

# Walking in the Garden of Forking Paths – examining notions of ‘post-physical’ printmaking in digital space.<sup>1</sup>

## Introduction

The findings outlined in this paper draw upon research<sup>2</sup>, which examines developments in digital culture; Web 2.0, social networking and ubiquitous smart phones and tablets which are impacting both physical and virtual (temporal) printmaking and how this expands previously established boundaries within contemporary printmaking practice. These developments the authors suggest are leading to a ‘Post-Physical’, e-culture paradigm shift in the discipline of printmaking. The paper examines this notion of ‘Post-Physical’ printmaking through the digital medium of Augmented Reality<sup>3</sup>, drawing on the authors professional printmaking practice, established academic research; and *Thompson’s* contextualised practice-led PhD research.

Contemporary printmaking as “unique but multiple artworks rather than the commercial reproduction of a pre-existing and singular work” (Edinburgh-Printmakers, 2012), is driven by “individuals/groups/networks engaged in a process of symbolic change, innovation or novelty within a recognised cultural domain” (Pengelly and Thompson, 2012). Against this context, the physical and temporal boundaries of the print are being challenged and redefined by developments in the technical practices of printmaking.

## Digital Culture[s]

Let us consider the physical and temporal parameters of digitally mediated printmaking practice, as they might be extended by these developments in digital media; specifically the impact digital culture and new modes of networked distribution and consumption. The very pervasive nature of *the digital*; a recent report from the Chief Scientific Adviser to HM Government (Beddington, 2013) clearly articulates:

*“Emerging trends towards ‘hyper-connectivity’, where mobile technology and the ubiquity of the internet enable people to be constantly connected across many different platforms.... removing any meaningful distinction between online and offline identities, while also blurring ‘public’ and ‘private’ identities.” (Beddington, 2013)*

This discourse, has sought to examine, the societal and philosophical impact of the digital over the last two decades. Notable voices such as Deuze, postulate a digital culture being akin to “...an emerging set of values, practices, and expectations regarding the way people (should) act and interact within the contemporary network society”. Deuze goes on to say that digital culture is “having an immediate impact and particularly changing the ways in

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<sup>1</sup> NB: The paper is to be accompanied by an installation of a series of post-physical (virtual & geolocated) prints developed through augmented reality situated throughout the surrounding conference environs.

<sup>2</sup> As part of a PhD being undertaken at Grays School of Art / The Institute for Innovation, Design & Sustainability Research at The Robert Gordon University Aberdeen Scotland

<sup>3</sup> Augmented Reality is “Any case in which an otherwise real environment is “augmented” by means of virtual (computer graphic) objects” Milgram, P. and F. Kishino (1994)

*which we use and give meaning to living in an increasingly interconnected, always on (line) environment.”(Deuze, 2006).*

This mobile ‘always on’ and increasingly ubiquitous Internet is, it would seem, blurring distinctions between virtual and physical realities, through developments in Augmented Reality (AR), which is the focus of this paper, where “otherwise real ‘environment[s]’ are ‘augmented’ by means of virtual (computer graphic) objects” (Milgram and Kishino, 1994). The critical underpinning of this research is the philosophical and metaphoric nature of these ‘objects’ or ‘meta-layers’, by which augmentations or virtual information might be interjected or superimposed over the physical in a very ‘real’ sense. This ‘meta-layer’ metaphor within ‘AR’ is developed later around notions of ‘AR’ being a natural extension to the print ‘language of layering’, traditionally the purview of the contemporary printmaker.

Given the blurring between physical and virtual spaces in our everyday lives through the ubiquitous nature of smart phone technologies. Previously held distinctions between our personal identities (social-networked selves) and the spaces we inhabit (Physical Spatial Realities) now overlap in increasingly complex ways. Giving raise to greater physical and virtual interweaving within these ‘spaces’, the authors suggest, and leading to opportunities for new ‘*post-physical*’ printmaking practices. It is with specific reference to this notion of *post-physicality* that this research has sought to explore the impact these conditions and mechanisms are having on contemporary printmaking.

