Experiments in the boundary zone: Science Gallery at Trinity College Dublin

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Abstract

Universities have an ever-increasing need to engage the public with different areas of research, to justify public funding, to extend their relationships with local communities and to attract potential students. Science Gallery, a new initiative of Trinity College Dublin, is an experiment in public engagement with science and technology, bringing science into dialogue with the arts through exhibitions, events and festivals and acting as a sociable environment for face-to-face interactions and encounters between the public and scientists. Key challenges that will be discussed include: engaging the research community with the public, creating a two-way conversation, engaging young adults with science and technology and balancing research priorities with public interest.

Prologue

It's 6pm on a cold and dark February evening in Dublin. Commuter traffic is clogging up Pearse Street, one of the busiest arteries in the capital. But there is something happening that provides a distraction from the traffic jam. A quadricycle driven by a strange group of alien-like figures wearing pulsating LED spheres on their heads is maneuvering into place outside a new glass-fronted building, and a crowd is making its way inside the building which is a transparent frontage of Trinity College Dublin onto the city (Fig. 1). Inside the building scientists, artists and designers are involved in animated conversations, and visitors are participating in LED graffiti workshops and experimenting with electroluminescent fibers and fabrics. It's the *Lightwave* festival and we are at Trinity College's new experimental space, the Science Gallery.

Fig. 1 - Bubbleheads by Eric Staller at the *Lightwave* festival at Science Gallery

Up the large open staircase, past a 3D visualization of solar flares by astrophysicist Peter Gallagher, is a queue of Dubliners waiting patiently. Evelina Domnitch, a Belarusian art-scientist with a swirling pattern shaved on her cranium, invites small groups of visitors into a mysterious dark chamber. They wait in silence for almost ten minutes for their eyes to grow accustomed to the darkness and then a rising tone begins to emanate from a liquid filled transparent sphere. When the sound reaches a certain pitch startling luminous streaks begin to penetrate the liquid forming changing three-dimensional patterns of light – displaying the phenomenon of sonoluminescence, sound becoming light as tiny bubbles formed in the liquid are made to implode and reach temperatures that according to some are as hot as the surface of the sun.

Stepping out of the darkness, a group of students, arty types and a couple of old Ringsend ladies are crammed into the point of the building where they are staring into a large cubical arena, in which live bumblebees navigate towards colored lights to find a sugar reward. An experiment is in progress on the color vision of bees and their ability to learn to associate particular shades with sugar. The bees flight-paths have been scanned in three dimensions and laser etched onto resin blocks which are stacked into glowing towers of blocks tracing the learning curve of the female bumblebee (Fig. 2). Neuroscientist Beau Lotto is explaining the principles of the experiment to the group when suddenly a bumblebee manages to escape from the arena and staff and students alike gleefully chase her around the building. In the meantime a DJ has started up downstairs and a dancer, wearing a fluorescent dress has her movements mirrored by a light tracing installation (Fig. 3).

Fig. 2 - Bee Matrix by Beau Lotto

Background to Science Gallery

Science Gallery, which opened its doors in February 2008, was created by Trinity College Dublin to develop a more porous interface between the university and the city, between research and the public. The gallery received support through the Irish government's Strategy for Science, Technology and Innovation, to address the low numbers of bright young people choosing courses in the science and engineering disciplines, a problem that is shared by Ireland with many other developed economies. A major new research facility for nanotechnology (CRANN) was being developed with the support of Science Foundation Ireland, and the scientists leading the project, especially Professor Mike Coey, argued that a major new research facility for nanotechnology in Dublin's city centre should be accompanied by a radically new approach to engaging the public science and technology. Unlike the project also underway to develop a science centre for children and families in Dublin (the Exploration Station), Science Gallery would focus its efforts on adults, with specific emphasis on 15–25 year olds, beginning at Transition Year (a tremendous opportunity for project work in the Irish secondary

curriculum, currently under threat of abolition), and going through to include university students and professionals.

Fig. 3 - Light tracer, by Karl Willis

Trinity College has a particularly striking urban location – an oasis of learning with population of 15,000 at the centre of a city that has witnessed cataclysmic changes in its social and ethnic makeup in the past twenty years. In the past, Trinity has come under a certain amount of criticism from local community advocates for being 'inward facing', but Science Gallery is part of a sea-change in the university's perception of its relationship with its immediate urban location also emphasized by activities such as the Trinity Access Program which provides students from disadvantaged inner city schools with opportunities to experience the college.

