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# Understanding Third Space:
# Evaluating Art-Science Collaboration

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## Abstract

CP Snow's mid-century idea that a "third culture" might come into being to connect arts and science is perhaps most publically realised today through *art-science* - a heterogeneous field of creative research and production, characterised by the collaboration of artists and scientists and by research combining scientific and aesthetic investigation. This paper reports on the development of a new method for investigating the value of third culture collaboration for both the expert collaborators involved (artists and scientists) and the audiences who engage with the work. The visual matrix is a recently developed psychosocial method for evaluating aesthetic experience, which has been used in various socially-engaged and site-specific art contexts. In 2014 it was experimentally applied to two art-science exhibitions staged in the UNSW Galleries, Sydney: *Amnesia Lab* and *Body Image*. This paper discusses the unique potential of this method to capture the shared, complex, emergent and transformative aspects of the experience of these exhibitions. In particular it highlights the ability of the method to capture the emergence of a "third space" at the intersection of art and science in the public domain – a site of trans disciplinary engagement, enquiry and knowledge production that plays a vital role in the contemporary research landscape.

## Keywords

Art-Science, evaluation, collaboration, third space, third culture, expertise, aesthetics, curating.

## Introduction

More than half a century has passed since CP Snow identified the chasm between the "two cultures" of science and arts as a serious problem. [1] Today, by contrast, there is acknowledgement that "the greatest challenges for society" require the combined insights of science and arts/humanities. [2,3,4] Snow's mid-century idea that a "third culture" might come into being to connect arts and science has been considerably expanded – but is perhaps most publically realised today through 'art-science', a now heterogeneous field, characterised by the collaboration of artists and scientists and by research combining scientific and aesthetic investigation. [4,5,6,7,8]

Grounded in the conviction that art-science plays a pivotal role in today's research landscape, this paper reports on the development of a method to investigate the value of third culture collaboration for both the expert collaborators involved (artists and scientists) and the audiences who engage with the work. As a form of collaborative research art-science is distinguished by its intersection with the public, and its capacity to connect audiences and stakeholders to researchers in ways that are mutually enhancing. We describe this intersection of art and science in the public domain as "third space". More than just the conceptual bridge between art and science that Snow envisaged, the third space is the site of a three-way engagement between science, art and the public (the 'public' in this context overlaps with and potentially extends 'audiences' for art exhibitions but also includes a variety of stakeholders in relation to science and/or the specific area of inquiry).

Understanding and extending this engagement is important in today's 'connected' research environment, where knowledge production is itself understood as linked to a broad set of engagements and networks. [9] Contexts for research are often forged at the edges of disciplines, or through engagements with industry, non-academic professionals, citizens and publics. [6,10] In this setting art-science provides a means to connect science to a public. But to see it merely as communicating existing science is inadequate. Art-science undertakes research under new conditions, through methods unavailable in a 'two culture' setting. It creates contexts that provide critical "connection to forms of human and subjective experience", informing and feeding into research. [6] The nature of these connections – *how they occur and why they are important* – requires new methods of evaluation capable of capturing and articulating shared, transdisciplinary knowledge as it emerges.

In this paper we report on the experimental application of a new pychosocial method for evaluating aesthetic experience – the visual matrix – to two art-science exhibition held simultaneously at UNSW Galleries in Sydney in 2014. *Body Image,* curated by Felicity Fenner and John McGhee, displayed arts-led modes of visualising complex scientific and biomedical data. It included animations, photographs and immersive virtual reality showing phenomena such as blood and heart vessels, cellular processes, microscopic and molecular views of the internal body and imagery generated from CT and MRI scans. The works in the exhibition were juxtaposed with a selection of preserved human organ specimens from UNSW Medicine's Museum

of Human Diseases. *Amnesia Lab* was an experimental forum in an exhibition setting, bringing together memory experts and artists to explore how photographic images, sound and immersive media can advance our understanding of memory and forgetting. The *Lab* was part of an ongoing research collaboration led by artist Shona Illingworth with cognitive neuropsychologist Martin A. Conway, neuropsychologist Catherine Loveday and theorist Jill Bennett. Whilst both exhibitions represented deep collaboration between artists and scientists they presented markedly different types of audience experiences. *Body Image* was a visually spectacular, immersive and dramatic exhibition, whilst *Amnesia Lab* was a subtle, process-oriented experience, which demanded close attention from its audience. The contrast between the two exhibitions offered a productive testing ground for the development of a method that could effectively capture, and evaluate these very different kinds of experience.