This research sits within a broader and on-going discourse examining and questioning notions and boundaries of “traditional printmaking” and/or the validity of wholly “digital printmaking” which might be tracked back through previous IMPACT or South Graphic Council conferences for example in seeking to critique distinctions or *labels* as these technologies have matured. Clearly there is significant overlap within any designate process we might seek to label, therefore in order to contextualise and further postulate this notion of *post-physicality* within the printmaking *canon*, a taxonomy was developed based on: extensive literature review, including juried open exhibition<sup>4</sup>, the researchers own practice[s] and an international digitally mediated exchange portfolio<sup>5</sup>, and importantly extensive interviews with peers and experts. The model proposed here is based on four domain areas (see Figure 1). These domains outlined reflect the taxonomy of constituent artistic practices having been categorised into four phases:

1. Traditional Printmaking - Direct Matrix,
2. Traditional Printmaking – Transferred Matrix,
3. Digital Printmaking – Electromechanical Matrix
4. Digital Matrix - Printmaking 2.0 (the focus of this paper new and emergent forms, some of which are examined here)

These domains or phases (and their combinations in mixed method printmaking) are in most part bounded by familiar terms. However in the digital to post-physical, where printmaking practice[s] exist both in physical space, and “digital space” (Kilian, 2000), and notions of traditional (analogue & digital) atelier types can shift to post-physical (digital & networked) and expanded to better reflect this paradigm shift towards notions of meta-layering or

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4 Exhibited works at the 2011 International Print Biennale, Newcastle upon Tyne

5 Born Digital New Materialities Digital Exchange portfolio

Printmaking 2.0. The traditional atelier may be defined as the correlation between physical practice and outputs through direct process resulting in art objects resident in physical space. Whereas the post-physical atelier may be defined as virtual space in which digital practice and processes result in art objects, which occupy digital space and remain in a virtual transmissible state.

