



SMASHfestUK 2016

A festival. Big story. *An Adventure...*

18 - 20 February 2016

SMASHfestUK 2016

A festival. A big story. *An adventure...*

Evaluation

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Evaluation

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Tackling critical issues: introduction

February 2016 - a solar storm is about to hit Deptford. Electricity, electronics, communications and infrastructure will all be hit. Deptford - and the world – will plunge into darkness as hospitals crumble, water supplies dry up ... life and health are at immense risk.

This was the scenario constructed for SMASHfestUK 2016. The Festival unfolded this fictional narrative through 3 days of activity all themed around an imminent solar storm. Audiences could experience a human power station, a self-build planetarium, a new play, poets, comedians, human-sized mutant fruit flies, UV interactive activities, a variety show, electric paint, Aardman animation and a pilot virtual reality experience at The Albany. Deptford Lounge Library featured an interactive installation, a coding club, a solar exhibition, artist's residency and a film programme.

SMASHfestUK tackles an important and critical issue in an imaginative and engaging way. Its mission is to stimulate the interest of young people in Science, Technology, Engineering and Maths (STEM). This is a pressing issue as interest and achievement in STEM topics in schools is declining, leading to low entry levels to STEM tertiary studies and careers and an imbalance in the supply and demand for qualified STEM professionals¹. The implications are serious: science and research are major contributors to the UK's prosperity. If the UK's economy is to continue to prosper, high skill levels in science, technology, engineering and maths (STEM) are needed, with citizens that are interested and aware of the importance of these subjects.

*'The accepted response to these facts is that female, black and minority ethnic and disadvantaged young people are underrepresented in STEM study and the STEM workplace and that, if only we can enthuse / inspire / encourage these particular groups to enter STEM fields, then the skills shortfall will disappear.'*²

SMASHfestUK set out to introduce young people (aged 7 to 17) to STEM subjects in fun and creative ways that appealed to their imaginations. The festival strategically targeted those who are under-represented in STEM, such as economically disadvantaged young people and BAME communities, women and girls³, young people living in poverty.

*'Science, technology, engineering and maths (STEM) are enabling. They enable people to make sense of the world around them, they enable people to make informed decisions, and they enable people to pursue a wealth of exciting and fruitful career opportunities. For young people from relatively low socioeconomic status (SES) backgrounds in particular, STEM subjects can be invaluable. They can provide a means by which these young people can better engage with the modern world and take advantage of the opportunities it affords.'*⁴

¹ <http://www.educationandemployers.org/wp-content/uploads/2014/06/joyce>

² "Not for people like me?" Under-represented groups in science, technology and engineering. www.wisecampaign.org.uk/uploads/wise/files/not_for_people_like_me.pdf

³ <http://progressivescience.org/Diverse.html>

⁴ Science beyond the classroom ,Experiments in Engagement: Engaging with young people from

Introducing STEM topics to young people within their own community makes them accessible and helps remove the barrier that science is *'not for the likes of us'* by giving them a positive experience of science; *'it is for you'*. Enthusing young people is especially important because *'careers from STEM are not popular aspirations for students age 10 -14 and pupils from age 10 start to self-identify as 'not STEM'. Teachers often have lower (stereotypical) expectations of under-represented groups in STEM.'*⁵ Several reports suggest that more must be done at school-age level, to redress the imbalance in STEM degrees/careers, and to sustain the STEM workforce⁶.

Deptford is a particularly appropriate location for SMASHfestUK. 50% of young people in Deptford live in poverty, and 75% of young people in schools are BAME. The Festival aims to engage economically disadvantaged young people directly by bringing informal science-engagement activities into the community. These provide an important entry route into STEM subjects as well as stimulation and engagement for young people, *who 'should be inspired and engaged with science in order to continue developing the next generation of brightest minds.'*⁷

SMASHfestUK works with artists, scientists and creatives to devise new opportunities to introduce STEM subjects to young people through imaginative, innovative and interactive arts experiences. By utilising the skills and imagination of professional artists and scientists to develop these activities SMASHfestUK seeks to engage young people to stimulate interest and embed learning. Presenting the Festival in venues that already have the trust and awareness of the local community helps this engagement process. By holding the Festival in The Albany, Deptford Lounge alongside on street performances, people were invited to be inquisitive and participate within their comfort zone.