A place where ideas meet

In developing the concept of Science Gallery, we considered it essential to establish it as a sociable, meeting place – a constantly changing space 'where ideas meet', rather than a museum space housing a permanent collection or an interactive science centre. From the beginning, it was about creating a place where new kinds of conversations could be sparked off, based on the idea that exciting things happen when you provide people with different backgrounds and beliefs with the opportunity to share ideas in a supportive environment. A visit to the Science Gallery would be as much about who you might meet as what you might see.

The central urban location of the gallery, at the intersection of cultural, business, social and commuter routes through the city centre, provided a good opportunity to be a meeting place and 'idea exchange' for different communities. Clearly the core location asset we had to work with was Trinity College itself, both in terms of being able to involve the student population in our programs, and being able to tap into the many research groups connected to Trinity. While we have a natural opportunity to work with

Trinity College scientists and engineers, we also involve researchers from other universities around Ireland and the world in our activities.

Interdisciplinarity is at the core of the Science Gallery's mission to "ignite creativity and discovery where science and art collide". Many of our projects involve taking scientists outside of their comfort zone – what happens, for example, when a nanotechnologist talks to a fashion designer? How can new materials technologies transform clothing? Like Le Laboratoire, the new 'artscience' space in Paris created by David Edwards, or the Wellcome Collection (bringing biomedical science into dialogue with the arts) in London, we believe that exciting things happen when you stimulate new conversations across disciplinary boundaries. Our approach to interdisciplinary conversation is very simple. We select an extremely broad theme (for example 'light', 'fear' or 'infectious') and then develop an open call for ideas from scientists, designers, artists and engineers for projects exploring the theme. An interdisciplinary group of curators reviews the projects proposed and a selection are invited to develop their projects further for implementation in the gallery. The advantage of the open call process is that it attracts a very wide (and unpredictable) range of project ideas, and proposers of projects are usually very enthusiastic to be involved in an exhibition or festival, frequently giving their time to participate in workshops and events in addition to their specific installation or exhibit.

Science Gallery is not primarily intended for tourists or one-off visitors. Instead it is about stimulating a new, interdisciplinary creative community, and providing opportunities for increasing depth of engagement with science and technology (Fig. 4). For this reason it was important to us to develop a pyramid model of engagement in the Science Gallery. Visitors can choose to become Members of the Science Gallery (currently free of charge), providing them with a profile on our website, invitations to special member events and discounted prices on tickets, and purchases our café and shop, as well as free WiFi in the gallery. Members who get truly involved in Science Gallery, whether by exhibiting their work, by working as student mediators, by getting involved as artists or researchers or by running workshops can get invited to become Science Gallery Ambassadors. Exceptional participation can mean that an Ambassador can be promoted to the Leonardo group, a group of up to fifty thought leaders drawn from science, the arts, technology, business and the media who feed program ideas into the Science Gallery. In the next three years we aim to have an Ambassador in every Irish secondary school, with the idea that this person (perhaps a 16 year old student) will be a key point of contact between the school and the gallery. It is important to emphasize though that Ambassadors do not all come from schools. Some are school students, some come from our partner companies, some from research, some are artists, some are engineers, some are involved with kindred cultural organizations around the world.

