

Ingenious

Public Engagement Grants

Final Report Form

The Royal Academy of Engineering's *Ingenious* Public Engagement Grants support projects that:

- **inspire creative** public engagement with engineering projects;
- **stimulate engineers** to share their stories, passion and expertise in innovative ways with wider audiences;
- **develop engineers'** communication and engagement skills;
- **create debate** between engineers and people of all ages to raise awareness of the diversity, nature and impact of engineering.

Additional information is available from www.raeng.org.uk/ingenious

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1. Grant details

a) Principal applicant/ grant holder details:

Name: Mr Wyn Griffiths
Job title: Creative/Technical Director
Organisation: SMASHfestUK
Address: The Albany, Douglas Way, London SE8 4AG
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Telephone: 07976051537

b) Project manager

Name: Mr Tobin May
Job title: Festival Producer
Organisation: SMASHfestUK
Address: The Albany, Douglas Way, London SE8 4AG
Email: tobin@smashfestuk.com
Telephone: 07860478893

c) Grant reference ING1617\11\187

d) Funding:

Total *Ingenious* grant awarded: £29500
Total *Ingenious* grant amount spent¹: £29500
Total partnership funding received: £29500

Source of partnership funding:

Total in-kind support received:

Please summarise the nature
of the in-kind support:

¹ For any significant under-spend, please provide further details in the sections below.

2. Project details

a) Project:

Title: SMASHfestUK: The Earth and Sky Tour
Start date: 01/05/2017
End date: 15/12/2017

b) Project objectives (up to 200 words):

1. To deliver a Survival Village and Space Camp (SVSC) of 1 day built at each of 4 locations, Greenwich (July), Brighton (the BSA Science Festival) (September), Manchester Science Festival (October) and Birmingham (November).
2. To take SVSC to 4 areas in each of the new locations which are currently under-served by current informal engineering outreach or learning activities nearby
3. To carry out related SVSC schools outreach programme in each of the 4 locations (Greenwich, Brighton, Manchester and Birmingham). This will involve going into a minimum of 3 schools and carrying out engineering workshops which will relate to the school curriculum.
4. To engage 12 working engineers from academia and commerce in the development and delivery of the Survival Village as advisers and participants.
5. The engineers will be local to the 4 areas allowing interaction between local young people and those based there opening up the opportunity for mentoring in the future.
6. To provide training and outreach support to 12 engineers to better enable them to carry future public engagement projects of their own.
7. To achieve 6. by running participatory design and public engagement workshops during which the engineers will receive PE training and also help develop the SVSC concept
8. To build a SVSC community of engineers, audience participants and public engagement specialists to create a sustainable methodology for continuing to roll out SVSC in other areas of the UK.

c) Please provide a **project summary** for sharing with the wider engineering and public engagement practitioner communities.

This should be a stand-alone overview of the project that can be published on the Royal Academy of Engineering website. Please include details on the project aims, engineering content, format, outputs, outcomes, impacts and key learning (up to 450 words). Please ensure to include information on the engineers that participated in the project – number of; proportion of female engineers, proportion of BAME engineers, range of specialisms etc. You may need to repeat information covered elsewhere in the final project report.

SMASHfestUK: The Earth & Sky Tour had eight key objectives, all of which have been met or exceeded.

In the period from March to November, SMASHfestUK travelled around the UK to bring our award-winning festivals to different under-represented communities. Each one-day mini festival was designed around the Survival Village and Space Camp (SVSC), with the aim to challenge visitors with a natural disaster – a Super-volcano ready to erupt under their feet. The activities represented ways in which we could all rebuild society after the natural disaster, and what to do in case that was not possible (going into space!).



The SVSC involved 27 engineers developing activities and introducing public audiences to aspects of engineering in a creative way. This cohort of diverse engineers were key to engage and inspire under-represented communities in Greater London, Bradford, Gloucester and Neath.



