

Revealing All

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In the play Insignificance by Terry Johnson, Marilyn Monroe enacts the theory of relativity to Albert Einstein. Marilyn is overcome with excitement at discovering that Einstein is in New York at the same time as she is there filming the Seven Year Itch. She steals away after shooting the famous skirt-billowing-up scene to confront him in his hotel room. There, with a bemused Einstein (who has no idea who she is) perched on his bed, she acts out her demonstration with the assistance of various props like flashlights, toy trains and a paperback novel. Enthused, Einstein congratulates her on her understanding. But no, she tells him that she doesn't understand it, she just learned how to explain it: she is an actress. Einstein frowns and tells her, to her disappointment, that there is no point in learning if you don't understand.

As the play goes on it becomes clear that there are fleeting connections and missed opportunities and that it is not possible to understand all things all the time. Knowledge can be fleeting and understanding is not an absolute thing: it is relative and affected by the circumstances surrounding it. For the audience watching the play, some of the same sensation is there also. Some people would be completely familiar with Einstein's theories and so the scene is just an amusing demonstration for dramatic purposes. But for others, Marilyn's enactment suddenly tangible information that was possibly previously incomprehensible. The actress rushing across the room pretending to be a train speeding through the night to Pittsburgh and flashing a torch at an oncoming toy train, put flesh on an intellectual construct. However, once the curtain had come down, the audience might be left to ponder, like Marilyn, how much they actually knew: that certainly they had experienced something, but how complete was their knowledge? Yet they might also ask themselves, even if their knowledge was incomplete, was not the richness of what they had experienced itself valuable?

Marilyn's position is not dissimilar to the position of artists and audiences in art projects which centre on scientific concerns. Just as in the play, there is in arts projects a delicate balance between the gaining of knowledge and communicating through experience. Sometimes the balance tips solidly to one side, sometimes to the other.

This paper looks at three concerns about the ways that the process of critical and creative understanding can be dealt with. They involve firstly the way that audiences are involved in the conceptual development of the work; secondly the context in which the work is developed and placed, which involves the site, the timing and the nature of the collaboration; thirdly, the roles involved, which involves an awareness of the nature of the collaboration, and how it functions.

Many collaborations are not as simple as a two person, two discipline partnership. They may involve different individuals that draw on different skills and knowledge, and the collaboration may include a curatorial or artistic-managerial role. The role of the curator is of particular concern in this paper, as it identifies the capacity of an individual to participate on a different level, and yet to have an involvement all part of the collaboration; furthermore it is arguable that in a complex collaboration, this role is needed as a way of brokering the project to a wider community, and to mediating between the component partners. A key function of the curator is to be observant of the process that is involved in the collaboration. Where a demonstration of the collaborative process is a desirable outcome of the project the curator has a key role. One which supplements the way that the artist or other partners may demonstrate the gaining of knowledge.

Often there is an apparent sub-text to interdisciplinary collaborative projects. Many arts projects operate within, or raise, a series of questions: some are very specific and others might be described as questions that are part of the context in which the work is located. They deal with a range of things from very exact scientific concerns to very generalised issues. But one of the generalised questions often deals with the nature of knowledge: not only asking what we may specifically understand about a particular issue but considering how understanding - as a process - actually takes place. Furthermore, as an artistic project, a further objective is to find a way to convey this through the way the work unfolds for its audience.

Art projects rarely make it their primary concern to explain complex information. Instead they operate within a subject field, or context, which may lean hugely upon scientific concerns (or concerns from another discipline) and they often create an environment in which the audience is challenged, compelled or intrigued into questioning what they are experiencing. Part of the attraction of an arts and science project for an arts audience is that an artist can both bring important ideas within reach and give them a particular twist and resonance within ongoing cultural concerns. The delicate position of the artist, however, is in determining how to negotiate the balance of the two sides: so that the audience can be assured of having enough knowledge to comprehend the purpose and the questions behind the work without finding the work to be 'illustrative' or 'educational'.

A further issue arises from a curatorial point of view, where the concern shifts from being about the making of the work, to the contextualisation and the presentation of the work. The curatorial role in interdisciplinary and collaborative projects has been highly debated in recent years (for example as evidenced on the CRUMB discussion list maintained by the University of Sunderland) and the consensus of debate has focused upon the role of the curator as not only being the catalyst, producer and sometimes artistic director, but also upon having a responsibility to create a lasting context for the work. While brokering work to a venue, or organising an exhibition may play a significant part in this, an other

area of activity is the providing legacy of work through documentation or other forms of secondary but lasting presentation.