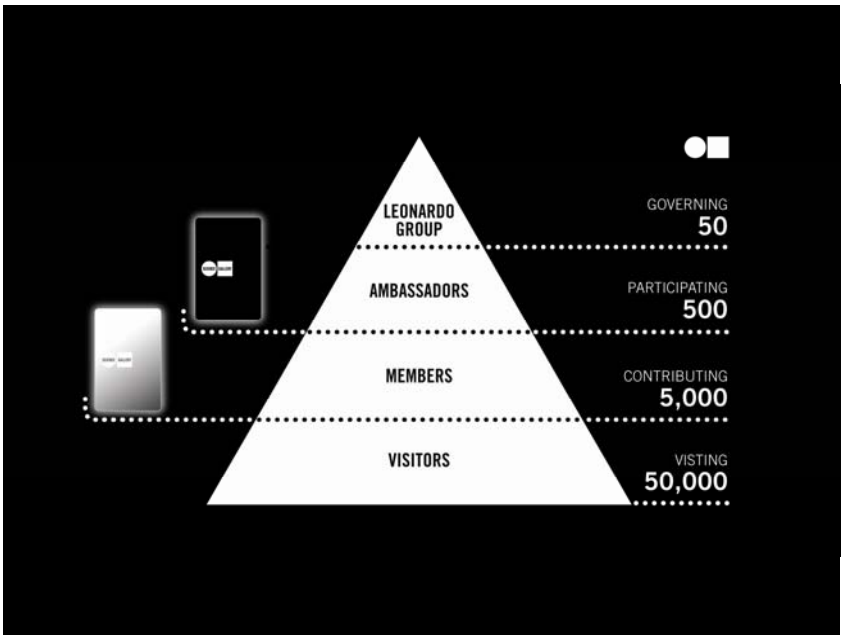

Fig. 4 - Pyramid of Aspiration

Lessons learned and future directions

The first year of activities has explored themes ranging from our relationship with prescription medication (*Pills*: Which ones have you taken?) to a mouse tissue culture being used to create 'victimless leather' (in *Technothreads*: the art and science of future fashion). In addition to offering a wide range of experiences and highs and lows, our first year has provided some rich lessons as our theoretical aspirations encountered hard realities and the feedback of our audiences.

First, not all scientists want to engage with the gallery. In fact some are downright suspicious of it and either would prefer a more didactic approach to science communication or have no time for such trifles. However the good news is that a core group of enthusiastic scientists and engineers (both in TCD and elsewhere) has emerged from the woodwork and is almost unstoppable in its passionate involvement in gallery programs. This is an exciting development as it means that the gallery staff can shift more into the role of facilitators and translators of ideas into the public realm. The media profile of the gallery and high footfall (over 120,000 people, having had a target of 50,000) in its opening year has been a factor in helping scientists to recognize the value of engagement with the gallery.

As an example of how this works in practice, Professor Ian Robertson and Professor Richard Reilly of the Trinity College Institute for Neuroscience approached the gallery team about doing an interactive neuroscience exhibition. The work of their research group focused on the theme of attention. At the time, we were developing an idea for a series called LAB IN THE GALLERY, involving taking a working science laboratory and shipping the whole thing into a public space. Two local points of inspiration for the project were the Francis Bacon studio, meticulously reconstructed in Dublin's Hugh Lane gallery in exactly the chaotic state in which it was left on Bacon's death, and a performance called One developed by PanPan theatre in which 'nurses' took individual members of the audience to meet one on one with individual actors and recline on a couch while the actors confessed their reasons for getting into the acting profession.

What, we wondered, would it be to do something similar for science? It had to be real, publishable research happening in a public space. But how would the act of observation affect the science observed? Some fascinating 'science live' experiments had been carried out by the Science Museum in London and other organizations. When Ian Robertson and Richard Reilly came to us with their ideas we thought this was an ideal opportunity to launch the Lab in the Gallery series. Their work, involving human experimentation with EEG, seemed like the perfect fit. Even better, we spoke to the Dublin Theatre Festival and they were excited about having Lab in the Gallery as part of the festival – this was great, science as theatre in every sense. Loughlin Deegan, the Theatre Festival Director suggested the name *Lab Rats* but the scientists didn't warm to it so we settled on the less controversial but literally accurate *Lab in the Gallery*.

Lynn Scarff of the Science Gallery worked closely with the scientists and their whole research group to develop a series of experiments that would be suitable for the gallery. The ethics of human subjects experimentation in a public setting turned out to be rather complex. Ironically we weren't allowed to advertise participation in the experiments – our advertisements could say "come and watch the experiments", but could not invite people to participate as human subjects.

While we began the project with romantic notions of ornate glassware, sparking voltage discharges and a scientific lab as gloriously messy as the Bacon studio, we had a design challenge when we realized that a modern neuroscience lab looks to all intents and purposes very much like an office. Even worse, many of the experiments seemed to require isolation of the subject and any distractions or noise could interfere with the quality of the data.