Our Super-volcano narrative threatened six locations and pushed over 10200 visitors to discover ways of surviving and rebuild society with activities such as "Water Filtration", "Rocket Making" and "Building Bridges". In these six locations, SMASHfestUK engaged with a plethora of audiences local to the areas visited. The outreach programme linked to the project was very successful, maturing over 4000 face-to-face engagements with young people in areas often not reached by informal engineering activities. School pupils were engaged with enrichment activities that complemented the national curriculum and pushed their imagination through engineering.

With 50% of engineers involved being female and over 60% of a BAME backgrounds, we nurtured engagements between audiences and role models that truly represented a diverse engineering field. These audiences came from communities in highly diverse and deprived areas of Greater London, South Wales, Bradford and Gloucestershire. Visitor comments such as "Fantastic learning and creative experience. The enthusiasm of volunteers was grand and fuelled my children – they enjoyed it incredibly" do show the impact we had on both communities and collaborators.



Children and their families were engaged in discussions that nurtured change within their communities, with engineers as catalyst of that. Our overwhelmingly successful ID Card activity allowed families to discuss career paths in creative ways, to think about ambitions and discuss it with collaborators from different fields. The SVSC brought together engineers from the Energy & Power, Biochemical, Aerospace, Transport & Mechanical, Robotics and Automotive fields of engineering.

This tour pushed the boundaries of engagement and represented an opportunity for engineers to develop relationships with their local communities.

d) Is this the first time you have completed an engineering-themed public engagement project?

No

The following sections (3, 4 and 5) ask you to report against the *Ingenious* **key outcomes** defined at the start of your project. For key outcomes that do not apply to your project, write n/a.

The *Ingenious* evaluation guide also contains further information about reporting key outcomes: www.raeng.org.uk/ingeniousevaluationguide

3. Public Audience

The Academy requires you to collect data about the socio-economic profile of the public audience you reach. Depending on your target audience please provide the following:

- Adult and families - full post-codes from a sample of the audience
- Educational audiences - the name and address of the schools, and the number of pupils or classes you engage with

1) Adult and families:

Colindale	Woolwich	Neath	Gloucester	Bradford	Greenwich
NW4, NW7, NW9	SE7, SE18	SA10, SA11	GL1, GL2, GL3, GL4, GL5, GL6, GL20, GL51, GL53, HR8, HR9	BD2, BD3, BD4, BD5, BD7, BD17, BD18, LS28	SE3, SE6, SE8, SE10, SE23, BR2, BR3

2) Educational audiences:

School	Address	Total pupils involved
St Joseph's Catholic Pri Hendon	Crossfield Street, London, SE8 3PH	270
Woodcroft Primary	363 Watling Ave, Edgware, HA8 0NF	471
Goldbeaters Primary	35 Thirleby Rd, Edgware, HA8 0HF	477
St Thomas More	Appleton Rd, London, SE9 6NS	204

Ealdham Primary	Ealdham Square, London Area, London, SE9 6BP	60
Discovery Primary	121 Battery Rd, London, SE28 0JN	390
Full Circle School	124-126 Broad Walk, London, SE3 8ND	20
Calton Primary	Calton Rd, Gloucester, GL1 5ET	300
Kingsholm Primary	Guinea St, Gloucester, GL1 3BN	600
Widden Primary	2 Sinope St, Gloucester, GL1 4AW	200

Educational audience not in a school setting:

Event	Location	Total pupils involved
Google Day	The National Science & Media Museum	288 from local schools

4. Key outcomes - metrics

a) Please restate your key outcomes for the target number of activities, events and/ or resources you aimed to deliver:

1. To deliver a Survival Village and Space Camp (SVSC) of 1 day built at each of 4 locations, Greenwich (July), Brighton (the BSA Science Festival) (September), Manchester Science Festival (October) and Birmingham (November).
2. To carry out related SVSC schools outreach programme in each of the 4 locations (Greenwich, Brighton, Manchester and Birmingham). This will involve going into a minimum of 3 schools and carrying out engineering workshops which will relate to the school curriculum.

b) Actual activities, events and/ or resources delivered. If target was exceeded/not reached please provide a brief explanation:

1. Delivered the SVSC in 6 locations: Woolwich (May), Colindale (May), Bradford (July), Neath (September), Greenwich (October), Gloucester (October).
2. Delivered SVSC related schools outreach in 5 locations: Woolwich, Colindale, Bradford, Greenwich and Gloucester. 100% of the teachers that filled the evaluation form strongly agreed and agreed that the workshops were beneficial to the class and the school curriculum.



