SISSA – International School for Advanced Studies
ISSN 1824 – 2049

Comment

SCIENCE FESTIVALS

Einstein's Garden 2009–2014: unexpected encounters with science

Ellen Dowell

ABSTRACT: *Creating science content for cultural contexts in which the audience are not primarily motivated by an interest in science, can provide exciting opportunities for experimenting with new approaches to science engagement. This article explores some of the learning gained, and practical methodologies developed by Einstein's Garden, the science, nature and environment area of the Green Man Festival.*

Introduction

Novel and unique experiences have been identified in previous research as important motivating factors for audiences when attending festivals in a range of genres [1, 2]. Novelty is also important in attracting audiences to participate in science-related activities in non-science leisure spaces [3]. It is therefore possible that generating inherently unexpected content, perhaps even perceived as incongruous, such as science-inspired activities within a music festival, has an immediate advantage in creating novel and unique experiences for the audience. This article explores just such a perspective and reflects on the first six years of developing Einstein's Garden, the science, nature and environment area of the Green Man Festival.

Morgan describes festivals as 'extraordinary experiences' set apart from everyday life [4]. Curating and producing science content within such an 'extraordinary' non-science context and for an audience who are not primarily motivated by an interest in science, provides exciting opportunities for doing science engagement differently. The approaches used in Einstein's Garden are often overtly creative, visual or otherwise sensory, interactive and playful. The non-science context creates freedom to experiment, both on the part of the scientists and collaborating practitioners, as well as the audience participants. Although not unique to Einstein's Garden (see, for example work by Guerilla Science [5]), the evidence to date suggests that such approaches can create highly effective engagement experiences for all involved.

Green Man & Einstein's Garden

Green Man is an independent contemporary music and arts festival held annually, over four days, at Glanusk Park in Wales, with an audience of 20,000 people. Known for it's beautiful location, support of emerging artists and lack of commercial sponsorship, Green Man has received UK Festival Awards including 'Best Medium Sized Festival 2010' and 'Grass Roots Festival 2012'. The site design is composed of ten areas, each with their own distinctive character. In addition to the various music stages, areas include Little Folk (children's area), Nature and Nurture (spa area), Babbling Tongues (spoken word) and Einstein's Garden. The management of these areas is highly devolved, encouraging the creative freedom of individual curators and their teams to design and develop content, creating authentic experiences for the audience [6].

Located in the rose garden of Glanusk Park, Einstein's Garden is a cluster of three grassy spaces divided by trees, flowerbeds, stone walls and bordered by a stream. Three venues provide the focus for each space; the Solar Stage, the Omni-Tent and the Workshop Dome and each is edged with 'Science Stalls' delivered by universities and learned societies (Figure 1).

Figure 1. Views of Einstein's Garden: Solar Stage, Omni-Tent, Workshop Dome and Science Stalls.

A fusion of science, art and nature, the Einstein's Garden programme is composed of music, comedy and theatre, science shows, workshops and much more. Sometimes delivered by artists, sometimes by scientists, and often through collaborative practice, all activities are inspired by science, nature or the environment whether in a very obvious or very subtle way. Most content is programmed from within the UK's arts, science and science engagement communities. However, Einstein's Garden also produces original projects with the aim of experimenting with new approaches to science engagement. Projects produced by Einstein's Garden are underpinned by the premise that science engagement is an interdisciplinary endeavour, involving the collaboration of experts in both science and engagement. In addition to scientists, practitioners involved in Einstein's Garden projects come from a range of art, design, performance and creative industry disciplines including theatre, music, film, interaction design, textile design and games design.

Since 2009, Einstein's Garden feedback, evaluation and research has been captured through yearly post-festival questionnaires completed by contributors, project specific evaluations [7–9] and an MSc Science Communication research project [10]. Within the scope of this article it is not possible to comprehensively explore six years of Einstein's Garden practice and learning. This article focuses, firstly, on some of the observed participant impacts — for both the audience and science collaborators. This is followed by a consideration of three key themes that have been consistently identified as contributing to Einstein's Garden's successful practice: a visual invitation, flexibility and choice and collaborative experiments.

Participant impacts

Audience perceptions

It is evident from evaluation and research that Green Man audiences perceive Einstein's Garden activities as novel and unexpected [8–10]. Festival-goers see Einstein's Garden as 'alternative' to other parts of Green Man and they consider this different and unique approach to enhance their overall festival experience [10].