## The challenge of art-science evaluation

Art-science is now well established, long promoted through the journal *Leonardo*, supported in the UK by the Wellcome Trust since 1996, and in Australia by the Australia Council Synapse program, as well as Labs such as SymbioticA. As a field art-science is diverse [6]; we focus specifically on work that goes beyond 'science-informed art' to produce a new third culture [5] or transdisciplinarity [6, 8]. We do not yet have the means to properly determine the value of such projects – either in terms of research or exhibition and public engagement. Ferran et al found that art-science evaluation currently tends to rely on existing measures, orienting to the established goals of *either* art or science. [11] But a genuine third culture or third space activity is more than the sum of its parts. Art-science has given rise to new forms of research and to findings that couldn't have emerged from disciplines alone [8, 12], and these require terms of reference that take account of but do not reduce to those of disciplines. Similarly, a research-driven art-science exhibition may depart from conventional exhibition models, potentially extending museum/gallery practice and engaging new publics in new ways. No major study to our knowledge has taken on the task of looking at art-science collaboration in respect of both its distinctive aesthetic modalities and its wider public role in the production of knowledge.

Studies of major art-science schemes consistently indicate that their value is perceived by collaborators to be significant (82% of participants in the Wellcome Trust's Sciart scheme reported that involvement provided "new insights"; scientists spoke of "intangible value and speculative benefit". [13 p.71] But there is currently very little detailed analysis of *how and why* transformation occurs when scientists engage with art and public through aesthetic practice. Quantitative methods (visitor numbers, citations, etc.) do not provide the data needed to determine the value and benefit of aesthetic engagement; conventional quality evaluations are insufficient because they do not assess value beyond their disciplinary value structures.

There are two interrelated challenges for evaluation: Firstly, the lack of a developed discourse for expressing value within this hybrid field. Ethnographic study of the UK "Arts and Science Research Fellowships" describes how participants often fall back on "familiar narratives" and on "the conventional, oppositional distinctions between art and science in describing their integration". [14] Moreover, it is often difficult for collaborators and participants from non-arts backgrounds to fully articulate the benefits of aesthetic engagement. This highlights a methodological issue with the use of participant narratives in areas where there is no established, shared discourse. Secondly, the evaluation of any kind of art faces the problem of how to account for aesthetic experience. By focussing on social and economic indicators and measures, evaluation often "fails to account for the very aesthetic dimensions that count". [15] Conversely, art evaluation may fail to account for utility [14] or value beyond the discipline. An effective evaluative approach needs to counter this polarisation of aesthetics and utility, accepting instead that the distinctive aesthetic (visual, sensory and affective) dynamics of art are central to art's 'practical' value [16] and to its capacity to play a distinctive role in a transdisciplinary field. [12,17]

To address this challenge we formed a research team that combines and applies specialisations in interdisciplinary curating and audience experience (Lizzie Muller and Vanessa Bartlett) practical aesthetics (Jill Bennett) and in psycho-social evaluation (Lynn Froggett) to develop a framework for evaluation of aesthetic experience in a field connecting diverse experts and stakeholders. The project draws on a unique method – the visual matrix – to pioneer a means of capturing the experience of an emergent field.

## The visual matrix

The visual matrix is a methodological innovation developed by the Psychosocial Research Unit (PRU) at Uclan to address the need for arts sensitive research in the cultural sector. [18,19] It was initially developed in the Public Art and Civic Engagement project (PACE), which was funded by the AHRC Cultural Value Programme. The method was developed to address two key challenges in evaluating experience. Firstly the problem that the sensory encounter with an artwork usually precedes verbal expression, whilst our understanding of this encounter is usually heavily dependent on people's ability to give an account of it in words. This makes it intelligible and communicable within the research process, but at the risk of denaturing the primary aesthetic and emotional impact of the artwork on participants and audiences. Secondly the problem that interviewing – perhaps the most widely used of qualitative methods - tends to individualise experience, whereas art is also appreciated and understood in the context of a set of social relationships and often in the shared space of the public realm which in part it helps to sustain. Even focus

groups set in train discussions in which people speak from personal knowledge and opinion, often becoming more entrenched in their positions as debate proceeds.