Both the objectives/targets that initially set and outlined in 4a have been exceeded. As the design of the project progressed, we realised the importance of addressing the needs of the communities in London - those that would closely match the audience we engage with in Deptford. Therefore, we started rethinking the structure of the tour, starting with locations in London (Woolwich, Colindale, Greenwich) and progressing out to reach Bradford, Neath and Gloucester. The change in locations as well as the addition of two more come as a result of relationships we have decided to develop further.

c) Please restate your key outcome for participating engineers including the target type and number of participating engineers:

1. To engage 12 working engineers from academia and commerce in the development and delivery of the Survival Village as advisers and participants.
2. The engineers will be local to the 4 areas allowing interaction between local young people and those based there opening up the opportunity for mentoring in the future.
3. To provide training and outreach support to 12 engineers to better enable them to carry future public engagement projects of their own.
4. To achieve 3 by running participatory design and public engagement workshops during which the engineers will receive PE training and also help develop the SVSC concept

d) Actual engineer type and number of engineers that participated. If target was exceeded/not reached please provide a brief explanation:

1. We have engaged with 24 engineers from both academia (19) and commerce (5) which have been involved in the development and delivery of the SVSC.
2. Engineers involved in each location were local to the area.
3. All the engineers involved have attended a 2 hours training session delivered by the SMASHfestUK staff and different other PE professionals (such as Huw James, University of South Wales).
4. See 3

It was important to us to collaborate with as many engineers as possible to maximise their engagement with visitors. In each location, we aimed at having a minimum of at least 3 engineers facilitating and delivering activities within the SVSC. This target was met in all locations and exceeded in some of them:

Colindale	Woolwich	Neath	Gloucester	Bradford	Greenwich
4*	4*	5	4	5	3

*One engineer collaborated with us on both events as they were local of those areas.

Although we exceeded the target of involving 12 engineers, we found challenging engaging with professional engineers in different locations (please see below for further explanation).



e) Please restate the key outcomes for public audiences including the target audience type and number:

We aimed at engaging with 4160 disadvantaged and underrepresented young people both on the day (including families and individual visitors) and the the local school workshops in the run up to the events.

f) Actual audience type and numbers reached. If target was exceeded/not reached please provide a brief explanation:

Overall, we counted approximately 10280 face-to-face engagements. Of this 10280 (± 20):

- 4040 were young people aged 5-10 engaged with outreach only.
- 6050 were families (including young people)
- 100 were teachers
- 90 were volunteers

This figure greatly exceeds our target. This might have been due to different factors:

- Higher number of events held in comparison with the initial target;
- Success of the marketing strategy for each location;
- Great interest from teachers to involve large number of students;

Of course, it is important to notice that the tally count for each location might have not been 100% accurate in the festival setting. Only two venues had an automated door counter, Gloucester Library and National Maritime Museum. In the latter we were part of a bigger event (i.e. Fun Palaces), hence we used tally count of those we interacted with instead of the door count. The other 4 locations visited were outdoor areas. In this settings, we used the welcome desk (where hand held tally counters were used) as baseline and cross-referenced this with hosting partners.

In addition to the overall figure, we matured over 8000 online engagements, with peaks experienced on the days of the pop-up events.

5. Key outcomes – experiences

a) Engineers' experiences

Please comment on the engineers' experiences as specified at the start of your project: enjoyable; interesting; informative; well-organised and include any additional experiences that you identified. Please give figures where appropriate (e.g. three quarters found the activity enjoyable) (up to 400 words):

From observation and surveys, 90% of the engineers involved reported enjoying the experience of being involved in this project.