> "*I was expecting to be lying on a hill listening to music, I didn't expect to be racing maggots, it's cool*" (Audience Member — child female) [8]

'Fun' is another overriding audience perception of Einstein's Garden [7–9]. The high level of entertainment within activities exploring science may in itself contribute to the novelty and enjoyment of the experience. Venugopal noted that participants felt they had engaged with activities that 'dealt with serious topics in a not so serious way and that this was in part a reason for their enjoyment' [10]. The transformation of 'serious' and complex science content into fun activities has consistently impressed, as well as surprised, the Green Man audience. Festival-goers have noticed that barriers to topics perceived as 'difficult' are removed and content made accessible [7, 9].

All projects produced by Einstein's Garden, and much of the curated content, place great importance on direct interaction with real scientists. In line with similar findings

in other non-science leisure spaces [3], evaluation data for Einstein's Garden suggests that this direct engagement is perceived by the audience to be genuine and rewarding. Scientists are described as passionate, enthusiastic and patient, with conversations often developing into prolonged discussion and debate [7]. The key value for audience members is in being able to ask questions and receive informed responses; particularly in a relaxed, informal environment in which they don't feel their questions are judged for being 'silly' [7, 8].

One of the main challenges that has emerged from research into audience perceptions is the difficulty in convincing people that Einstein's Garden is for everyone. There is a tendency for festival-goers to assume Einstein's Garden is primarily aimed at children [7, 10] and this could be creating a barrier for adults, particularly those not accompanied by children, to engage with Einstein's Garden activities. There are a number of over-18s events, which have been prioritised in response to these evaluation findings. Audience members do express appreciation for adult-only events and the associated 'permission to play', although still consider them to be the exception.

Despite this assumption that some aspects of Einstein's Garden are largely aimed at children, evidence suggests that when adults engage alongside their children they benefit equally from the experience:

> "*it doesn't feel like we're just killing time with him [refers to his son] at all, it feels like time well killed*" (Audience Member — adult male) [7]

The fact that activities are perceived as engaging for both adults and children is greatly appreciated by families, who can share meaningful experiences [7, 8]. The data suggest that this is very important for adults, who do not have to be a passive carer while their children play, and also for children themselves, who value seeing that adults find the same activities interesting and enjoyable.

It could be speculated that this kind of multi-generational engagement is more likely to lead to long-term impacts on participants because of an increased likelihood of families continuing conversations during and after the festival and reinforcing or reminding each other of the knowledge generated from the activity. Parents may also be in a position to follow up particular areas of learning with their children or help their son or daughter further pursue interests that were sparked at the festival. There is excellent existing research exploring family learning in museums and science centres [11]. It would be very interesting to expand this to festival settings and exploring long-term impacts.

Impacts on science collaborators

Although Einstein's Garden evaluation has never extended to investigating long-term audience impacts, some data have been collected about impacts on scientists. An online survey conducted in February/March 2014 collected responses from 19 (out of 32 invited) scientists who participated in the development and delivery of one of four Einstein's Garden projects (Science at Play, 2011–12 [12]; The Energy Factory, 2012 [13]; Hormone

Harmony, 2013 [14]; Blood Lines, 2013 [15]). Respondents were asked to rate the impact of their involvement in Einstein's Garden on a scale of one to ten in three different areas in respect to public engagement with science (attitude, involvement and confidence), as shown in Figure 2.