Between traditional evaluative metrics and the intrinsic nature of an artwork lies an area that poses particular challenges for research – that of aesthetic experience in its sensory, emotional, aesthetic and cognitive aspects. This is the ground where individuals and communities can be moved or transformed by a process, object or concept. Positioned between arts based and social scientific methods, incorporating rigorous protocols of hermeneutic interpretation, the matrix fills a gap in the current methodological repertoire by creating a group based setting for shared associative thinking in response to an aesthetic stimulus. The particular conditions in which the matrix is conducted, and the procedures by which it is analysed, are designed to ensure that understanding of the embodied experience of an artwork is not over-whelmed by words thinking. [see 19] The matrix has been applied successfully in public art and clinical contexts, but not in transdisciplinary art-science projects. In the work reported here we aimed to assess the potential value of the method for such projects.

The process begins with exposure to a visual stimulus. In this case we ran two matrices with two different groups – each focused on one of the two exhibitions. Participants spent 30 minutes in the target exhibition before gathering in a separate space nearby. Participants are then seated in chairs positioned in a 'snowflake' pattern, rather than in rows or a circle. The facilitators sit among the participants and also participated in the matrix. This arrangement minimises eye contact and discourages group dynamics. It also discourages direct addresses to the facilitator and any assumption that the facilitator is there to actively direct the process of the matrix. The facilitator introduces the matrix by asking what the images bring to mind. Participants are invited to contribute their impressions, feelings and further thoughts and images. Doing this with others who are present and engaged with the same process allows shared thinking, or at any rate thinking that becomes intelligible within a shared communicative process. This process accumulates into a shared 'collage' of imagery, affect and ideas. For example, the following demonstrates the flow of imagery from the *Amnesia Lab* matrix, with each statement coming from different participant within the matrix:

*The thing inside the EEG, for me, was reminiscent of being inside some kind of buzzing hive, or swarm of insects. And quite a lot of the experience of that whole showed me - brought to mind insects, insect activity, scurrying, whining, kind of [9:04] like activity.*

*I thought it sounded like screaming. It had a kind of sense of pain to it, I thought.*

*I really liked the shadows on the walls that were cast by the lights. But at the same time the lights really disrupted the way I listened to the sound.*

*I thought there was something quite spider-like, actually, about just the speakers hanging on the wires.*

*Spider web.*

*Yeah. Or spiders legs, or something.*

*Mmm.*

*An octopus for your head.*

*Mmmm.*

*I heard the sound of - of crickets quite a lot of the time, actually.*

*Tinnitus.*

*Mmm.*

## Evaluating expert experience

The aim of this experimental application of the visual matrix was to evaluate its potential usefulness for art-science contexts. A particular challenge of evaluation in such contexts is the need to investigate the expert experiences of the artists and scientists involved in the collaborations themselves. There are particular difficulties in accessing and evaluating the affective and transformative experiences of experts who are trained to offer well informed and considered analytical opinions. Whilst such informed, critical opinions offer vital information on the impact of art-science projects, they necessarily remain entrenched in individual perspectives and within the narrative arc of an individual's career. The visual matrix offers a complementary method to techniques (such as interviews) that can capture these expert, individual perspectives. In this experimental application of the method we aimed to test its ability to elicit a different quality of data from expert participants – where the shared, affective aspects of experience might offer insights into the transformative impact and transdisciplinary knowledge produced by such collaborations.