This evaluation

The following sources of evidence were used to compile this evaluation:

- Online and onsite audience survey
- Interviews with artists, scientists and cultural organisations
- Briefings and feedback sessions with SMASHfestUK Directors
- Feedback from teachers in schools that hosted a SMASHfestUK assembly
- Interviews with Young Science Explainers
- Social media and web analytics

We begin this evaluation by defining SMASHfestUK's main achievements for 2016 against a set of indicators that benchmark the Festival's progress from its beginning in 2015. We then look at how SMASHfestUK has impacted on audiences, creatives and artists, scientists and the education programme. Finally we offer some suggestions and recommendations to inform future

disadvantaged backgrounds, April 2014, Wellcome Trust

⁵ Not for people like me?" Under-represented groups in science, technology and engineering. www.wisecampaign.org.uk/uploads/wise/files/not_for_people_like_me.pdf

⁶ Improving Diversity in STEM A report by the Campaign for Science and Engineering (CaSE) May 2014

⁷ Experiments in engagement: Research into engagement activities with young people from disadvantaged backgrounds.

http://www.wellcome.ac.uk/stellent/groups/corporatesite/@msh_peda/documents/web_document/wtp056381.pdf.

planning.

SMASHfestUK 2016 Key achievements

- **35 unique events** in the Festival programme **increase from 27 in 2015**
- **1048 attenders** for ticketed shows; **850** through **Deptford Lounge** activities
- **Increase in SMASHfestUK social media:** 70 Tweets; 36.9K Tweet impressions; 808 Twitter followers (up from 600), top tweet earned 2,379 impressions; 82 New followers with top interests of Science News and Technology.
- **94 artists and creatives involved** including writers, artists, performers, poets, musicians, digital producers and filmmakers
- **40 scientists** involved including an eco-geneticist, a design engineer and a Professor of Mathematics
- **64 collaborations** (including Greenwich Student films) emerge as a result - **new artworks, presentations, and performances**
- **20 young people** join up as **Young Science Investigators** who volunteer their time and commitment
- SMASHfestUK **Community Audience Development Programme (CADP) ran year round**, developing new connections
- SMASHfestUK **established and consolidated innovative partnerships** with major cultural and scientific institutions including Wellcome Trust, Middlesex University, Arts Council England, Royal Society of Chemistry, Science and Technology Facilities Council, The Refinery, Vound Software, University of Greenwich, Royal Observatory, Lewisham Council, Telegraph Hill Festival
- **Relationships with arts and cultural organisations grew successfully** including The Albany, Deptford Lounge, Fun Palaces, National Maritime Museum, Besson Street Community Garden, Mind's Eye and local youth theatre - GLYPT and music groups.
- **Local partnerships are extended** - including the Lewisham Education Arts Network (LEAN), The Mayor's Office, The Young Mayor's Office and the Lewisham Pupils

Ambassadors Scheme.

- **Relationships with local businesses** (L&Q Housing, CIS Security) are brokered
- **Schools enrichment programme (SEP)** delivers **9 education events** and **outreach** projects involving over 2924 schoolchildren
- **A new governance format:** an independent not for profit legal entity is being set up to deliver the Festival
- **New sponsors** invest in the Festival

SMASHfestUK 2016: values and objectives

1. **Making science fun, interesting and engaging for young people** through an immersive science/arts festival with a strong narrative that communicates science in ways that caught their imagination and are relevant to their lives
objective: to directly engage 7500 in 2016 SMASHfestUK and 15,000 people via online opportunities, with a specific target of BAME young people and families
2. **Creating positive experiences for ‘hard to reach’ young people** to stimulate their interest and engagement with STEM subjects by taking science ‘outside the classroom’
objective: to engage local underprivileged young people with STEM/Arts through innovative, narrative-lead programming and expose them to scientific and artistic excellence which they may not have the opportunity to access,
3. **Unlocking synergy between science and arts:** SMASHfestUK is a stimulus for dynamic collaborations between scientists and artists to explore creative possibilities
objective: to work in partnership with over 20 arts and science organisations and 15 scientists and artists to deliver the programme
4. **Tackling issues and opening up dialogue:** SMASHfestUK provokes interdisciplinary dialogue that explores issues, ideas and challenges
objective: to build the community of science communicators, scientist performers and audience members initiated in SMASHfestUK 2015
5. **Raising interest in STEM subjects in schools:** SMASHfestUK recognises the role schools play in encouraging the enjoyment of studying STEM subjects: if primary school science is ‘fun’ it can help to engage young people in science at secondary school and as careers.
objectives: to work with 8-10 local primary and secondary schools and over 2000 pupils in a schools enrichment programme preceding the festival
6. To actively support pupils with **thinking and debating creatively** about contemporary issues within the biomedical sciences and other STEM topics
7. **Providing young people with opportunities for greater interaction:** SMASHfestUK aims

to empower young people by actively involving them so that there is a sense of ownership and the opportunity to learn new skills and gain confidence as volunteers

objective: to engage 20 young people as Young Science Investigators

8. **Commitment to the local area:** SMASHfestUK chose to work in Deptford because it is an area which experiences extensive childhood poverty and has large BAME communities.
objective: to reduce barriers to access with hyperlocal approach and deepen relationships with Deptford audiences nurtured in SMASHfestUK 2015.
9. **Realising the potential of partnership:** the support of organisations such as the Wellcome Trust, Royal Society of Chemistry, Science and Technology Facilities Council and Arts Council England is fundamental to the Festival
objective: to grow relationships with scientific/cultural institutions already partnered with to bring them to local communities.