"Thank you very much for the opportunity, the work that you do is amazing"

In particular, engineers said that they enjoyed the training and that it was useful for them for different reasons. They considered both the training and one-day festivals to be well-organised and to have allowed them to experience public engagement in a different way. Importantly, from discussions we had with engineers, some have particularly enjoyed being part of a local event and contributing to that community.



It was very inspiring to see the enthusiasm shown by the engineers in engaging with mixed audiences. Their energy and will to try new ways of communicating concepts had a great impact on the visitors too

"Fantastic learning and creative experience. The enthusiasm of volunteers was grand and fuelled my children – they incredibly enjoyed it" - Mother from Neath

b) Public audiences' experiences

Please comment on the audiences' experiences as specified at the start of your project: enjoyable; interesting; informative; well-organised and

include any additional experiences that you identified. Please give figures or percentages where appropriate (e.g. 82% found the activity enjoyable) (up to 400 words):

Each one-day event attracted a high proportion of local residents and ones from the surrounding postal areas. Around 85% of the adult responders agreed and strongly agreed that both them and their child/children enjoyed the event they visited. When asked to why it was important for SMASHfestUK to be in their local area, some commented:

"To bring the community together, so children can have fun and educate them about the world and future ambitions"

(Parent, Female, Woolwich)

"Because my area doesn't have a science festival for families to learn together"

(Parent, Male, Colindale)

"More commercial activities are expensive. Not having to pay is a need in our community"

(Parent, Female, Woolwich)

"Fun activities making science come to life. Gloucester doesn't get many events like this, [we] need more! Would prefer to have it on at the doorstep [rather] than travelling to Cheltenham or Bristol"

(Parent, Female, Gloucester)

"Not having to pay is a need in our community, more commercial activities are expensive. Good to stimulate and create conversations."

(Parent, Male, Neath)

"Really loved @smashfestuk at #bradscifest today. Fantastically engaging real science."

(Parent (Male) and six year old daughter, Bradford - via Twitter)

"Wonderful to see engineering brought to life, with women engineers. Our daughter, and the girls in her class will be inspired by this!"

(Parent and teacher, Female, Bradford)

