the artist critically engaging with these technologies.

The need for an author: artist or designer to site or locate a work (visually, physically and culturally) be it a print, sculpture, multiple, designed object, has rested on a clear understanding that legitimacy is fixed in an experiential and analogue world of *use - where meaning is endorsed primarily by its context and use, and not by some rigid notion of a grammar of form*. But with creative practitioners increasing pre-disposed to work simultaneously across two or more domains, disciplines are blurred as packaging, buildings, products and art are all produced by the same software and manufacturing means. Thus, our perceptions of objects meaning or purpose is constantly being called into question. For Walter Benjamin the whole sphere of legitimacy and authenticity was *to quote* "outside technical reproducibility"² this is evidently no longer the case with exact reproduction now lying well within the technical possibilities of digital reproduction.

² Walter Benjamin. *The Work of Art in the Age of mechanical Reproduction*, Illuminations – essays and reflections, Schocken Books Inc. 1969 pp 222.

Quoting Hal Foster

“‘Mediation’ used to mean the critical attempt to think of the totality of the social world beyond its fragmentation and disconnection. Now it tends to refer to the social world given over to the electronic media – and to an economic world retooled around digitizing and computing. In this mediation, the commodity is no longer an object to be produced so much as a datum to be manipulated – designed and redesigned, consumed and reconsumed”³

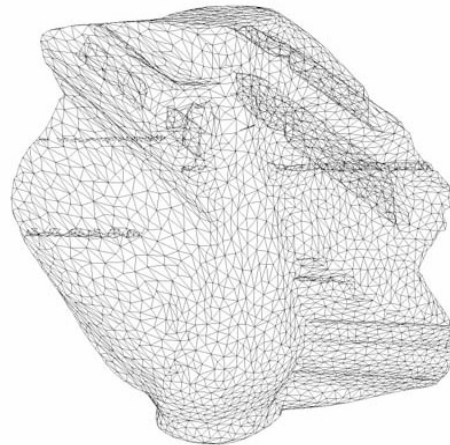
Seen within the context of the twentieth centuries preoccupation with ‘designed objects’ having the ability to express inherent meaning, as a function of their form or shape on the one hand, and their meaning on the other being attributed to their context and use, seems clear. But in regarding the art object and its relationship to material cultural contexts, this oppositional model is clearly too blunt a tool.

For Kant, art unlike design could not be systematised in this objective purposeful way. The art objects meaning whether derived from external signs of *utility* or its imbued essential *perfection* could not be evaluated in these terms. To paraphrase Stephen Wright’s recent article *The Future of the Reciprocal Readymade: in so doing, Kant sought to preserve art from the realm of the “merely useful” from a contemporary world where utilitarian rationality and cost-benefit analysis reign supreme, where art is co-opted by profit-driven production industries.*

Compared to the analogue material world, the digital is determined by its potential for multiplicity, reproduction and dissemination. It is precisely this dimension of a ‘*logistics of iteration*’ that mass customisation inevitable leads. But what if ones intention as an artist, is to use these technologies to purposefully transform artefacts, to instigate a critical process of digital slippage between form and meaning.



Jon Pengelly Digital Responses V&A 2002
3D digital image



Jon Pengelly Digital Responses V&A 2002
3D mesh object

These works (above) forming part of the authors Digital Responses Exhibition at the V&A 2002 (<http://www.vam.ac.uk/vastatic/digitalresponses/>) consciously subverted 3D scanning & CAD software, resulting in digital iterations or representations of the physical object, which have more in common with audio resonance or audio feedback distortions. So for example, the original object (left) taken from the V&A permanent collection and the resulting visual distortions produced by this process (right) have resulted in manifestation of the actual space around the object being incorporated into the new digital objects own spatial boundaries. As a result these works not only undermines the digital software used and its ability to resolve the forms, but importantly these works anticipate for the author important questions

³ Hal Foster, *The ABC's of Contemporary Design*, October 100 (spring 2002) pp 195.

concerning the nature and relationship between the digital/physical forms being fixed in any real sense at all.

Discussion:

So crucially, the author suggests there is a need for new terms of reference with which to contextualise the digital iterations and manifestations of these technologies which evidently exist somewhere between digital 'solid imaging' and a new 'logistics of digital iteration'. Towards developing a more critical framework with which to contextualize this notion of a 'New Topologies of Practice' this research acknowledges an established critical discourse within architectural theory, in particular the work of Greg Lynn, Manuel Delander, and Neil Leach⁴ with reference to the critical discourse developed around Deleuze's notion of the *Objectile* within the area of architecture and the built environment. But here I would like to advance other key concepts, which I believe will be crucial to our greater understanding and contextualisation of these new digital object forms in light of the developments outlined in this paper.