The Audience Experience of SMASHfestUK

1048 people attended SMASHfestUK ticketed events, which were free but had limited capacity. Many others attended the drop-in sessions.

Over three days artists, scientists and audiences pondered how the world would cope if every electronic device and communications infrastructure instantly ceased to exist, meeting the challenges of global catastrophe with some highly imaginative responses. These included how to survive in a world where things we rely on have been wiped out; the effect on the human body of electromagnetic spectrum waves and radioactivity; genetic mutation. The Festival explored key concepts in bioscience: including human metabolism, physiological efficiency, nutrition for energy, exercise physiology. It presented these themes through performances, events, educational interactive games such as The Mutation Generation Unit led players on a journey of discovery and enlightenment, using tools such as thermal imaging cameras. Performances, Dr De'Ath and the Carrington Event explored how a solar storm would bring the world to standstill and darkness, returning medicine to medieval times.

What audiences like about SMASHfestUK

attenders came to SMASHfestUK as part of a family group, or a mixed family and friends group. Engaging families in informal science learning and enjoyable experiences can support positive attitudes to STEM subjects, foster science literacy and alert young people and their parents to new possibilities about careers in STM subjects.

Happy Kids: for many audience members this was the most important aspect of SMASHfestUK, it was the chance to do something as a family and learn something with their children. Activities proved just as engaging for adults as they were for children:

The opportunity for a fun day with the children watching them learning and enjoying themselves (whilst learning myself!)

Seeing the children learning and enjoying the event

Spending some time with the children and learning

Come and learn together with the kids about science

Lots of adults and young people coming together to have fun and learn. And it's free!

Everything - sorry its true - everything as no matter the age you can still get involved

A great day out for the kids (x10)

The 'family' audience has immense variations - from parents who have aspirations for their children and are actively engaged in lots of activities to those who are apathetic and disengaged. Some have a challenging home environment.

The Favourite SMASHfestUK event

- Audiences really liked the **Interactive activities** and overall these were the most popular, polling nearly 60% of votes cast despite accounting for only 48% of the scheduled events. Young people liked the interactive or hands-on exhibits the most as an opportunity to do something rather than read or sit and watch
 - Model making, solar system show, science busking, SMART tower*
 - Everything arty making things, hands on building*
 - Den Building, Magnets, Planetarium, Telescopes, Maths Tower*
- The big **theatre shows** received very positive feedback and a high number of votes – matching the popularity seen in ticket sales for these events and justifying the repeat of crowd favourites such as 'Dr Death' and 'Comedy Club 4 Kids' which received the most votes. Children attending the shows were invited to cast a simple happy face / sad face vote, depending on whether they enjoyed the show and wanted to see more, or didn't enjoy. Of 367 votes cast, 97.28% were positive, and many of the shows polled 100% approval.

What mattered about SMASHfestUK to audiences

57% of audiences came to SMASHfestUK because they wanted to encourage their children's learning and understanding.

Seeing kids enjoying science

Watching young people engage in science

Seeing my grandchildren really enjoy science

Some parents clearly have high aspirations for their children and this appears to be more common amongst ethnic minority families.⁸ The “Not for people like me?” report⁹ highlights the issues of under-represented groups in science, technology and engineering. It identifies untapped potential in the family as an important encourager or influencer for young people, particularly in the Asian population, to take up careers in science and how important it is to ensure that parents, particularly in lower income groups, are aware of the full range of careers available. Presenting STEM subjects in fun and accessible ways opens up new ideas that this is something that could be ‘for them’. SMASHfestUK was designed to target under-18s, particularly those who are BAME. The table below shows that SMASHfestUK succeeded in attracting a very diverse audience:

Young audiences at SMASHfestUK by age and ethnicity						
Age	White	Black African	Pakistani	Mixed Heritage	Black Caribbean	Chinese
5 - 7	28%	17%	17%	11%	6%	
8 – 11	27%	33%	-	20%	-	
12 -15					100%	
16 – 17		40%		40%		20%

68% of audiences were local: Lewisham is the 15th most ethnically diverse local authority in England, and two out of every five residents are from a black and minority ethnic background. The largest BAME groups are Black African and Black Caribbean: BAME groups are estimated to comprise 30% of the total population of Lewisham.¹⁰ with only 41% White British residents. In particular, Lewisham has large Black African (11%) and Black Caribbean (12%) communities

Being local: 44% came because SMASHfestUK was local to where they live.