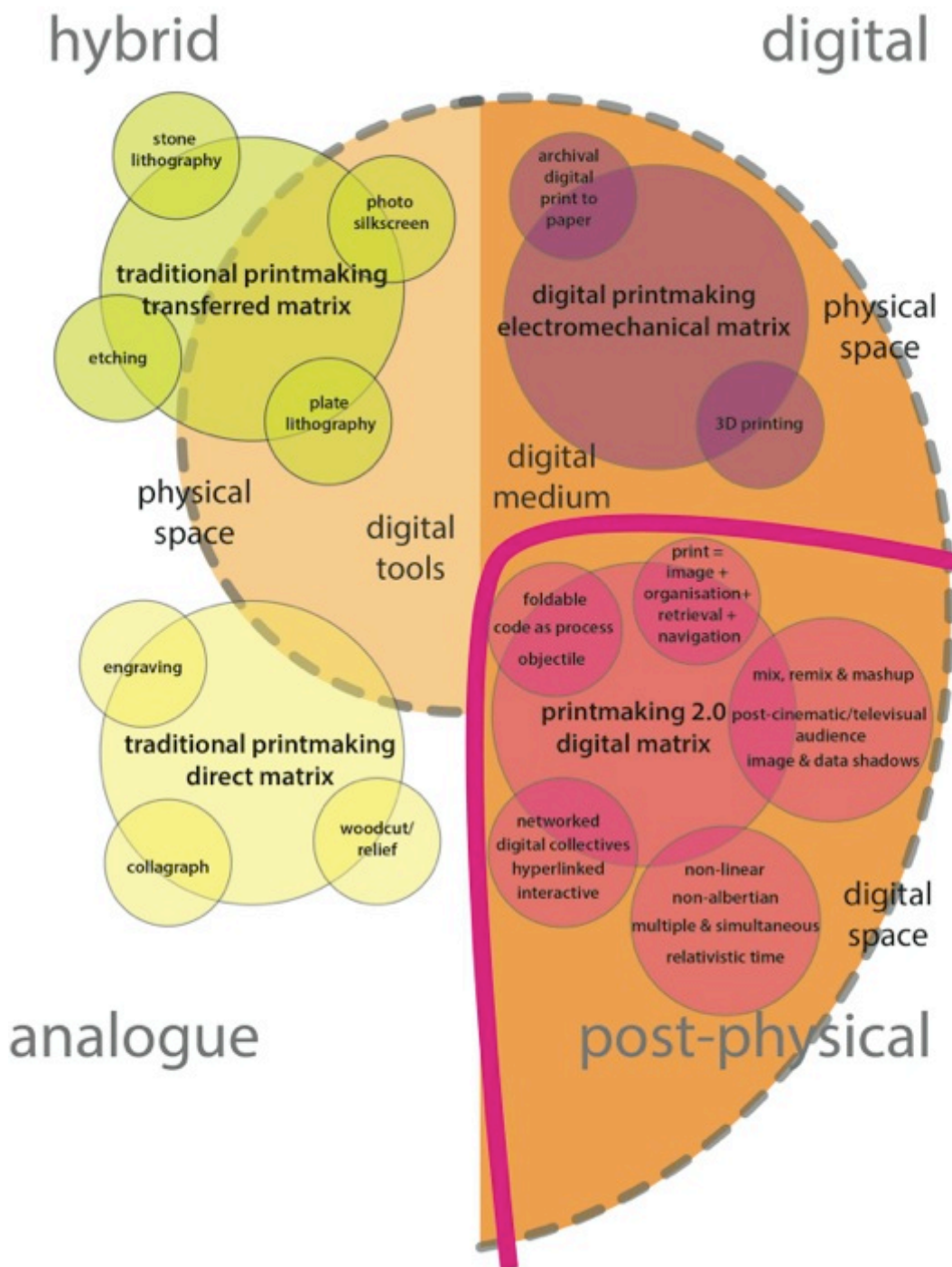


Figure 1

This notion of a Digital Matrix - Printmaking 2.0, is informed by both logistic and philosophical conditions: greater levels of 'networked-ness' and the opportunities of 'post-physicality' respectively. Which might result in an art object "presented through an online or digital medium, shifted from the physical to the temporal" (Corcoran, 1996). These post-physical modalities (which may, but not necessarily, result in 'imprinted' forms) the authors suggest demands new approaches and aesthetic conditions requiring an "intellectual shift away from [haptic] object production" (Hovagimyan, 2001). Moving towards a recognition of the intellectual processes inherent within a practice of fluid 'counter-permanence' where 'always-on' editability is a key characteristic in this notion of *meta-layering*, which is not necessarily fixed at the point of production. This *McLuhanian* media form *Printmaking2.0*, should be seen as having close contextual association with "...the 'post-cinematic' 'post-televisual' viewer" (Friedberg, 2009, p.242) who expect new perspectives based on "ever-virtual mobility - new speeds of access to deep histories of images and text" (Ibid).

The research sought to examine the opportunities and limitations of the domains within a *Post-Physical Printmaking 2.0* form, through a series of practice-based research 'Probes'<sup>6</sup> (Thompson's PhD research has developed this model of practice-based research 'Probes' which may be further explored at [www.printmaking2-0.info/Probes'\\_expo.html](http://www.printmaking2-0.info/Probes'_expo.html)). This paper reflects on two specific 'Probes' from this research, which particularly examine and develop the argument for *Post-Physical* printmaking space, using 'AR'. These 'Probes' specifically examined the potential of adding new meta-layers of meaning within and beyond the physical print form through 'AR' augmentation using proprietary applications "Layar" and "Junaio", which have gone some ways to having realised William J. Mitchell's prediction of 'always on' place[s] and space[s].

### **The Print as Portal: augmented reality optical / image tracking experiment (Probe no.3)**

This probe sought to examine through a series of 4 physical, but digitally mediated artists' prints (titled "Four Walks @ 55° North"), our understanding of the physical presence (boundaries) of the print, when mediated within this Print 2.0 framework. Which may be contextualised against concurrent explorations in Augmented Reality site specific / public art and photography as illustrated in the work of John Craig Freeman<sup>7</sup> and John Goto<sup>8</sup>. In this sense *Print-Probe* no.3 examines a blurred boundary between *Physical Space* and *Digital Space*, by specifically focusing on the potential for adding new layers of meaning within and beyond the physical print through digital augmentation. The matrices for these prints can be seen as conventional digital, with artwork created in and printed from digital space. But critically additional materials or content in "Four Walks @ 55° North" can only be viewed or accessed by the viewers accessing the extended contextual layer[s] or 'meta-data' embedded within each print supported through 'AR'. In this sense 'Four Walks' is an exploration of temporality and post-physical printmaking within the virtual 'e-space' presented by 'AR', space we might consider as having associations with the Deleuzian notion of an objectile event<sup>9</sup>. So materiality in this special context, should be considered as being

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6 Conceptually the 'Probes' are derived from the "cultural probe" model developed by William Gaver and constitute specifically designed research tools.