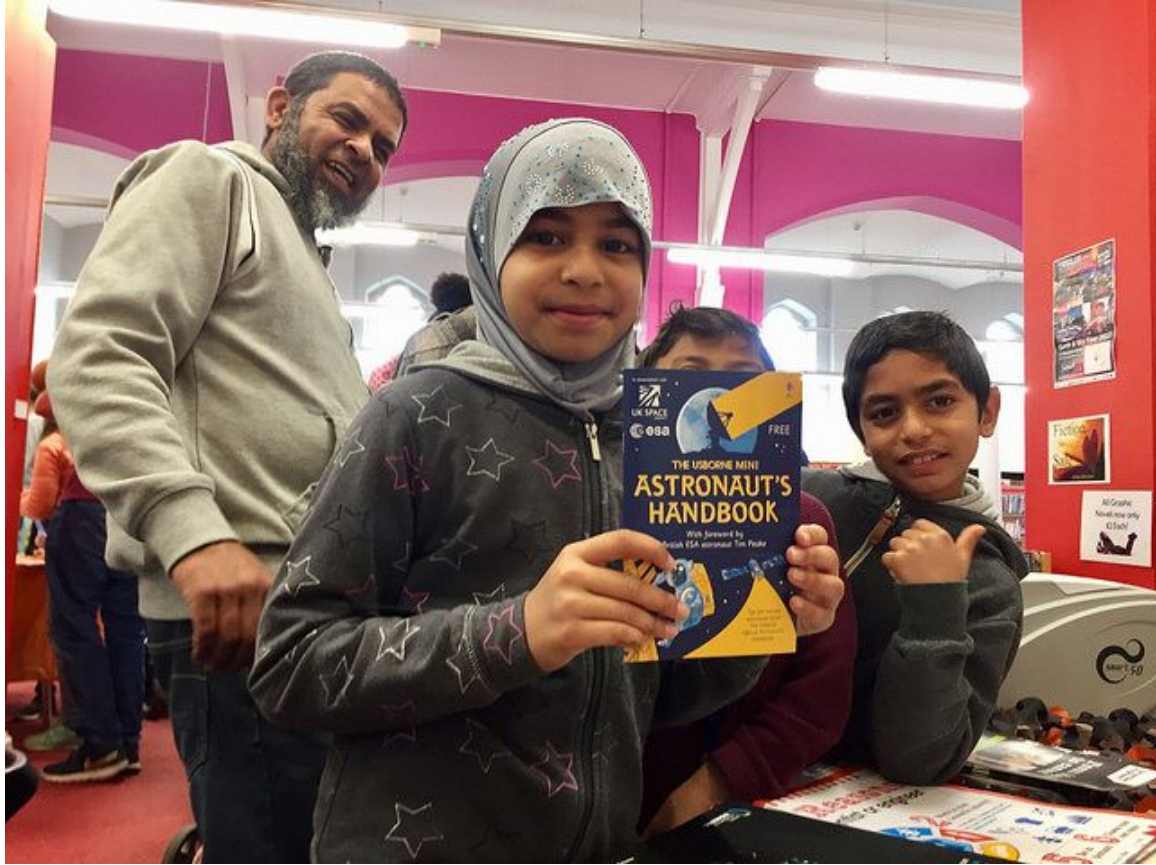
"It allows the children to get hands on experience, which is wonderful. Due to class sizes being so large, it is hard for them to get this involved"

(Parent, Female, Woolwich)



82% of adults said that the event was excellent, and 18% rated it as good. Of the children that completed the evaluation forms (mostly 6-9 years old), 70% rated the event as excellent and 20% as good.

These comments not only show that the responders enjoyed the experience, but that they valued it to be an important and much needed part of their communities. Importantly, this does mirror the general call of the PE field for more activities to reach less affluent areas.



The school outreach programme represented an important opportunity to create meaningful connections and generate interest ahead of the festival. Around 90% of the pupils strongly agreed and agreed that they enjoyed the outreach workshop in their school. Particularly, school pupils enjoyed the narrative we created to introduce them to engineering, volcanology and space science. About 82% of the responders agreed that the workshop introduced them to new concepts. All teachers involved agreed and strongly agreed that the workshop delivered at their school was beneficial to the pupils and that it related to the national curriculum. Importantly, teachers found the workshop exciting and enjoyable.



6. Key outcomes – impacts

a) Impacts on engineers

Provide evidence from your evaluation about the impacts of the project on the participating engineers. Please include a brief summary of how you collected this data.

How was the impact on engineers evaluated (e.g. via interviews, questionnaires, focus groups, observation) (up to 150 words)

Impact on engineers was evaluated using mixed methods, particularly focusing on observation, continued conversations before and at the end of the festival and using a questionnaire with closed questions.

Raised knowledge and understanding (e.g. of public engagement, ethics, societal implications) (up to 100 words):

Each one-day event attracted a minimum of 500 visitors from the local area, exposing engineers to audiences from different socio-economic backgrounds. On this matter, we had meaningful discussions with some engineers who agreed on the need to push for more community focused activities. Some of them saw a different side of their local community, hence opening up about public engagement ideas.

Moreover, it was interesting to see how engineers appreciated the innovative and creative way we design our festival. Some of them never had the chance to try a more arts-based approach whilst engaging with the public. Importantly, they all commented on the benefits of storytelling in an engineering/ scientific setting to spark curiosity in audiences that might not have a strong interest in their field.



Improved interest/ attitudes (e.g. to public engagement) (up to 100 words):

90% of the engineers involved stated that the experience increased their understanding of public attitudes towards engineers and engineering.