While arts projects which draw on scientific concerns and arise from collaborative engagement between artists and scientists but which have a conventional outcome (ie an artefact which can be exhibited), for example Andrew Gormley's sculptures which arise from discussions with quantum physicists and which are positioned the bank of the River Thames, easily find a place within the conventional process of documentation based around the artefact. Put simply, their audiences know what to expect from them and the curatorial role in contextualising the debates and concerns that have gone into the collaboration and production can be relatively easily crystallised. However, projects which are more process based and have less of an obvious object-based outcome are harder to place within conventional documentation practices. The unfamiliarity of audiences to this form of work (which may include the communities in which the artists and collaborators are working) requires additional and complicated support.

The video artist Grace Weir has developed a strategy that is very interesting in this respect. One component of her recent exhibitions is video installation that works in a very conventional way for an art gallery audience. One does not need to know about Einstein's Theory of Relativity to be moved by her work Around Time, where the viewer is placed in between two aerial points of view, on one side circumnavigating a cloud and on the other looking outwards from the same moving position. Nor does one need specific information to be tantalised by another piece, Déjà Vu, where two people are momentarily part of the same event but have different perceptions of it, even different time-scales. The characters' lack of connection is poignant, and the work speaks to an audience through a cinematic language that references brief encounters and missed opportunities as much it references theories of time and space. However, in the gallery, Weir uses a second component that anchors the work specifically in a scientific context. She exhibits what she calls her 'footnotes' which are short videos that document her discussions with her collaborator, astrophysicist Ian Elliott. The conversations give the audience a way to access the scientific base of the work, yet are neither pedagogic nor heavy-handed. In effect, this is a demonstration of an artistic and curatorial strategy that enables the audience to approach the artwork laterally and understand it from an intellectual position, and which gives an extra dimension to the metaphors that she has drawn on in the installation itself. Furthermore the videos document the process of intellectual exchange, how Weir is learning very specifically from Elliot, and how her point of view and as artist is engaging him. While this is not an equal two-way exchange it is a situation in which each partner learns from each-others skills of communication and how, in this case, understanding is gained. Much of their discussions involves simple experiments and hypothetical propositions (which owe a debt to Einstein's thought experiments)sketched out. Through this process Weir says she began to understand, that as scientists seek simple language to

describe complex things, so artists also often script visual concepts with simple line drawings. For the audience, the footnotes indicate the beginning of the subtle and complex visual intelligence that is used in the set-piece videos to explore the major themes of the exhibition.

However, the context of the site where an exhibition takes place determines what strategies can be used. Weir's work, shown in fine art spaces enabled the dual strategy, and the audiences were primed to the issues involved in collaborative arts and science projects through previous experience. Therefore the work and the strategy needed no framing device to make it palatable to the audience.

In a different context, those conditions do not necessarily apply and a different strategy may need to be engaged. In his installation Tide (2001), Luke Jerram, set out to make work which explored the gravitational pull of the moon on the earth, addressing cultural as well as astro-physical concerns. The resulting artwork was an audio installation that drew on measurements of the lunar gravitational pull to provide data that controlled an audio installation. In a darkened room the audience encountered three beautifully modelled tripods, each holding aloft a spinning glass bowl, partially filled with water. In each, the water level very gradually rose and fell over the period of twenty-four hours, and as it did a sound emanated, caused by vibrations from the glass bowl, like a wine glass singing. Standing in the middle to the installation, the audience were given the sense that they were hearing gravity; that they were aroused to something they constantly experienced physically but didn't often contemplate.

As Tide, the title of the piece, suggests the water within the glass bowls was not only a means to generate the audio aspect of the work but associated the installation with the rise and fall of the oceans, of tidal flow caused by the moon. However, while the work could be experienced as a sculptural or generative-audio work without any background or scientific information, it is arguable that it would have been a diminished experience for the audience. The work was not a conceptual piece but a work that had a particular relationship to science. It also arose from more complicated collaborations than Weir's work, with a number of scientists, astro-physicists and geo-physicists, engineers and musical historian dealing with the ancient notion of the music of the spheres. The piece had been developed over an extended period in which I had a role as curator working alongside the artist. The conclusions that we reached about the presentation of this work has informed later projects.

The key venue for the work was not a conventional gallery but a hands-on science exploration centre, and this introduced a considerable number of issues relating the presentation. Typically in such venues, the time given to each exhibit by audience members is brief, unless there is a reason for continued engagement with the work, such as a gallery interactive using a gaming structure. A piece which has a strong conceptual element and which requires extended contemplation is not an easy fit. Similarly, very few of the exhibits had

much text involved, and audiences were not in the habit of reading about work by the time they reached the space which held temporary exhibits. Therefore a strategy to demonstrate how the piece drew on scientific endeavour had to be non-didactic and conformed to the display. The resulting solution was to display also the gravity measuring device, the switches that drove the installation and a screen with an additional data output and that gave another visual representation of high and low tide. Through these means, the audience not only were able to cite the work, and what they were experiencing, connecting it with information about lunar gravity, but they were also able to see the work as a theatrical piece that operated live through a sequence of processes.