7 Site specific public art FREEMAN, J. C. 2012. John Craig Freeman - Blog [Online]. USA. Available: <http://johncraigfreeman.wordpress.com/> [Accessed 3rd January 2013].

8 Photographic practice GOTO, J. 2012. John Goto [Online]. UK. Available: <http://johngoto.org.uk/> [Accessed 9th December 2012].

9 For example a series of objects, at once similar and yet all different, like the way types of tree are unique yet are represented by a particular morphological variation. These non-standard objects or spaces are not designed, but rather calculated by computer and

closer to “larger and more diverse world[s] of replicable, transmissible, mediated art and communication”(Barfield et al., 2001). Where viewers experience[s] are augmented through optical /image tracking, and these physical / digital print-object[s] might be considered as having closer associations with a portal by which we might engage with non-fixed layered digital space - suggesting quite different conceptions of the ‘material print form’.

In practical terms, the spectator launches the proprietary ‘AR’ software - *Junaio* ‘app’<sup>10</sup> (Figure 2a), then enters scan mode (Figure 2b). This scans and recognises the tangible digital print on paper (image-artefact), the app loads the augmented content [meta-layer] (Figure 2c) here an introductory video. Further scanning the prints then locates the augmented layer of that print (Figure 2d) - an animated version of the print image area and a signature icon which subsequently launches the printmaker’s website and contextual materials (Figure 2e).

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digitally-controlled. As conceived by Deleuze “the object assumes a place in a continuum by variation” DELEUZE, G. 2006. *The fold : Leibniz and the Baroque*, London, Continuum.

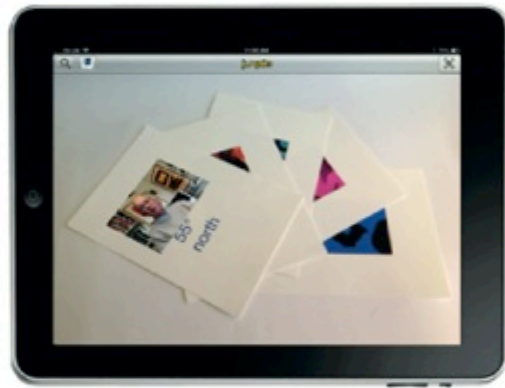
<sup>10</sup> On an iPad, iPhone or Android device



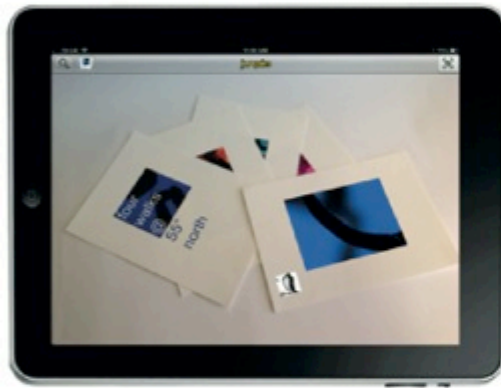
(a)



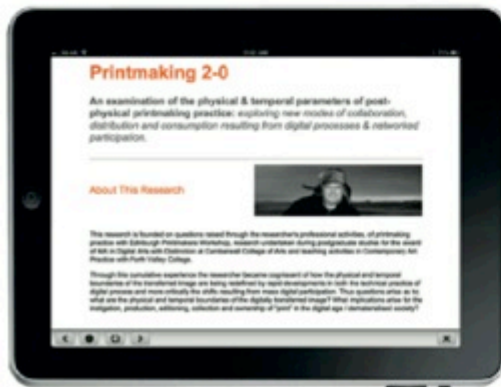
(b)