Developed skills (eg public engagement skills) (up to 100 words):

As the events drew the attention of many visitors, engineers were exposed to many interactions with mixed audiences. Almost all the engineers involved commented that the experience increased their confidence in speaking with the public (although some of them felt they were confident already). Importantly, around 90% of the engineers stated that the event helped them enhancing their communication skills. Two engineers commented that participating to the festival was important to develop their confidence embarking on a PGCE. Our ad-hoc training focused on storytelling, creative approach to PE, PE skills, safeguarding and engaging with younger audiences. It is inherently true that all these concepts covered will be of benefit to the skillset of each engineer.



Other impacts

If you specified any additional impacts in your Project Planning Form please comment on these below (up to 100 words for each experience)

b) Impacts on public audiences

Please report back on the impact of the project on public audiences.

How was the impact on public audiences evaluated (e.g. via interviews, questionnaires, focus groups, observation) (up to 150 words)

Impact on public audiences was evaluated using different tools:

Group 1, adult and child visitors:

- Exit questionnaire with closed and open-ended questions for adults, and a shorter form for children with visuals.

- Observation and dialogues with visiting adults and children.

Group 2, pupils during school outreach:

Summative questionnaire encompassing visuals.

Raised knowledge and understanding of engineering (up to 100 words):

Evaluation data suggest that over 75% of visitors strongly agreed and agreed that the event they visited increased their understanding of what engineers do. A slightly lower result was reported when visitors were asked if the event increased their understanding of how engineers improve their lives. Engineers mentioned that they had numerous in-depth discussions with visitors about what engineering is, what it does and who engineers are. This was particularly interesting as the activities in each mini-festival were designed to enhance those same discussion points.

Increased interest / changed attitudes towards engineering and engineers (up to 100 words):

Visitors approached activities with excitement and will to discover more about them. Around 85% of the festival visitors agreed or strongly agreed that they were inspired to find out more about engineering. The younger visitors reported that the event gave them a more positive attitude towards studying STEM subjects. This was particularly seen in our flagship ID card activity, with many kids choosing careers related to engineering.

Other impacts

If you specified any additional impacts in your evaluation planning please comment on these below (up to 100 words for each experience)

N/A

7. Project objectives

a) Please restate your *Ingenious* project objectives, as set out in your Project Planning Template.

1. To deliver a Survival Village and Space Camp (SVSC) of 1 day built at each of 4 locations, Greenwich (July), Brighton (the BSA Science Festival) (September), Manchester Science Festival (October) and Birmingham (November).

2. To take SVSC to 4 areas in each of the new locations which are currently under-served by current informal engineering outreach or learning activities nearby
3. To carry out related SVSC schools outreach programme in each of the 4 locations (Greenwich, Brighton, Manchester and Birmingham). This will involve going into a minimum of 3 schools and carrying out engineering workshops which will relate to the school curriculum.
4. To engage 12 working engineers from academia and commerce in the development and delivery of the Survival Village as advisers and participants.
5. The engineers will be local to the 4 areas allowing interaction between local young people and those based there opening up the opportunity for mentoring in the future.
6. To provide training and outreach support to 12 engineers to better enable them to carry future public engagement projects of their own.
7. To achieve 6. by running participatory design and public engagement workshops during which the engineers will receive PE training and also help develop the SVSC concept
8. To build a SVSC community of engineers, audience participants and public engagement specialists to create a sustainable methodology for continuing to roll out SVSC in other areas of the UK.



b) Addressing each objective in turn please report back on what you have found out through your evaluation – both what went to plan and what didn't (up to 500 words)

a)

1. The SVSC was delivered to 6 locations instead of 4. This is because we felt the need to be the catalyst of change in communities that matched Deptford more closely.