However, the solution did have limitations, and although the additional objects positioned the work effectively as coming out of an exploration of geophysics and measurement they did not indicate the level of personal exchange and collaboration, but instead relied in a more conventional arts paradigm on the representation of the art object as 'the thing in itself'. Ironically, when the work was later shown in art galleries, and therefore in a very different context, the additional objects worked more effectively. In the science centre their effectiveness was reduced because they appeared to conform to the principle of showing the workings behind the science involved in the exhibit, or decoding the exhibit. In an art gallery, and to an art audience, they had a different status as objects with their own histories and layers of information. They were read as being representations of different worlds of information, and conversations about the relationship of the digital processing of data derived from the measuring device and the analogue output, for example, followed more smoothly in the art context.

On reflection, in work such as Luke Jerram's Tide, processes can be demonstrated as a physical sequence of stages or components, and through this, the processes may be made transparent to reveal the means through which the artist has made the work, but the strategy is limited insofar as it cannot represent the complexity of human engagement in such a project. As Grace Weir's work alluded to it, process in a work about science often gives a deepening intellectual engagement; sometimes it is a solo journey of discovery, but sometimes it is collaborative. As Weir's pieces suggest, her conversations with Ian Elliott about theoretical physics are part of the process of her engagement with Einstein's theories and her exploration of the way we can understand time and space. The missing element in the depictions of these collaborations though deals with time, not as an abstract notion, but the specifics of the time involved in the collaboration.

One of the compelling aspects of contemporary inter-disciplinary projects is the way that both artists and scientists or other partners are increasingly interested in pushing the form of collaboration. As such, they may be making work that draws on cutting edge and sometimes highly controversial theories or discoveries, but more than documenting a series of intellectual exchanges, the work needs to

show how the exchange of knowledge is being built upon by each partner and how each partner has taken that back to their studio or laboratory where it has influenced their theorising or art practice. At this point the curatorial role deserves further contemplation. Often innovative collaborations appear organic and made up of complex threads of exchange and reflection, but a self reflexive process on the part of the partners in investigating the processes may be limited. A solution in some circumstances has been to demonstrate how such collaborations take shape by placing ethnographers or other observers alongside artists and scientists; through the analysis of the collaborators records, notebooks or documents the multi-layered processes are revealed. However, this process too is limited, and better as a research layer additional to the project than as part of the project itself (for example the ethnographic evaluation of the Desert Rain, a collaboration between the performance group Blast Theory and the Computer Science Department of the University of Nottingham). The question shifts to encompassing not only the issue of how to investigate the collaborative process, but how to convey it or demonstrate it.

An example of the need for this can be found in the project Aurora, currently in development, for which a different strategy has developed. The project is concerned with the Aurora Borealis as a phenomena which is both scientific and social, and it has involved a team that has fluctuated over time. They have included Luke Jerram (the artist involved in Tide), Nina Czegledy, who is an artist and scientist working with visual representation, a data analyst and modeller, an information architect, and a composer as well as a scientific team headed by Esa Turunen at the Sodankyla Aurora Research station in Northern Finland. The eventual artwork that will result will create an installation that does not try to represent the aurora but that intends to deal with one of the more controversial aspects of aurora research, that of the existence of a measurable or perceivable acoustic effect of the aurora. It also intends to create a space that deals with the subjective desire of the aurora observers to 'give themselves over' to the experience of the phenomena, which is a very traditional response to a sublime encounter, and a recognition that visual representations of the aurora are deeply limited in their capacity to convey the experience of the event. However, the project has reached this point through a journey that has taken it through a range of approaches and areas of expertise; these are not discarded notions but components of the project. If the outcome is to represent not only the concluding artwork but also the process of discovery and engagement then a form of documentation of the evolving project is required. This has become one of the goal of the project

In this case the curatorial role has not only been to observe and moderate the project but it has also been to define the aims of the collaboration and to manage how the aims may remain consistent while the specifics of the area under concentration changes. In this case it was also defined early on that the project was not aiming to 'communicate' science or increase the public understanding of science, and that rather than beginning with clear outcomes, such as

communicating a scientific idea, its aim was to transmit, and question, the 'essence' of a scientific idea via an artwork. As such the collaboration did not start with clearly defined goals, but recognised that the goals would be 'converged upon' through self-reflexive practice and documented discussion.