(c)



(d)



(e)

# Four Walks @ 55 Degrees North

Figure 2



**“Picture Space: Walking in a Garden of Forking Paths”: augmented reality geo-located print multiples exploring conceptions of indexicality<sup>11</sup> in digital and virtual space. (Probe no.4)**

This Probe (drawn from the series of ‘Probes’ developed as part of Thompson’s practice-based PhD) should within the discourse of this paper be considered as having been designed specifically to explore the extended practice model(s) developed within this proposed digital matrix model. This work was informed by conceptions of “ambient findability” (Morville, 2011) and inspired by the writings of Jorge Luis Borges, in which an “infinite series of times, a growing, dizzying web of divergent, convergent, and parallel times” (Ibid). The “...Forking Paths...” ‘AR’ print is presented as an outdoor installation in “physical space” (Figure 3a) in which 12 digital markers floating in “virtual space” are accessed using the “LAYAR” app on a smart phone (Figure 3b). The work responds to the landscape of digital space with multiple virtual layers and data stimuli, representing informing and extending the image experience onto the physical landscape. Yet the work is also experiential, in its response to landscape and might be seen to have closer associations to psychogeography or emotional geography<sup>12</sup>. In this work an indexical relationship may be considered to exist, between these distinct but integral content sources and viewer experiences afforded by these ‘AR’ hyper-linkage[s] or meta-layer[s]. These layers concentrate on the potential for geo-located triggers as portals to a digital construct, dislodging conceptions of physical form and shifting the viewers relative temporality (Figures 3c.1 & 3c.2).

The *Picture Space* within this series is an example of what this research defines as a *Digital Matrix*, in establishing an additional space if you like, of collected information for, by and of, the post-physical printmaker (Figure 3d). A conceptual “Wunderkammer” (as defined by Büscher (Büscher et al., 1999)) akin to individual portals within which “nearly every space we live in - be it work, home, travel or pleasure is characterized by a digital layer.” (Ciolfi, 2011, p209). This digital ‘layer’ in every sense might be considered as a *physical print layer*, but mediated in extending notions of multiplicity and sequentiality. Allowing these digitally mediated *Prints* to occupy both physical and virtual space, which we might term *Printmaking 2.0*.

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<sup>11</sup> As conceived by Krauss wherein “The functioning of the index in the art of the present, the way that it operates to substitute the registration of sheer physical presence for the more highly articulated language of aesthetic conventions (and the kind of history which they encode)” KRAUSS, R. E. 1977b. Notes on the Index: Seventies Art in America. Part 2. *October (title)*, 4, 58-67.

<sup>12</sup> See Christian Nold [www.emotionalcartography.net](http://www.emotionalcartography.net) for example



(a)



(b)



(c.1)



(c.2)



(d)

## Walking in a Garden of Forking Paths

Figure 3



### Discussion: Augmentation and Index

The findings from these research 'Probes', have attempted to quantify concepts of 'imprint[ing]' virtual materials upon physical surfaces (as in "The Print as Portal") or physical spaces (in "Picture Space"). It has been argued that "In the field of art, AR (Augmented Reality) environments are, electively, a derivative of site-specificity installation art, in which the site is de/un/re-specified by the activation of computer-generated data." (Manovich, 2005, p.19) However this model does not account fully for the concept of imprinting or "layering" virtual digital space (data) onto physical image space, with specific reference to image tracking and geolocated 'AR' as demonstrated through this research.