2. The SVSC was brought to 6 different areas that satisfied the objective. Although the area of Greenwich we held the event in matched our criteria, the audiences engaged did not (with a strong percentage of white, rather than black/mixed). We attribute this to the event being held in a museum, rather than in a public place. Although this is slowly happening, a profound change in the ways cultural institutions, such as museums, engage with visitors is needed to solve challenge to access for diverse audiences.

3. Although we did meet the objective, getting into schools outside of Lewisham was challenging as teachers did not necessarily know of the initiative, and the offset in geographical location meant that building

relationships was more difficult. Our hyperlocal approach allows us to engage with the community at a considerably different level than other festivals. However, it is also true that that same approach partially defines the areas we are most known in, hence making relationship development harder outside of it.

4. This objective was met but, as previously mentioned, we found particularly challenging engaging with engineers from commerce.

5. Almost all engineers were local to the areas the events were held in. This was particularly crucial, as they were able to connect with the visitors at a deeper level and knew of local services and opportunities. Engineers reported of discussing with both parents and children about ways into engineering. With the ID Card activity, we initiated discussions around careers right at the welcome desk and were able to advise on which stall to approach first to know more about a certain field. This being a starting point in each community, we aim at fostering those relationships between engineers and visitors further by bringing more projects in those areas.

6 and 7. All engineers received overall support, training and were included in participatory design workshops. In particular, engineers were satisfied with the SMASHfestUK approach, shared through an ad-hoc training, and enjoyed being involved in a live festival setting.

8. The co-participatory workshops nurtured an environment for partnership development. Each event's atmosphere and dynamics fostered opportunities for partners, volunteers and engineers to communicate with each other and create networks. These contacts, along with the streamlining of our production processes, have helped us develop a sustainable methodology which can only be supported by further funding to make truly financially sustainable.

8. Media coverage

a) Please note if your project generated any items of media coverage:

National press	0
Regional press	0
Local press	0

Social Media	Website >8000 Flickr > 75000 Views Facebook = 32204 Reach
Radio	BBC Gloucester feature
TV	0
Specialist media (e.g. <i>Times Educational Supplement, Ingenia</i>)	The Engineer - Winners special feature edition: https://www.theengineer.co.uk/disaster-movie-stem/ Queen Elizabeth Prize for Engineering 'Create the Future Feature': http://qeprize.org/createthefuture/ingenious-survival-smashfestuk/ Science and Technology Facilities Council 'Stories of Great Engagement': http://www.stfc.ac.uk/public-engagement/strategy-and-evaluation/stories-of-great-engagement/ http://www.stfc.ac.uk/files/engaging-through-disaster/ Ingenia article due to be published.
Other (please state)	

Please share links to online coverage wherever possible:

N/A

b) Any other comments on media coverage including successes and challenges if appropriate? (up to 200 words):

I assume we're not discussing the bbc south wales thing?

9. Shared learning

a) What were the most successful elements of the project? For what reasons do you feel these were successful (up to 100 words):

One of the key successes was that we successfully held the event at the heart of the communities that we aimed at. Our understanding of the needs and challenges to access of those same communities allowed us to tailor each event to them. Taking the time to develop meaningful relationships with hosting partners and local groups enabled SMASHfestUK to be seen as part of the community, not a stranger. The expertise we matured in partnership development was seen on the individual interactions with visitors. Engineers, general volunteers and contributors were there to spark discussions around engineering, creating numerous opportunities for meaningful engagements.

b) What lessons did you learn from the project? For example what problems did you encounter? What strategies did you try to tackle those problems & how successful were they? What would you do differently if you ran the project again? (up to 100 words):

Adapting and scaling the activities designed for the 2017 festival. Each activity had to be easily transported and fairly easy to set-up. As a result, we streamlined the production processes and aimed at designing activities almost like "packages".