Many Lewisham families do not have transport, making travel outside their area expensive. There is also an issue of venturing outside of their immediate local area to places that they don’t know so being able to access free events within their familiar area and local community is a significant benefit.

A local event for friends and family

68% of attenders were from the immediate Lewisham area. Others came from neighbouring Boroughs: Greenwich (10%), Hackney (4%) and Southwark (3%).

15% came from areas outside Greater London

However only 19% felt that holding SMASHfestUK 2016 in Deptford as a location was important. One of the key aims of the festival is for it to be held in a neighbourhood where there are fewer opportunities for the community to engage in such Science/Art festivals.

⁸ Experiments in engagement: Research into engagement activities with young people from disadvantaged backgrounds April 2014 Rebecca Atkinson, Kate Siddall & Carolynne Mason, Platypus Research

⁹ Not for people like me? Under-represented groups in science, technology and engineering, A summary of the evidence: the facts, the fiction and what we should do next. Professor Averil Macdonald, South East Physics Network, November 2014

¹⁰ <http://www.lewishamsna.org.uk/a-profile-of-lewisham/social-and-environmental-context/ethnicity>

Being a free Festival was appreciated by 40%. This is especially important in an area that experiences high levels of poverty and restricted household spending. Poverty is higher amongst ethnic minorities and immigrant groups. Lewisham has the joint-highest proportion of pupils eligible for free school meals and lacking 5 A* - GCSE grades including English and Maths, standing at 63%. Nearly a quarter (23%) of jobs based in Lewisham are paid below the London Living Wage, and 24% of young people live in families claiming tax credits.¹¹

Affordable activities that have thrilled my daughter throughout her holiday

The mix of arts, craft and science to learn about the planet

Welcoming staff and good atmosphere: everyone said they felt welcome at the events they attended. Outdoor space to play in was welcomed by parents.

Everyone is very welcoming and friendly. The experts are very knowledgeable and the acting is brilliant!

Audiences at SMASHfestUK 2016¹²

- 30% of people at the 2016 Festival had been to SMASHfestUK in 2015, showing that the Festival is starting to build a loyal following
- 25% had been to another similar event.

This strongly suggests the festival reached out to audiences who were new to the idea of Science/Arts festivals.



Age of audience

Age: as given in the survey	Number of survey participants	%of total (90 people responded)
5 - 7 years	18	20%
8 - 11 years	15	17%
12 - 15 years	1	1%
16 - 17 years	5	6%
18 - 24 years	1	1%
25 - 30 years	8	9%

¹¹ <http://www.londonpovertyprofile.org.uk/indicators/boroughs/lewisham/>

¹² There were 100 responses to the surveys in total but not everyone responded to each question

31 - 45 years	30	33%
46 - 50 years	7	8%
51 - 65 years	1	1%
Over 65	4	4%

Gender: overall the male: female ratio was 27%:73%, whereas for the Under-18s it was closer to 39%:62%.

This is encouraging because *girls are less likely than boys to aspire to science careers, even though girls are more likely to rate science as their favourite subject at school. Women are consistently under-represented in STEM, particularly in the higher levels of academia and industry.*¹³ The Science Grrl report refers to gender stereotypes *From the start, children are confronted by gender stereotypes with girls' toys and boys' toys' and by GCSE level, gendered career ambitions are clearly evident.*¹⁴

A parent comments that SMASHfestUK:

*Inspiring my daughter that science is fun, is artistic and is for girls.
It's all about the girls and science*

(Males aged 12 – 15 were not present within the data captured but for other age groups the gender split was as above)

*Mothers in particular, need to know their daughters could be happy in a career from physics/in engineering, and that the working environment would be supportive. Girls, in addition to parental support, need to resolve the conflict between self-identity and STEM identity in order to see STEM as offering careers 'for people like me.'*¹⁵

How audiences heard about SMASHfestUK 2016

19% were told about the Festival by a family member: Visiting informal science and arts events outside of school is more prevalent among younger children. Attending events as a family tends to decline in secondary school years. This is not unique to SMASHfestUK but a well-documented trend as children reach their teens.

14% saw an online article, post or blog and 13% saw a poster or leaflet. The 21% who said 'other' included people who were passing and either called into The Albany or Deptford Lounge on the day or saw the Science Busking and were intrigued what was happening.

Overall this shows an overwhelmingly positive view of SMASHfestUK in terms of reaching audiences and promoting science ideas in an inclusive, fun and friendly way.