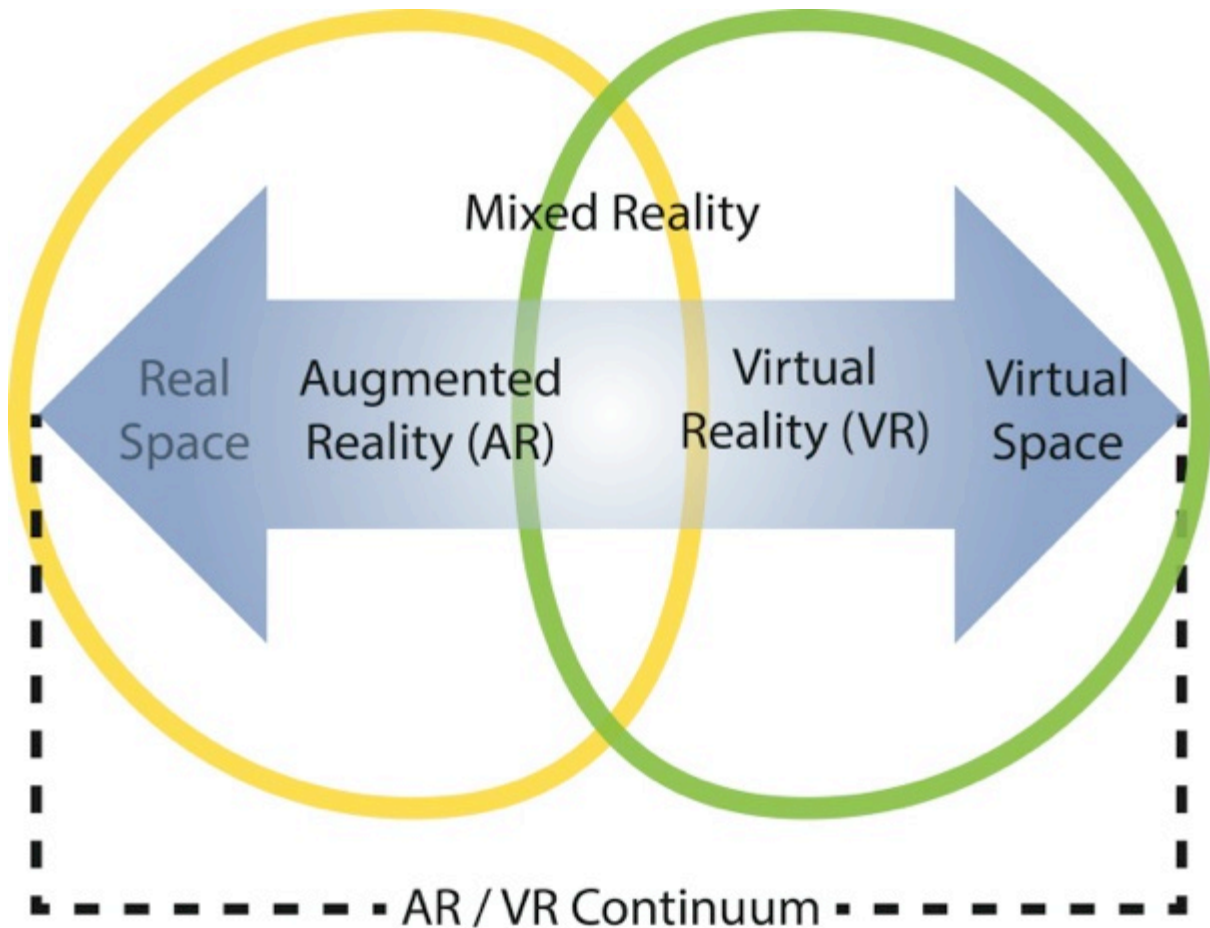


Figure 4

A modified model (developed from Milgram & Kishino's "virtuality continuum", 1994) is presented here to better understand the complex and developmental relationship[s] associated with these augmentations (in the real or physical environment), *Figure 4*. The 'AR' / 'VR' Continuum developed here illustrates the complexity we might experience as we increasingly negotiate the spaces between real/physical and digital/virtual environments.

The adoption of "smart phones" has significantly expanded the accessible base of "augmentation" and access to "augmented space" (Mitchell, 2005), through which a substantial audience base willing / able to experience and participate within the work of the augmented printmaker is being opening up. Within this evolving discourse "the special status of the spectator whose connectedness is at once a requirement and an uncertainty" (Ross, 2010) to the 'AR' artwork is key.