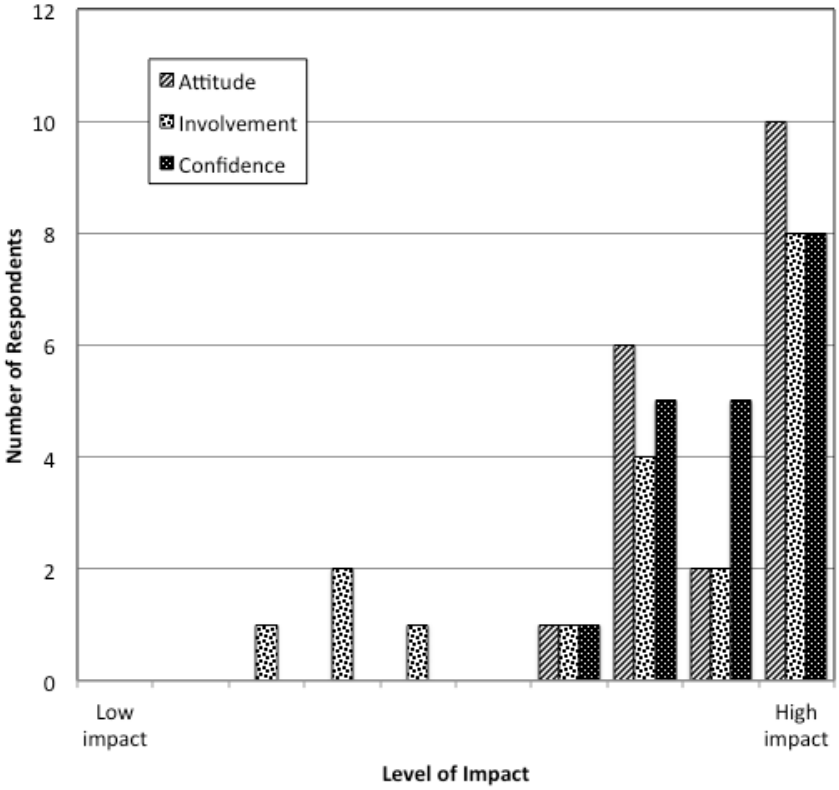

Figure 2. Results from survey with scientists involved in projects produced by Einstein's Garden (n=19). Respondents were asked to rate (on a scale of 1 to 10) the impact of their participation on their attitude, involvement and confidence relating to public engagement with science.

The respondents were very positive about their involvement in Einstein's Garden projects. The reasons behind such positive reactions were drawn out further in open-ended responses. The high impact on their attitude towards public engagement was mainly attributed to the realisation (often surprising to scientists) that the public were so interested in science and enthusiastic to engage. In some cases scientists experienced a more extreme attitude shift, for example:

> "*My attitude to public engagement has changed drastically. Before I thought that public engagement would be a boring and tedious thing to do. However, working in Einstein's Garden showed me it can be the complete opposite.*"

Figure 3. Festival-goers, performers and scientists engaging together in the project Hormone Harmony.

Impacts on continued involvement in public engagement with science were incredibly encouraging. Specific examples included the Einstein's Garden experience used as: a 'springboard' to seek involvement in other projects, opportunities and funding; a case study to 'open doors' and inspire new collaborations; a way to legitimise and motivate further projects and in one case the establishment of a specific outreach programme.

The key reason given for the positive impact on scientists' confidence was the realisation of their own capabilities to successfully engage with audience members. The supportive and immersive environment of Einstein's Garden allowed them to relax into the experience and discover their own abilities.

It is true that scientists who are willing to camp for four days in a field in order to participate in a public engagement project are likely to be more open minded to its consequences. Nevertheless, it is remarkable that they attributed strong longer-term changes to their attitudes, confidence and continued involvement in public engagement, to their participation in Einstein's Garden projects.

Einstein's Garden practice

A visual invitation

Since it's inception, Einstein's Garden has always included a theatre/event designer within the core team to create the visual identity of the area. Using design to shape the character

of the space enables visual communication with the audience and the transmission of key messages and invitations to festival-goers that are easily understood. Brightly coloured bunting and parasols communicate that the space is fun and relaxing, whilst large sculptures of eyes and moustaches hung in trees make Einstein-inspired 'tree faces' that tell the audience that the space does not take itself too seriously. Scientists wear everyday clothes or intriguing costumes (not lab coats!), making them approachable and avoiding stereotypes, whilst participatory installations invite the audience to join in and play (Figure 4).

Figure 4. Communicating key messages of fun and playfulness to the audience: brightly coloured parasols, moustaches in trees, scientists in top hats and tail coats and a pedal power installation.

The significance of visual invitation has been evidenced in all Einstein's Garden project evaluations as important for drawing audiences in and generating curiosity [7–9]. The beauty of using visual engagement as a 'hook' is that festival-goers retain active control over their participation. They are choosing to engage through a piquing of their own curiosity, rather than being persuaded or cajoled into watching, consuming or taking part in an activity. This is particularly significant in the non-science context of Green Man, in which there exists an extra barrier to participation: festival-goers cannot be assumed to have an existing interest in science. An effective visual invitation can instantly overcome stereotyped or preconceived perceptions and opinions about science and scientists that people may hold. The invitation to engage can just as easily make use of other kinds of sensory engagement, particularly music and sound.

> "*. . . the harmonies caught everybody's attention, you could see that people were really drawn to them*" (Audience Member — adult female) [9]

Flexibility and choice

In Morgan's research exploring 'What makes a good festival?', he recommends that [4]:

> "*. . . the objectives of the festival organizers should be to design a program that offers freedom to sample and choose a variety of performances and activities, consistent with the overall theme and values. It is this richness and choice that distinguishes a festival from a single concert performance.*"

Figure 5. Examples of diverse content in Einstein's Garden: a 'hydrogen fuel cell' game, a knitting installation inspired by the vascular system, falconry and a talk in the Omni-Tent.