¹³ http://sciencegrrl.co.uk/assets/SCIENCE-GRRL-Stem-Report_FINAL_WEBLINKS-1.pdf

¹⁴ Ofsted 'Girls' Career Aspirations' Ofsted, 2011 'All Things Being Equal? Equality and diversity in CIAG, Hutchinson et al, 2011

¹⁵ Not for people like me? Under-represented groups in science, technology and engineering, A summary of the evidence: the facts, the fiction and what we should do next. Professor Averil Macdonald, South East Physics Network, November 2014

SMASHfestUK and schools

SMASHfestUK Schools enrichment programme (SEP) is having an impact:

10% of attenders were told about the Festival by their school: 5% came following a visit by the SMASHfestUK team to their school.

The school environment often makes up the vast majority of young people's exposure to science¹⁶ and influences whether children view STEM subjects in a positive or negative way.

Several reports suggest that more must be done at school-age level, to redress the imbalance in STEM degrees/careers, and to sustain the STEM workforce¹⁷. Attitudes to science are formulated at an early age so a positive experience that creates the sense of wonder and excitement at primary school influences how children feel about science subjects and develops interests that they can take further at secondary school.

Baring Primary School in Lewisham hosted a SMASHfestUK Assembly. BAME pupils from Black African and Caribbean heritage make up over three quarters of this school, half have a first language other than English. White British pupils account for 20%. 24% of pupils are disabled or have special educational needs, (above the national average). The proportion of pupils eligible for free school meals or in local authority care is above average. Baring's Deputy Head looked to SMASHfestUK *to promote science and inspire the children. Seeing the whole school aged 6-11 captivated: the behaviour was great as they were 'transfixed' by the exciting show. It is certainly not like this for all assemblies/ shows (in my opinion). They were certainly inspired and curious to find out more and enthused and keen to visit the free show during the half term break.*

As a teacher the benefit of SMASHfestUK is livening up the subject - making it more fun and interesting at primary level. The festival is also important as it gives local children an opportunity to get out and learn in a fun way (and for some who might otherwise be in their bedroom/ house all day staring at a screen...) I hope for some children SMASHfestUK may have helped them in their job aspirations - I would like to do that!

A teacher at a Deptford primary school that hosted a SMASHfestUK assembly commented *Thanks for the assembly and since we came back I have lots of children telling me about the festival over half term and how great it was. They really enjoyed it and I can say for most that was the only fun thing they did over the half term*

Influencing choices about the future

42% of people at school or college said the festival may influence their choice of subjects to study or work opportunities.

When looking at just under 18's, 100% said the festival had prompted them to consider choices in science subjects. This indicates that SMASHfestUK is addressing the issue of declining interest in STEM topics in schools that leads to low entry levels to STEM tertiary studies and careers and an imbalance in the supply and demand for qualified STEM professionals¹⁸.

¹⁶ Experiments in engagement: Research into engagement activities with young people from disadvantaged backgrounds April 2014 Rebecca Atkinson, Kate Siddall & Carolynne Mason Platypus Research

¹⁷ Improving Diversity in STEM A report by the Campaign for Science and Engineering (CaSE) May 2014

¹⁸ <http://www.educationandemployers.org/wp-content/uploads/2014/06/joyce>

associate that with science in general, then that is a very positive outcome. Several of the children became engrossed and asked many really quite sophisticated questions. One little girl in particular sat in on at least 3 of the planetarium shows I gave and I had to ask her to leave because the building was closing. Showing that level of interest was very rewarding for me.'

The Festival also gave young people opportunities to meet artists and scientists - and to recognise that scientists don't fall into stereotypes. *Kids tend to think of scientists as reclusive old men in white coats so it opens up horizons for them to see ordinary people in science jobs and see the possibilities that they too could be engineers or scientists.* Carmel Britto, Chair of Greenwich BAME Forum and Lpf kids club

New opportunities for young people: Young Science Explainers

SMASHfestUK introduced its scheme for Young Science Explainers to act as a bridge between scientific knowledge and ideas and small children and to break down seemingly complex concepts in ways they could relate to. Vound Software international eDiscovery company sponsored SMASHfestUK to support their mission of inspiring and developing the next generation of creative problem solvers worldwide as creative problem solving is a skill that will be in high demand for those who wish to enter into careers that involve investigation and discovery. Vound-Software.com and SMASHfestUK are working together to encourage individuals to use the creative problem solving skills to devise solutions that could help society survive a global catastrophe.

The Festival recruited sixth form students studying a science, technology or creative subject and the role of Young Science Explainer gave them the opportunity to develop communication skills, knowledge of STEM subjects, and to gain experience in communicating science. Their responsibilities included actively engaging audiences with science and technology exhibits and interacting with audiences to enhance their Festival experience and understanding of the issues explored at SMASHfestUK. It gave them the opportunity to meet scientists, artists and other young people interested in STEM subjects and the arts.