This research concurs with Manovich's argument that we might focus more on the "experience of the human subject in augmented space" rather than the augmentation technologies themselves (Manovich, 2005, p.2), towards a "re-conceptualising augmentation as an idea and cultural and aesthetic practice rather than as technology" (Ibid). Furthermore in consideration of the "experience" of augmented spaces and print art objects within this context we need to also consider the nature of *index* in this area and "the way that it operates to substitute the registration of sheer physical presence for the more highly articulated language of aesthetic conventions (and the kind of history which they encode" (Krauss, 1977a, p.81). In Krauss's 'Notes on the Index Part1' she conceives of the "panorama of the index" with reference to analysis of Duchamp's 1918 work "*Tu m'*" (Krauss, 1977a, p.70-71) a conception which serves as a useful tool in the reading of both contemporary mixed media multi-layered prints and now digitally mediated augmented reality printmaking. In the 'Probes' presented here the works are located in "the continuum between the real/physical and the digital/virtual environments or spaces"(Milgram and Kishino, 1994) and we are presented with "a panorama of the index"(Krauss, 1997) through artistic constructs and virtual ready-mades each an indexical sign or portal to the extended contexts of the art work itself within this 'AR' domain. In these extended or augmented dialogues between the audience and the indexical mediated print 2.0 object, the works at their core still necessitates the viewer engaging at a personal level with the research 'Probes' presented here, providing examples of this.

### **A socially mediated audience**

As a socially mediated society we are increasingly located or choose to be represented in a "*virtual environment as well as a real place*"(Beddington, 2013) and "*national citizens are globally networked individuals*"(Ibid.) in which "*people have become accustomed to switching seamlessly between the internet and the physical world, and use social media to conduct their lives in a way which dissolves the divide between online and offline identities.*"(Ibid.). We have seen, the balance between the digital and analogue generations defined by Prensky (Prensky, 2001) as inexorably shifting toward immersive digital experiences and an "*always on(line) environment.*"(Deuze, 2006). Thus we are now experiencing or seeing the potential for conditions, wherein the relationship between the artist and spectator might now include or expect an extended virtual media experience in which traditional medium / message communication[s] are increasingly augmented by reciprocal but aesthetically driven interactions.

Our predisposition to more 'traditional' artistic (printmaking) practice[s] founded in conceptions of Alberti's Window, a "renaissance metaphor" has "remained a defining concept for theories of painting, architecture, and moving-image media" (Friedberg, 2009, p.1). However we have seen digital space is no longer restricted to single, or temporally fixed moments or layer[s]. As Friedberg alludes, we now increasingly see the world through "virtual windows" that rely more on the multiple and simultaneous than on the singular and sequential"(Friedberg, 2009, p.243).

Augmented Reality offers unique opportunities; to afford the viewer extended contextual background[s] and experience[s] – towards the print (2.0) as portal to engage in digital space through interactive, and increasingly temporal print-forms. Analogue printmaking fixes through layering and discrete states at the point of impression. However within digitally mediated printmaking (2.0), the meta-layers (augmented *index*) is always in flux.

The nature of these additional virtual meta-layer[s] within the print, conforms more closely to Krauss's conception of "panorama of the index" and forms a decisive marker of transition from analogue / digital (traditional) printmaking to Printmaking 2.0

To conclude, the nature and development of a second generation of printmaking [Printmaking 2.0], which this paper has gone some way to outline, does not infer the dissolution or break with traditional practices. Rather, this research reflects a post-structuralist approach to printmaking; where the digital encompasses and embraces new modes of delivery, and forms of expression within printmaking, using mixed (mediated and 'AR') methods and techniques in the "conception and production of diverse forms of art making" towards "...hybrid art forms"(Atkins, 1990) which we might consider "transcend traditional modes of practice"(Jones, 2005), or at least offer alternative modalities by which we might engage in the discipline .

This paper presented work from current practice based research that seeks to investigate and more closely define the conditions informing new forms of digitally augmented printmaking practice. This area the authors suggest, is extending the contextual frame of reference by which the physical print-form is defined, through media based digital augmentation. The print "Probes" this research has employed, have sought to examine underlying philosophical questions around the impact of 'e-culture', 'de-materialised' practice, and emerging modes of 'post-physical' print-based artistic practice. Practices resulting from new imprinted data-forms that might extend and embrace the post-physical and virtual space[s] we increasingly seek to inhabit.

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### References

ATKINS, R. 1990. *Artspeak : a guide to contemporary ideas, movements, and buzzwords*, New York, Abbeville Press Publishers.