Einstein's Garden is only one aspect of the richness of experiences on offer at Green Man. However, Einstein's Garden itself has always been characterised by the huge variety of content on offer, from science rap and stand-up comedy to participatory knitting installations and live animal encounters (Figure 5). This diversity of content allows the audience a great deal of choice about what they engage with. The concept of audience choice has also been scaled down and applied to the individual projects produced by Einstein's Garden, focussing not on *what* the audience engage with but *how* they engage. Understanding the benefits of designing projects incorporating flexibility of engagement and different levels of participation, allowing the audience to choose how they take part, has been one of the most valuable lessons learnt from Einstein's Garden project evaluation.

> "*it felt fresh and experimental. Participants were in control of their own level of involvement, some taking full advantage of the information available and some just*

giving it a go. In a festival environment it seems to work better to have that level of choice and not be overpowering with content or delivery" (Arts/Engagement Practitioner) [8]

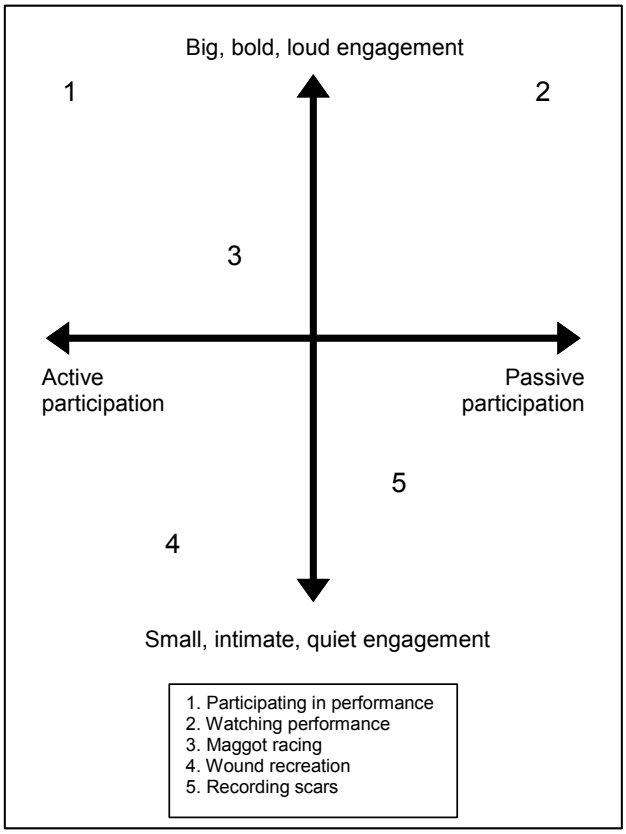

Figure 6. Diagram showing the various levels of participation and styles of engagement within one activity; The Roaming Scar Collectors, part of Science at Play 2011.

Figure 6 shows how, within one single activity, audience members can choose to engage along a scale from active to passive, intimately through one-to-one engagement or in a bold, spectated way. Other dimensions of choice include the time that an audience member decides to spend interacting and the depth and complexity of engagement with the scientific content that they choose to have. This last point sometimes, but not always, links to the age of participants, with the activity incorporating the flexibility to effectively engage both children and adults. Additionally, activities produced by Einstein's Garden are rarely timed: usually audience members decide for themselves how long to participate, with multiple starting points or 'ways in' provided for each activity on offer. Careful incorporation of flexibility and choice within Einstein's Garden therefore continues the theme of empowering the audience to decide their own 'path' through the activities, as well as ensuring that the content is suitable for as wide a range of participants as possible.

By creating experiences that invite people to take ownership over their participation, it is intended that they might be more willing to actively enter into two-way engagement with scientists, ask more questions and more readily offer their own perspectives and opinions. Although, to date, this has not been a focus for research and evaluation efforts, anecdotal comments from participating scientists suggest that within Einstein's Garden they often experience much higher levels of audience engagement than in any other context. Similar observations were also noted previously in an evaluation of a science activity at Glastonbury Festival [16], suggesting that the impacts of such environments may be worthy of further investigation.

Collaborative experiments

Over the years Einstein's Garden has become a meeting place for an interdisciplinary community of scientists, science communicators, arts and engagement practitioners and an open and enthusiastic festival audience. At it's best, Einstein's Garden might be seen as a test bed for piloting new approaches to science engagement and as a place where emerging practitioners of creative engagement with science can experiment and take risks alongside a friendly audience and a support network of peers and mentors. From both a producing and curatorial perspective, Einstein's Garden values 'doing things differently' which inevitably means taking risks and accepting a certain amount of failure as part of a learning and development process. A key advantage for Einstein's Garden in being able to provide and facilitate a place for experimentation is it's placement within a wider festival and the fact that, once inside Green Man, festival-goers do not have to pay for individual activities. This means that the occasional failed experiment is more likely to be taken with a pinch of salt amongst the variety of content on offer.