We were also interested in experts' experiences of the method itself and their opinions about it – did they find it enjoyable, challenging, interesting, irritating, pointless? How did it impact on their experience of the work itself? What was their assessment of the method and its potential usefulness? In order to promote a rich and rigorous discussion on this topic we recruited colleagues working in the arts and sciences – as both researchers and practitioners. Several had a particular interest in evaluation and aesthetics experience. There were approximately 15 participants in each matrix. The normal analytical process of the visual matrix was slightly modified to include discussion about the method itself with participants (see below). The effectiveness of the method for working with expert experience and the impact of the group composition on the results is discussed later in this paper.

### Analysis of the visual matrix

The highly structured process of analysis begins with a group discussion led by the participants themselves. The post-matrix discussion, contrasts with the mental 'wandering' of the matrix, as a process of extrapolating meaning, ordering and linking begins. The session is facilitated by one of the researchers, who notes the ideas that have emerged from the matrix on the board or flipchart. The post-matrix process resembles a form of 'image-mapping', where clusters of images and intensities of feeling and ideas configure as 'maps' and where the interaction between the images, affect and ideas relate to each other as 'scenes' that echo the scenes evoked in the matrix itself. In this project we also used this session to discuss the participants' experience of the method itself, and their views on its effectiveness. This example from the *Body Image* post-matrix discussion demonstrates how the style of thinking and communicating differs from the associative mode of the matrix. Here participants are negotiating with one another to articulate the different emotional qualities evoked in the matrix:

*I think that the journey is also linked to anxiety because there is that moment of anxiety before you launch yourself in, whether it's into an MRI machine or into the exhibition space.*

*Yes.*

*I mean even during it, not just before it. "Have I done the right thing? Am I going in the right direction?"*

*Anxiety seems a little lightweight compared to some of the really emotionally heavy words we used, and…*

*Like what?*

*Like death.*

*Yes.*

*People spoke with some swear words, all sorts of things about what they felt about that. And anxiety doesn't really cover that.*

*I think fear.*

*You could go fear, yes.*

*Fear more than anxiety.*

Following the post-matrix discussion there are ideally three further interpretation cycles. The first interpretation panel is a researcher debriefing held the following day. This is composed only of researchers who participated in the matrix. Each one speaks uninterrupted, and in turn, on the impressions that remain with him/her most strongly from the previous day, without looking at the transcript, and in the knowledge that the experience of the scene remains quite close. The panel works back and forth between currently emerging meanings and the original matrix itself. They begin to ask *how* images and associations were offered, with what language and emotional tone. They consider the fluctuation of feeling in the matrix as a whole. [19] In this case this panel was also used to discuss and evaluate the quality of the data and the potential value of the method to art-science projects.

In most applications of the method there are 2 further interpretation cycles where the panel return to the data once further distance has been established by virtue of a break of some days or weeks. These panels establish further links between the material (matrix, post-matrix discussion and interpretation of the first panel) and the social situation and context. They move towards a level of synthesis and abstraction from the material, incorporating more remote ramifications and theoretical and contextual considerations to arrive at a full analysis of the research themes. The final panel can include members who were not present at the original matrix, presenting an outsider view. This is the point at which findings emerging from the matrix can be compared and triangulated with other data sources such as interviews. [19]

It is not our intention here to present the full results of this extensive process of analysis – but rather to present an assessment of the potential value of the method for art-science collaboration based on our experience of the matrices, the quality of data elicited there, the discussion with expert participants and the subsequent researcher debriefing. In the following section we identify the value of particular qualities of the method in this context, drawbacks and challenges and implications for its future deployment.

## Aesthetic experience at work

One striking observation from the experiment was the difference between the two matrices for *Body Image* and *Amnesia Lab*. Associations flowed thick and fast in the *Body Image* matrix, with participants rapidly and enthusiastically offering images, memories and sense impressions that seemed to have been generated in abundance by the rich, even overwhelming visuality of the exhibition. Much of this imagery was intensely visceral– evoking physical sensations connected to strong emotions. For example:

*It reminded me, the quality of some of those illuminations in there reminded of the experience you get when you close your eyes and you look at the sun, which I guess is the only time when you actually see the inside of your body, actually, because it's a moment when your body is illuminated and you can see it with your eyes. And I did get that sense of that strange luminosity that feels like blood, or tissue, but you can see tissue.*