The two case studies below indicate some of the impacts on young people who volunteered as SMASHfestUK Young Science Explainers.

Laitan Odubiyi, a Young Science Explainer, got involved with SMASHfestUK because he is doing A levels in STEM subjects and is interested in science research and new technological developments and wanted to practice explaining such ideas - and *SMASHfestUK' looked fun and different.*

I met science experts—like an eco-geneticist and someone from an organisation that sends satellites to the sun and tried a virtual reality headset. Seeing what other people do was mind-blowing as I'd never actually met people who work in such scientific fields or pursue academic careers. It was so positive and made me think – 'if they can do it - why can't I do it too'.

I'd read up on subjects before the Festival so I felt prepared and I had covered a lot in my GCSE so I got the gist. Over the three days of the Festival I learned improvisation skills and I was expected to do all sorts of things as some volunteers didn't show up. I had to work on a stand with a big plasma screen and show people how it worked – I got better at doing this and felt proud of

myself

It's convinced me about a career in science

Tyreese Hines had been involved with the Young Mayor of Lewisham where he heard of this SMASHfestUK opportunity. He's studying biology, chemistry and physics at school so felt that being a volunteer would give him a chance to extend his interest.

It's important that SMASHfestUK is in Deptford because there's a lot of gentrification and new development. What was a 'bad' area is being sorted out and it's great that there are events like this that bring a chance to people who wouldn't usually engage. Young people liked how the Festival was on the High Street, with games and outdoor activities and they could come in and enjoy themselves. They don't see these sorts of things in the rigid environment of school and they can't explore these sorts of ideas. I enjoyed explaining ideas to children and parents and I learned a lot of new things that you don't usually put together in the conventional sense. The arts make it all more creative and putting things together in different ways reveals the overlaps. For people who don't engage with science it hooks them in and makes them want to find out more.

I'd always wanted to do microbiology. By showing me different ways of doing it and career options SMASHfestUK has confirmed to me what I want to do.

I learned new skills by being thrown in at the deep end to help run SMASHfestUK activities. Engaging with the public has made me feel more confident and independent.

This scheme has stretched and challenged the young people involved and they have added to their self-esteem being able to achieve the tasks they were asked to carry out. The experience has validated and confirmed their thinking about progressing toward a career in science.

Carmel Britto is Chair of Greenwich BAME Forum and Lpf kids club. She volunteered at SMASHFESTUK to support what she saw as a *really fantastic opportunity - it's a great way to get kids involved in science.* Her two sons also volunteered as Young Science Explainers. *SMASHfestUK is free which is important in an area with a lot of poverty and where kids get limited exposure to opportunities. This has a knock-on effect because it means as kids progress they can't recognise opportunities or have the skills to know what to do even when opportunity is facing them – and they are unsure how to engage. They don't see past secondary school so it's good for them to meet university students and to see that 'I could do this too.'* Kids could relate to SMASHfestUK events as they were right 'in their face' so they could understand the environmental issues. *They had fun and could input and realise they could affect their own community when negative things happen.*

It's also good to see girls taking an interest in subjects they had thought were boring and to meet scientists and university students - and to see the lightbulb go on.

A creative catalyst between arts and science: introducing audiences to

new ideas

Several of the artists and scientists involved in SMASHfestUK valued coming into contact with different ways of working and different views of the world. When these different disciplines work together in an open-minded way to engage audiences, there are many interesting cross-overs and novel ideas.

Collaborations are useful for creativity as you see other people's interpretations and views, so can learn a lot and can develop something even better. I think that art and science are more similar than people think, but for some reason a boundary was created at some point in time. Artists and scientists working together shows that the two disciplines merely use different methods to interpret the world around them.' Indrayani Ghangrekar, consultant; Fellowship Advisor, London chapter lead with Science Grrl Daphne Jackson Trust

Jenny Edbrooke, artist in residence for SMASHfestUK 2016 finds that working with young people is revealing as they see things differently and this develops her artistic practice.

At SMASHfestUK it was great to see kids who had not been engaged with science 'having a go'. Considering questions like 'what would you take to a survival bunker' led them to recognise what is important to them. Talking with scientists about ideas like the big-bang theory of creation got them to think about science in a way that is different from what they do at school. It captured their imagination to see how they can apply these ideas to their world. It was good to have specialists who know the facts and bring creative imaginations to science I see my role as a go-between for science and creativity by providing practical ways to emotionally engage.

Even teenagers - who are much harder to engage – responded to the spray painting sessions to create a planet and lifeform near the sun. Some parents also joined in and the activity connected parents and children in a positive way.