Deleuze's *Objectile* events

As already mentioned Deleuze's notion of the 'objectile' has been critical to underpinning a lot of architectural theory as it embraces the iterative nature of the digital. Deleuze defines it as "a very modern conception of the technological object: where fluctuation of the norm replaces the permanence of a law; where the object assumes a place in a continuum by variation... the object here is manneristic, not essentializing: it becomes an event."⁵ Deleuze uses the term to refer to objects that we might consider no longer existing in terms of form or matter but rather to those objects or histories of objects located or referenced in time as temporal modulations between two time events or two form events - these objects are *Objectiles*.

So for example: an artefact produced from the virtual model of a 3D scanned masticated toy figure would produce a single iteration of the object drawn from its own history. The resultant objectile might act a sign – removed from both the destructive act of chewing and the original toy form that produced it. This new object might be considered as an extract from a trajectory; the temporal modulation of that object.

Adorno's notion of the *Mimetic* form

In its original meaning the term mimetic relates clearly to the act of modelling of 'making a copy of' but for Adorno and also Benjamin the term is more expansive reflecting not only the act of making but importantly our experiential engagement and emotive affinity with designed objects - resulting in a kind of symbolic identification with the inanimate object. Paraphrasing Leach (in *Designing for a Digital World*) individuals are able to intuitively identify with an object, even if it's an inanimate manufactured artefact (car, plane, iPod) it becomes invested with symbolic personal significance to the extent that it can be appropriated into the very fabric of that individuals identity and persona.

The term is interesting in this context of this argument as it offers a theoretical insight or engagement here to designed objects, where the process or result of the design might function at a singular individual and intuitive level, which the technology increasingly allows. Objects can be realistically designed in order to respond or to trigger mimetic responses from single individuals – with the very real possibility of objects becoming endlessly customisable through this technology. In this sense a mimetic object, is both a function of the technologies ability to create it – and also a personal fantasy or metaphysical manifestation of the immaterial.

⁴ *Folding in Architecture*. Ed. Greg Lynn, Wiley-Academy, 2004.

Digital Tectonics. Neil Leach (Editor), David Turnbull (Editor), Chris Williams (Editor), Wiley, 2004

⁵ Deleuze, Gilles. *The Fold: Leibniz and the Baroque*. Minneapolis: University of Minnesota Press, 1992.

Duchamp's notion of the *Infra-thin*

This notoriously indefinable term is most commonly assumed to refer to the difference between two identical things. When asked for a term of reference for the concept Duchamp replied that the notion is impossible to define “one can only give examples of it” so:

- the inextricable difference between the feel of two liquids - is infra-thin,
- the warmth of a seat just vacated – is infra-thin
- 2 forms cast in the same mould - is infra-thin
- and importantly for this argument the space or reaction between a mould and the cast itself - is infra-thin.

Critical examinations of the term by scholars have been predicated on the terms importance in contextualising Duchamp's fascination with Ready-mades (David Hopkins for example) in highlighting critical distinctions between works which are self-consciously created by the artists hand and artefacts selected or found and offered as art – are infra-thin.

But lets consider Infra-thin with respect to the digital. The digital copy introduces a new topology of space, where nothing is moved in the sense that location and iteration are indistinguishable. Further, the technologies referred to previously allow multiple divergent iterations, which are topologically (and in manufacturing terms) inseparable from one another - these I would suggest are 'infra-thin'.



Jon Pengelly 2005
Still from 3D scan of a plastic container



Jon Pengelly 2005
Code in this object is systematically removed resulting in digital iteration or *Objectile* event

Conclusions

The relationship between technology and form, developed with respect to these theoretical concepts is critical to my argument. The technologies blur existing debates within object semantics and importantly also our relationship with the resulting artefacts themselves, where the boundaries we previously sought to establish between artist/designer/maker/client/consumer might now be turned over – and turned over periodically. It might be easier to think about these new objects, if we consider them in terms of digital 'hard' and 'soft' surfaces or having a 'digital plastic topology'. The objects resulting from these technologies, I believe, ask us to consider the philosophical terms of reference by which we currently describe these digital objects or events. Towards what one might consider 'new topologies of practice', I

suggest this critical dialogue will be developed around greater engagement with these key theories: Deleuze's objectile trajectories, Adorno's mimetic inferences and Duchamp's infer-thin indifferences.

The research outlined here specifically addresses this notion of an emergent and fundamentally interdisciplinary praxis and evolving critical language. The research focuses intentionally on non-prescriptive possibilities, towards the development of 'object variants' i.e. modifications; creative departures, options, substitutes, mutations or evolutionary trajectories that allude to a new topology of practice. In this regard and critical to these aims is a process of re-contextualising these key theoretical constructs: infra-thin, objectile, mimesis to be critical to this examination of mapping these evolving topologies of practice both critically and philosophically.

In doing so this work seeks to develop a series of *body plans* for the production of artefacts or interventions that both locate this engaged practice but importantly bring critical insight to these new object forms. The New Topologies of Practice research in this sense seeks to develop an engaged art / technology / manufacturing syntax, which will critically examine the key role artists and designers will play in an emerging digital 'solid imaging' language.