*Did you ever shine a torch through your fingers?*

*Mm.*

*Yes.*

*My kid does that all the time with my iPhone, actually, and she's constantly looking at her finger with the iPhone. So I guess that's exactly the same quality of luminosity that I'm thinking of-----*

*Yeah, yeah, (28:07).*

*-----the moment when something about the flesh, the nature of flesh, which is opaque is kind of seen from within.*

*I used to do that so much when I was kid, pushing on your eyes, and then staring at the sun. Whenever you were waiting for your mum in the car. The patterns that show up on your, yeah, I loved it so much.*

The pace of the *Amnesia Lab* matrix, by contrast, was slower. Participants seemed to be searching and struggling to find imagery, and flows of association were frequently broken by long pauses. As in the *Body Image* matrix, imagery when it came often evoked intensely visceral and physical sensations, in this case these were often unpleasant – described by words such as "tortuous", "disturbing" and "alienating".

The capturing of "lyric" (moment-by-moment, affective, embodied) experience is clearly important in exhibitions that are so concerned with the materialisation of biological and neurological data. The intensely visceral, but markedly different qualities of these two matrices are isomorphic with the primary experience of the exhibitions. The matrix creates a space in which participants can, to some extent, 're-live' the exhibition. In this way the matrix makes available for examination the nature of the perceptual, affective, aesthetic *work* that is done by the audience within the primary experience. As one participant in the *Amnesia Lab* matrix expressed it:

*There was something - I felt alienated, too, and then I was - I was really struggling, working extra hard… for the connection between the visuals on the screen, and the sound experience as well, I really struggled, struggled, struggled there.*

The matrix articulates both the pleasures and the difficulties of the experience, as well as its contradictions. Antimonies that are part of the aesthetics of the exhibitions translate into the dynamics of the matrix – such as a tension between immersion and reflection, resistance and surrender evident within *Body Image*.

In revealing the profound complexity of an experience as it occurred, the matrix goes beyond traditional evaluative measures of success. Shona Illingworth – the artist involved in the Amensia Lab – participated in both the matrix and the researcher debrief the following day. She observed that:

*As an artist you have very little access to the experience that people have in your work. Art writers are fantastic – but there's a big space that's missing that gets filled with opinion. That is why evaluation is important. There's a massive space that is empty to do with engagement with the work. [The matrix asks] not just "did it work" – but more about a deeper engagement with the concept. Measures of evaluation usually stay at that level of "did it work.*

From the specific perspective of art-science projects the isomorphism of the method offers a way to re-create, observe and capture the emergence of new knowledge formed from the frequently complex, difficult and contradictory aesthetic experiences that occur in third space. In the theorisation the hermeneutic interpretation of the matrix Froggett is influenced by Donald Winnicott's account of the space of play as the origin of cultural experience, together with the understanding he offers of the capacity for illusion and reality-testing, and the importance of the 'potential space' (like the space of the matrix) in which these processes occur. [15,20] Whilst many evaluative techniques focus on the idea of a defined and bounded object of experience, the visual matrix elicits and captures impressions stimulated by imagery. These impressions can be disjointed in time and subject position, but by being expressed in the shared space of the matrix provide a multifaceted perspective on a complex project or research topic. The matrix sets in train a process which is isomorphic with the processes it seeks to investigates, and becomes itself and kind of third space - able to reveal aspects of the art-science encounter that have not been articulated, including the reciprocal influence on both parties. As the next section will show, this "thirdness" may also allow the matrix to capture the *shared* experience that underpins the generation of transdisciplinary knowledge.

## In-between experiences

Art-science projects necessarily imply the coming together of vastly different kinds of knowledge, held and imparted by individuals with different professional approaches to phenomena and argumentation. In this meeting of disciplines and individuals, knowledge domains become unsettled. A major strength of the visual matrix is its creation of a setting in which an *emergent* language forming in-between two domains can be observed and documented as it coalesces. Led by imagery, visualization and sensory stimuli, rather than processed and explained experience reported in a verbal account, the matrix is able to capture experience before it is re-absorbed into a more settled explanatory framework. Unlike focus groups, which tend to encourage and support the expression of different subject positions, the visual matrix supports a collaging of interrelated imagery. In this way it holds together contradictions and differences, whilst mapping affective intensities that cumulatively reveal shared aspects of experience.