BARFIELD, N., BARFIELD, R. & WHALE, G. 2001. *Defying Convention: Emergent Practices in Digital Print. IMPACT II* Helsinki.

BEDDINGTON, J., PROF. 2013. *Foresight: Future Identities - Executive Summary*. London.

- BÜSCHER, M., KOMPAST, M., LAINER, R. D. & WAGNER, I. 1999. The Architect's Wunderkammer: Aesthetic Pleasure & Engagement in Electronic Spaces. *Digital Creativity*, 10, 1-17.
- CIOLFI, L. 2011. Augmented Places: Exploring human experience of technology at the boundary between physical and digital worlds. In: JAMES-CHAKRABORTY, K. & STRUMPER-KROBB, S. (eds.) *Crossing Borders: Space Beyond Disciplines*. Bern: Peter Lang.
- CORCORAN, M. 1996. Digital Transformations of Time: The Aesthetics of the Internet. *Leonardo*, 29, 375-378.
- DELEUZE, G. 2006. *The fold : Leibniz and the Baroque*, London, Continuum.
- DEUZE, M. 2006. Participation, Remediation, Bricolage: Considering Principal Components of a Digital Culture. *The Information Society: An International Journal*, 22, 63-75.
- EDINBURGH-PRINTMAKERS. 2012. *What is an original print?* [Online]. Available: <http://www.edinburghprintmakers.co.uk>.
- FREEMAN, J. C. 2012. *John Craig Freeman - Blog* [Online]. USA. Available: <http://johncraigfreeman.wordpress.com/> [Accessed 3rd January 2013].
- FRIEDBERG, A. 2009. *The virtual window : from Alberti to Microsoft*, Cambridge, Mass. [u.a.], MIT Press.
- GOTO, J. 2012. *John Goto* [Online]. UK. Available: <http://johngoto.org.uk/> [Accessed 9th December 2012].
- HOVAGIMYAN, G. H. 2001. Art in the Age of Spiritual Machines (With Apologies to Ray Kurzweil). *Leonardo*, 34, 453-458.
- JONES, S. 2005. Fees and Payments : Good exhibition practice. *AN Knowledge Bank*. a-n The Artists Information Company.
- KILIAN, A. 2000. *Defining Digital Space Through a Visual Language*. Master of Science in Architecture Studies, Massachusetts Institute of Technology.
- KRAUSS, R. E. 1977a. Notes on the Index: Seventies Art in America Part1. *October (title)*, 3, 68-81.
- KRAUSS, R. E. 1977b. Notes on the Index: Seventies Art in America. Part 2. *October (title)*, 4, 58-67.
- KRAUSS, R. E. 1997. *The originality of the avant-garde and other modernist myths*, Cambridge, Mass.; London, The MIT Press.
- MANOVICH, L. 2005. *The Poetics of Augmented Space* [Online]. Lev Manovich (<http://www.manovich.net>). Available: [http://manovich.net/DOCS/Augmented\\_2005.doc](http://manovich.net/DOCS/Augmented_2005.doc).
- MILGRAM, P. & KISHINO, F. 1994. A TAXONOMY OF MIXED REALITY VISUAL DISPLAYS. *IEICE Transactions on Information Systems*, Vol E77-D.

MITCHELL, W. J. 2005. *Placing words : symbols, space, and the city*, Cambridge, Mass., MIT Press.

MORVILLE, P. 2011. *A Garden of Forking Paths* [Online]. Silver Spring Available: <http://www.asis.org/Bulletin/Feb-06/morville.html> [Accessed 16th September 2011].

PENGELLY, J. & THOMPSON, P. 2012. "Social Networking and Affinity Spaces - The Virtual Atelier". *3rd Annual International Conference on Visual and Performing Arts*. Athens: Athens Institute for Education and Research (ATINER).

PRENSKY, M. 2001. Digital Natives, Digital Immigrants Part 1. *On The Horizon - The Strategic Planning Resource for Education Professionals*, 9, 1-6.

ROSS, C. 2010. Spatial Poetics: The (Non)Destinations of Augmented Reality Art. *Afterimage*, 38, 19-24.