We were almost resigned to the failure of Lab in the Gallery, but, encouraged by the enthusiasm of the participating researchers, decided to go ahead and build it anyway. Then to our immense surprise, the public came in their droves and loved being human subjects. The value of the experience from the public's point of view seems to have lain in the opportunity to find out about one's own brain and to meet a neuroscientist in person. We leveraged this further by having *Meeting of Minds* sessions every lunchtime in our café, where you could book five minutes one-on-one time with one of the Principal Investigators in the project. The scientists were delighted – they performed over 2,500 human experiments. The public were engaged – visitor surveys reported one of the strongest positive responses to the experience, even though the exhibition just took up part of the ground floor of the gallery. This was a fascinating learning experience for us and showed how important it is to work with the right group of scientists, scientists who are willing to take risks.

Second, it is important to be able to work fast. The museum world is not necessarily associated with rapid production. The Science Gallery opened on what seemed like an impossible breakneck timeline. The positive aspect of this was that the whole team developed the ability to develop projects extremely rapidly. When the debate about anti-depressants was exploding in the media, we developed, in a hair-raising two-week timeframe, a major exhibition relating to prescription medicine. When the Large Hadron Collider was capturing the attention of the press, largely due to the idea that it might cause a black hole and trigger a doomsday scenario, we pulled together an event in less than two days bringing together the Irish scientists and engineers for an all-day marathon breakfast in the Science Gallery with a live feed from CERN. Although this event cost almost nothing, it became the national focus for Irish media covering the event, and all the young scientists and engineers involved were interviewed for television and national newspapers. On that day alone we had nearly 4,000 hits on our website. Quickly put together, cheap events that tap into people's current concerns can sometimes have more impact than the most carefully crafted big budget exhibitions.

Third, it is essential to offer the opportunity to 'be discovered'. It's not enough to tell people about other people's discoveries or even to allow them to make discoveries for themselves. To make a really strong connection with our elusive quarry of 15–25 year olds we need to go a step further and actually talent-spot our audience. We are still learning how to do this most effectively. You hear about Kate Moss being discovered as a model on Croydon High Street, a soccer-player being discovered kicking a ball on a beach in Brazil or a new band in a dingy pub, but where are the innovators of the future discovered? In every program or activity we develop we ask ourselves – how is this offering new talent an opportunity to emerge. If it isn't then we shouldn't be doing it. As an example we are currently developing a project with the goods lift in the Science Gallery. This happens to be quite a large lift, large enough to fit a desk and a few people. It takes the lift just under two minutes to reach the top of the building. The idea (entitled Elevator Pitch, naturally) is simple – 100 people (between the ages of 15 and 25) queue up on the street to get into the lift. As they get in they pitch their world-changing idea to the people in the lift. If the idea is hopeless, they end up back on the street with some words of advice. If the idea appears to have potential they are released on the first floor into the Science Gallery incubator where an interdisciplinary team is assembled around the idea. For example, if somebody were to suggest the idea of edible shelters for homeless people, they might be assigned a crack team consisting of a food scientist, an architect, a social worker and a patent lawyer to take it to the next stage. When a prototype is ready, they need to go back in the lift again, to compete for seed funding for the project. Talent-spotting our audience can also happen in less dramatic but equally significant ways, for example when a Google engineer is running a workshop for 15 year olds from inner city schools and the installations created are exhibited in the gallery.

Learning-theorist Stephen Heppell has suggested that whereas the twentieth century was mostly about the accumulation of 'stuff', the twenty-first century is (so far) more about being the glue that

binds people and stuff together. Perhaps the ultimate challenge for any space like the Science Gallery is whether it can really work as a social glue, or even a sort of fly-paper for young innovators, bringing them together in a sociable, creative and stimulating space and offering them transformational opportunities they would not receive elsewhere. This challenge is leading us to reconsider the baseline experience of the Science Gallery (between major exhibitions), offering a wider range of creative experience during 'downtimes' through the creation of an 'Ideas Lounge' which is a place both to share ideas and to be inspired through encounters with the ideas of others, whether scientists, artists, designers or students. What are the frameworks, prompts and supports we can put in place to trigger new kinds of conversations across traditional boundaries?

Seventeenth century coffee houses were not just places to drink coffee but also places for demonstrations of the latest technical wonders and for scientists, merchants and literati to share ideas and novelties. What can we learn from this in designing spaces for idea exchange? How can we leverage social network technologies and integrate online and offline experiences? How can places like Science Gallery transform the public face of a major research university and work as an interdisciplinary playground/incubator for artists and scientists? What simple models and formats for interaction between researchers, artists and the public could be portable to different environments where universities are found at the heart of major cities? These are some of the questions we are pondering as we embark on our second year of experimentation.

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