There is some evidence from this initial experiment that the matrix may do more than just capture the emergence of this shared language, but also go someway to supporting its development. Expertise in this context is a double-edged sword. The expert knowledge of collaborators is vital to the productive encounter between them, but limiting in the degree to which it restricts or defines participants' understanding of that encounter. The visual matrix was originally developed to help those *without* expert knowledge of art to articulate their experience of artworks. This experiment suggests that it also helps experts articulate experiences that might be beyond their professional critical or evaluative stance. In the debrief that followed the matrix for *Body Image* there was general agreement that the process of the matrix, and the post-matrix discussion was itself valuable and productive. In fact for some participants this was a source of methodological anxiety. One participant suggested that we needed to conduct pre-matrix interviews with participants:

> *And in that way you might be able to separate out further, what is actually the power of the group discussion. And what might've been there for us individually as we'd started, because I think my difficulty is… that this has enormous potential, but only because of the powerful experience that we have of analysing it together.*

There are two responses to this methodological dilemma. One is to attempt, as this participant suggests, to separate out through additional methods the impact of the primary art-science experience from the impact of the matrix on the participants. The other is to embrace the integration of the art-science experience and the matrix as an indivisible whole in which new knowledge is produced and articulated. The matrix becomes a tool for formative evaluation – a scaffold for surfacing and supporting the production of new transdisciplinary knowledge.

Scientists and artists frequently claim that art-science collaboration is 'transformative'; it changes their perspective or generates insight [21,22], often by facilitating engagement with the public or with stakeholders and subjects of science. [13,23] These claims are cited to underline the success of art-science programs but there is rarely any deeper examination of the evidence for transformation, or of what exactly occurs at the juncture of art, science and public. The notion of third space suggests that the potential for engagement is profound in these cases because it is participatory, not simply in the manner of any interactive artwork, but because both collaborators and the public engage in the third space as a *locus of research*.

This begs the vital question of the constitution of the group and the recruitment of participants. The visual matrix has been shown in previous applications to be extremely group sensitive – producing markedly different results depending on the community or demographic involved. Questions raised by this experiment include whether to combine expert with non-expert participants in future matrices, and how to ensure a balance between different kinds of expertise (broadly between art and science backgrounds). If third space is brought into being at the interface of art and science with the public, then it is vital to incorporate within the matrix the interaction of expert and non-expert knowledge.

## Conclusion: Curatorial implications

Our experiment demonstrated that the visual matrix is a valuable potential method for capturing 'deep' responses in contexts where shared knowledge and discourse is emergent. It offers the possibility for an evidence-based inquiry into the impact of aesthetic engagement in the third space. But further it offers a process that is able not only to assess value but also contribute to the creative/research process with which it is engaged. The visual matrix itself, it seems, can play a part not only in investigating but in supporting the aesthetics of third space.

The significance for cultural institutions, and for others involved in art-science development is potentially far reaching. Rather than taking place purely in a lab or research unit, art-science takes the form of a "public experiment" [6] or "living laboratory", enabling knowledge creation to happen within public space. [24], Increasingly museums seek to establish their relevance as "epistemic organisations" – sites for the production as well as the representation of knowledge. [25] Many are grappling with the challenge of how to curate interdisciplinary activity [26,27,28], how to contextualise shared objects of knowledge produced through transdisciplinary research [4,10], or how to foster spaces of mutual experimentation. The implications include new spheres of operation, new formats of exhibition, models of engagement and outreach. In order to develop innovative programming – and ultimately to rethink organisations in relation to 21st-century knowledge formations – cultural organisations need to understand the shape of art-science research and its multiple points of engagements with diverse community or interest groups. The visual matrix offers one of a potential suite of processes, techniques and tools that can allow them to work proactively, and collaboratively with both experts and audiences to understand the nature and significance of art-science.

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