Dr Alison Megeney is Associate Professor of Mathematics at Middlesex University School of Science and Technology. *The Maths team got involved as we are keen to promote STEM areas (particularly maths) more widely and SMASHfestUK seemed a fun and engaging way to do it. I think it is great to get a link between arts and sciences as it helps show the creativity of STEM disciplines which traditionally may have been seen as dull and boring. The collaboration aspect enhances this and makes science types like myself look at things very differently, which is a good thing. It was rewarding to see my students working with young people and promoting maths. SMASHfestUK's strength is its fun and interactive nature. It does a very good job of promoting STEM disciplines in a very creative way. I hope it has had a positive impact.'*

Alice Knight, Theatre Director of SMASHfestUK's Cosmic Jives commented: *Socially and politically, SMASHfestUK aligns totally with the sort of work I want to make as an artist as it is free and inclusive. I believe in the message underpinning the play completely, which is to do with the empowerment of women and encouraging diversity in a field that historically has been the domain of white middle class men. I knew the quality of the work would be good as there was an established writer and experienced and talented producers on board.*

Building on SMASHfestUK's strengths

What differentiates SMASHfestUK from other science festivals?

Clarity of purpose

A clear objective to engage young people in STEM delivered through the framework of a strong core story through which they can see direct relevance to their lives.

Location and ability to engage diverse audiences

SMASHfestUK's strength over other science festivals is its location: The Albany and Deptford Lounge are well embedded in their community: people of different faiths, ethnic backgrounds and ages all engage with them. Their local links enable SMASHfestUK to reach people who wouldn't go to a science festival. Many science festivals move around the county and have to create a new infrastructure each time and take place in affluent areas like Cheltenham. Working in Deptford means SMASHfestUK is building partnerships and relationships with local people and organisations so audiences are retained. This was the comment from **Simon Watt**, biologist, science communicator and TV presenter. He is committed to creating 'infotainment' that makes science entertaining and informative for schools and festivals. His *Dr Death: The Medi-evil Medicine Show* was a 'historically, scientifically accurate panto for children and other childish people' and one of the most popular events at SMASHfestUK. He went on to say: *SMASHfestUK doesn't brand itself as a 'science festival' – a term which can be off-putting to audiences. Its concept of a storyline is great for younger children who like science at school, maybe less so for teenagers who are much more difficult to engage. Most science festivals struggle with the teenage demographic. SMASHfestUK can engage them if they are just passing by the library or on the High Street as it's really local. Audience members came up and talked to me about issues that affect their health and life - that was also different from my experience at other festivals - I was aware that SMASHfestUK was reaching out to diverse communities.*

Indrayani Ghangrekar, consultant; Fellowship Advisor, London chapter lead with Science Grrl liked that *SMASHfestUK aimed to involve the local community through the YSEs and in a community space - rather than just attempt engaging with an already engaged audience.*

Alice Knight, Director of Cosmic Jives said: *'I live very near Deptford, so I feel SMASHfestUK has had a direct benefit on me as a local resident as well as a practitioner. It's enormously important that all communities have a place to congregate and moments in the year which lift us out of the ordinary and give us cause to think about who we are as people and as a society - this festival allows people to do that. There was such a great buzz around the Albany, it felt like such a positive event for the community.'*

Presenting SMASHfestUK at easy to reach local venues was important to local young people and families on low incomes as travel in London is expensive. The high street location of The Albany and Deptford Lounge and the regular community use of these venues and the library make them ideal for the festival.

Inclusive ethos of SMASHfestUK

For me as an artist SMASHfestUK is a lovely festival to work on because it's very ethical and has a strong team spirit. I like the way it's scheduled across the two venues. Lots of people remembered it from 2015 and recognised it by name. Jenny Edbrooke

Partnership reaches out to people

David Pollock, The Albany's Operations Manager sees that SMASHfestUK brings a different audience into the venue: It gives them a good experience and it gives The Albany a chance to welcome them back and to be aware that it's part of their area. *There isn't a lot of arts activity in SE London compared to SW London and SMASHfestUK is very engaging and informative in revealing science through arts. There are lots of workshops and performances and interactive stalls in The Albany's garden. Children can learn something new through positive experiences and it was fun for their parents too. It worked really well across the two venues as audiences could get to see lots of things quickly.*

Embedded in the community

Jane Hendie, Lewisham Education Arts Network (LEAN) has been a SMASHfestUK partner for two years. She organised a gatekeeper's event in January to introduce local opinion formers, network leaders and teachers to SMASHfestUK and to hear from the festival's creators. The event included sessions on how to use storytelling and the arts to engage young people in STEM; how to get a free session in schools as well as the opportunity to try out some of the fun and engaging interventions and workshops which bring the STEM subjects together. The purpose was to encourage them to promote the festival to young people they work with and connect the Festival to the local youth and education community. The event was attended by 30 people, including some children. 13 guests were teachers from schools who do not take their pupils to activities over half term.