A key component of the project was that it relied upon developing 'conceptual proto-types', an idea used in industry but drawn from the use in a new media arts context by the Proboscis research group at the London School of Economics. These prototypes, often playful projections of what might be an outcome were then tested for viability and interest at workshops hosted by external institutions, which ranged from the CAiiA STAR Institute at the University of Plymouth to a new media arts centre in West Yorkshire. In this context ideas were tested, modified and evolved in the light of the critical response. As the curator, I have found that the documentation of the resulting conversations, from the workshops and meetings reveals the impact on all members of the team's understanding of science, and on the way they construct their own frames of reference to hybrid projects. Revisiting audio and videotapes of our meetings (and knowing during the meeting that I will have that opportunity in the future) has given them opportunities for flights of fancy and creative thinking unencumbered by the sometimes overwhelming need to ensure they are all 'speaking the same language'.

However, in this project, this process and the documentation that results is not to be seen as a precursor to an art piece, but rather as a key component of the work: that the collaboration is as important as the resulting artefact. The extended goal is therefore to find a way to present the documentation of the collaborative process in a form that is neither laborious nor didactic and which sits as easily alongside the resulting work as the video documentation or mechanics of Weir or Jerram's more conventional works.

The art critic Jan Venwoert refers to a synergistic model when talking about art and science collaborations, in which the main driver is an economic one. In this model having two experts from different disciplines optimises the ratios of productivity. Implicit in this is that the artist is recognised as being an expert with a specific skills base. And as the Aurora project has demonstrated, the process of engagement in any collaboration includes a substantial period of negotiation through which each partner's relevant skills are brought to the fore, and an almost unconscious process of selection takes place as the team 'decides' which skills – and attributes – will lead to a productive relationship. Collaborators are usually aware of this negotiation in terms of the concepts or themes that they choose to work with, and a typical partnership might begin with a 'brain dump' where all manner of ideas are tabled, and then a process of synthesis as they are reduced to a mutual viable few. They are less likely to be so self-conscious about the 'expert' qualities we bring to the collaboration. For this reason, from the curatorial perspective, I find that thorough documentation of the collaborative

process is highly desirable and enables the relationships to be deciphered at a later stage.

Artist Jane Prophet has been working since 2002 on a long-term collaborative project, Cell, with liver pathologist Neil Theise, mathematician Mark d'Inverno, artificial life programmer Rob Saunders and myself as curator. She speaks of a primary need to 'get the science right' as a way of ensuring that there is viable underpinning to an interdisciplinary collaboration that brings together many different strands of knowledge and practice. The collaboration explores new approaches to understanding stem cell activity and suggests that there may be new ways to understand the complexity of human biology. The team are working to develop a computer-based model of the scientific principles being explored, so that this can become the core of the project from which many outcomes, artistic and scientific can be developed. The model, which defines the scientific principles through mathematics provides a conceptual structure as well as a practical one, and from it many metaphors can emerge which are appropriate for the different contexts and outcomes.

In many ways the Cell project demonstrates that when different disciplines contribute to a collaboration they draw on different contexts which leads them to make disparate observations of a process. While not disputing the relevance of each-other's way of working or the meanings that each reads in the situation, it creates an interlocking and diverse range of responses. For example, the process of cell division has led to strikingly different expressions of interest from the pathologist, the artist, the mathematician and the programmer. The meanings extracted have been influenced by each-other's response but remain separately couched in terms of the different discourses of scientific hypothesis, visualisation and mathematical model.

We can see this as an endorsement of the notion that there is no sole authoritative position, and that no observations are more or less valid or constructive than others, in this sort of endeavour. However, while the model may be one of mutual and integrated research, there is also a need for unilateral outcomes that allow these observations to be reflected back within their own discourses and cultural contexts. In this way, diversity becomes an asset to the complex needs of collaboration. It also needs to be demonstrated using time as a reference point, so that the evolution of these responses can be revealed.

Within the Cell project, knowledge management tools are being employed to allow an assessment of the documentation and to demonstrate the pathways through which ideas have been developed. Cell demonstrates a very real and rich impact of the project upon the research practice of all the participants, and the value of discussion as a key component of exchange is clearly demonstrated. The strategy of the cell project is to present this as an online resource: an active archive for the participants to enable reflection upon their own processes as well as a public document.

Through these lateral approaches audiences can gain complex understanding of very complicated fields of knowledge, and do so not necessarily through obvious ways. As a result, they be able to take on very complex approaches to the way that understanding takes place. Grace Weir, talking about her work has said that sometimes an artist can understand the underlying concepts but it may be only for a brief period of time. Knowledge sometimes seems to fluctuate, not just because of the ability to retain it, but because of the way that audiences reflect on it differently in different contexts. However, this, if nothing else, indicates one of the reasons why art works can be powerful and moving. They challenge the presumption that there is absolute knowledge that is immutable, they defy closure and create ambiguities. Like Marilyn Monroe in Insignificance acting out the theory of relativity, the performance does not guarantee knowledge, but it makes us think about how we understand our individual and collective world.

References:

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