Conclusion

Einstein's Garden exists within the fabric of an event that offers an escape from everyday life. Consequently, it's audience is open-minded, hungry for unexpected experiences, actively curious, and receptive to engaging with new knowledge and new people. The crucial question, therefore, is, 'Can the learning gained, and methods developed, in Einstein's Garden be applied outside a music festival environment?'. Or, does the nature of the 'extraordinary experience' and the expectation of novel and unique encounters mean the approaches that effectively engage the Green Man audience are not easily applicable to other contexts?

In Summer 2014, a team of Einstein's Garden collaborators worked with 21 scientists from the Royal Botanic Gardens, Kew to create an interactive installation and performance that was delivered at Kew Gardens over seven weeks between July and September. The methodologies used in this project, Plant Family Croquet [17], were developed in Einstein's Garden and included many of the techniques explored in this article. Although not yet formalised, evaluation suggests the project was successful. Time will tell if this

was a one-off success, or if the learning and practice trialled and tested in a music festival environment can contribute to a broader embedding of science in culture.

References

[1] H.E. Bowden and M.J. Daniels (2005), "Does the music matter? Motivations for attending a music festival", *Event Management* **9**: 155–164.

[2] K. Kim, M. Uysal and J.S. Chen (2002), "Festival visitor motivation from the organizers' points of view", *Event Management* **7**: 127–134.

[3] K. Bultitude and A.M. Sardo (2012), "Leisure and Pleasure: Science events in unusual locations", *Int. J. Sci. Educ.* **34**(18): 2775–2795.

[4] M. Morgan (2008), "What makes a good festival? Understanding the event experience", *Event Management* **12**: 81–93.

[5] Guerilla Science (2014), *Guerilla Science homepage*, http://guerillascience.org (accessed on 13 October 2014).

[6] Wales Arts Review (2014), *Green Man Preview: In Conversation with Fiona Stewart*, http://www.walesartsreview.org/green-man-preview-in-conversation-with-fiona-stewart/ (accessed on 13 October 2014).

[7] Einstein's Garden (2012), *The Energy Factory Evaluation Report*, available from Green Man on request.

[8] Einstein's Garden (2013), *Science at Play Evaluation Report*, available from Green Man on request.

[9] Einstein's Garden (2013), *Hormone Harmony Evaluation Report*, available from Green Man on request.

[10] S. Venugopal (2012), *Einstein's Garden: An exploration into visitors' motivations, perceptions and cultural associations of a science event at an arts festival*, University of the West of England, Bristol, U.K. .

[11] L.D. Dierking and J.H. Falk (1994), "Family Behaviour and Learning in Informal Science Settings: A Review of the Research", *Science Education* **78**: 57–72.

[12] Einstein's Garden (2011), *Science at Play*, http://youtu.be/Jng7acmlbN0 (accessed on 13 October 2014).

[13] Einstein's Garden (2012), *The Energy Factory*, http://youtu.be/YuyfxTHrkRQ (accessed on 13 October 2014).

[14] Einstein's Garden (2013), *Hormone Harmony*, http://youtu.be/ZRE8djGQhc4 (accessed on 13 October 2014).

[15] Einstein's Garden (2013), *Blood Lines*, http://youtu.be/RBr88hf7ZZM (accessed on 13 October 2014).

[16] K. Bultitude and L. Grant (2005), *Einstein at Glastonbury: Final report*, University of the West of England, Bristol, U.K. .

[17] Royal Botanic Gardens, Kew (2014), *Exploring Medicinal Plants with a Spot of Croquet in the Gardens*, http://www.kew.org/discover/blogs/plant-family-croquet (accessed on 15 October 2014).

Author

Ellen Dowell is a creative producer of science engagement projects. She has a BA in Theatre: Design for Performance (Central St. Martins College of Art and Design) and an MSc in Science Communication (University of the West of England). Ellen is the curator of Einsteins Garden at the Green Man Festival and she works part-time at Imperial College London leading The Curious Act, a programme of creative public engagement projects for the National Heart & Lung Institute. E-mail: ellen@greenman.net.

HOW TO CITE: E. Dowell, "Einstein's Garden 2009–2014: unexpected encounters with science", *JCOM* **13**(04)(2014)C06.