It's important that events like SMASHfestUK happen in Deptford, which still has a strong sense of community despite all the unaffordable luxury flats going up. SMASHfestUK gets people excited. It is a gateway to a sense of something different that opens up ideas beyond the everyday. The Festival has great ambitions and does a lot on a limited budget. Bringing experts in from universities as well as creative arts people is an inspiring and imaginative approach to engaging people in science and empowering them to think more about their world. Local people trust LEAN and this event established new and stronger relationships between the Festival and the local youth and education community.

75% of attenders at the gatekeeper's event agreed that the festival is fun, educational and valuable; 100% of attenders agreed to promote it to young people and families; 80% agreed to re-tweet, share on other social media channels. 91% felt they knew more about SMASHfestUK and could talk about it to colleagues, friends and pupils. 80% of the children who attended wanted to come to the Festival and would tell their friends

Brilliant! Wish I had this when I was young. The kids will love it!

Free: SMASHfestUK had many free events and this was important as the price of a ticket can be a barrier to engaging with activities for families with low incomes.

And next time?...

Interviewees and audiences made some suggestions about what SMASHfestUK could do differently next time

Focus on what SMASHfestUK does best: attracting and engaging an intergenerational family audience and continue to build a following. We are already seeing a level of repeat attendance, awareness of the Festival and goodwill and these are strengths that can be built upon.

My advice to SMASHfestUK is to focus on what it does best – to provide great experiences for family audiences and to programme work that has intergenerational appeal for adult family members as well as children. People take what they can from work and adding content for adults doesn't detract from the children's' experience.

Keep the concept of a central core theme – what if...? Narrative that forms the basis for all events and activities presents audiences with a coherent story and works well in capturing their attention and imagination and opening up dialogue and engagement in complex issues.

Involve young people in programming SMASHfestUK: the Festival could look at increasing the engagement of young people in planning and producing the event, so that they play a part in decision-making and coming up with ideas for activities that appeal to their peer group, as well as acting as ambassadors for SMASHfestUK and feeling a sense of ownership.

Continue to bring artists and scientists together in new collaborations: this has benefited audiences and practitioners and proved an imaginative way to give audiences insights and understanding into the complex issues that affect our lives and environment.

Create more opportunities to meet positive role models for exposure to new ideas about career paths for young people. Many young people live narrow lives and don't have the chance to meet adults who have interesting careers. The opportunity to meet and talk to artists and scientists alerts them to potential new directions that their futures could take. This is a valuable aspect of SMASHfestUK that could be developed.

Create more visibility and extend communications:

- More resources for marketing and more visual presence for SMASHfestUK so that its physical presence is greater for audiences
- More targeted cultivation events through trusted channels such as the gatekeeper's session to spread the word about the Festival and to build relationships with the local communities; this will build the Festival's reputation and generate word of mouth
- Sustain relationships with existing audiences and supporters through newsletters and

social media alerts

- More events that take SMASHfestUK out onto the streets: these are good for getting attention - as are the drop-in shows
- Produce the Festival programme earlier – especially to schools, opinion formers and gatekeepers

Keep in touch in order to build relationships with young people who have been involved with the Festival or attended with their families, and with people who influence young people such as teachers and youth workers. Regular communications from SMASHfestUK will increase their interest and maintain longer-term and year-round awareness and impact of the Festival.

Find SMASHfestUK Champions who will endorse the Festival and ‘talk it up’. This can range from famous figures that can draw more attention to the Festival, or to local people who are trusted, such as youth workers, teachers, club leaders.

Build the digital reach of SMASHfestUK: there is potential to increase engagement and opportunity for informal science learning online through the website. The website could be more user friendly and further developed as a resource.

Volunteers are a strength of SMASHfestUK. The opportunity to be a Young Science Explainer has created positive impacts on young people and the scheme is proving its value. Getting them more involved would benefit the Festival. Training them, stretching their skills and making good use of their experience and enthusiasm would add considerably to the Festival’s resources and inclusive ethos. It is also important for SMASHfestUK to find ways to build their commitment.

Engage more secondary schools, even if teachers are more resistant and teenagers are harder to engage. The development of relationships is important to meeting SMASHfestUK objectives. Emphasising the fun and sociable aspect of SMASHfestUK and encouraging teenagers at secondary schools to come with their friends.

Length of the Festival: there were several comments that the Festival could take place over a longer period, perhaps with an additional day.