As logistics and collaborators drastically changed between locations, we were not always able to nurture partnerships with engineering companies. Therefore, recruitment of local engineers from industry was at times challenging. In future, project management processes would take this learning into account to adjust resource allocation.

c) Who were your partners? Please comment on any collaborations, how well they worked, including challenges and lessons learned (up to 200 words):

SMASHfestUK could not be the same without a multi-partnership approach. The projects we deliver focus on the community we engage with. The mini-festivals and our partners, collaborators and volunteers embodied this ethos. Our partners for this tour were local university partners, community groups with a variety of interests (youth ones included), artists, commercial and charitable partners. Importantly, they all shared the SMASHfestUK core mission to increase diversity and widen participation in STEM by unleashing the creativity of the visitor. It was particularly inspiring to see how collaborators contributed to the Super-volcano theme by drawing visitors with storytelling, adding their own angle to the main storyline.

The biggest challenge was to give partners a better idea of the wider picture the festival is in, and we did not always have the time to nurture knowledge

share between partners themselves. In future, we would schedule a meeting ahead of time to allow collaborators to meet and act as catalyst for exchanges in the communities we engage with.

10. Sustained benefits and on-going work

a) Additional evaluations

If you have conducted an additional evaluation of your project please make a note of it here and send a copy of the report to the Academy:

ID Cards

The table below shows sample data gathered, through the ID Card activity, in two of the six locations we held the pop-up festivals in. Through the tour, we have developed the approach, delivery mechanism and recording of our ID Card activity, as feedback and output has indicated that it is a central activity, embedding the inspiration of the experience, alongside career insight and advice in a meaningful, resonant tangible artefact. The ID Card activity was located at the welcome desk of each event and aimed at raising awareness of careers in the STE(A)M sector.

ID Breakdown (Location 1)					
Career	Total	%	% (Space)	Total % in STEAM	Total% in STEM
Scientist	20	24	7	86	65
Engineer	12	14			
Technology	1	1			
Maths	1	1			
Medicine	21	25			
Arts	12	14			
Other	12	14			
STEAM (inventor)	6	7			
ID Breakdown (Location 2)					
Career	Total	%	% (Space)	Total % in STEAM	Total% in STEM

Scientist	19	32	12	81	64
Engineer	10	17			
Technology	2	3			
Maths	3	5			
Medicine	4	7			
Arts	9	15			
Other	11	19			
STEAM (inventor)	1	2			



One of the key components of each one-day event was the welcome desk. Here, conversations around STEM careers was fostered by our directors and core members of staff, with both children and adults. Our very successful ID card making activity, positioned at the entrance, enabled young people to

reflect on their career choices and ambitions. Adults, integral part of the activity, were encouraged to let the child choose freely whilst talking about potential and being made aware of the plethora of choices for STEM-related careers. Especially when discussing science careers, including the family is a critical step. Families have a strong influence in the future career path of young people, with the level of STEM Capital, knowledge of options, and confidence to support the options from parents critical in translating of inspiration and aspiration in children. Although difficult to measure, without a full longitudinal study, initial indications from the ID Card analysis, shows significantly increased positive intent from visitors than recorded at equivalent experiences/interventions. Further study is planned to explore how the focus on families at different levels, enhanced shared learning and meaningful contextualisation to enables the building of STEM Capital.



At each stop of the tour, we provided visitors with a series of branded engineering and space-related giveaways (handbooks, flyers and such) that they could take home along with their ID card. This tour was pivotal in sparking reflections around STEM at different levels, which undoubtedly is a key outcome of the whole project.

b) Dissemination

Please describe how you raised awareness of the project within your organisation and among the wider engineering and public engagement communities and the general public (e.g. newsletters, conferences, social media) and how many people estimate you reached (up to 200 words):

General public:

Online strategy. We created event pages on social media, shared content in line with the overall theme, engaged with accounts of local institutions as well as curated and shared content from our website. Social media was also key to engage with the wider public engagement community.

Word of mouth. Recruiting and engaging with local volunteers and collaborators was crucial to publicise each mini-festival. Volunteers and partners engaged with us on social media and spread the word of the events to their own networks both online and offline. Marketing material (i.e flyers and posters) was provided to hosting partners ahead of each event.

Outreach. A key strategy was to engage with as many local schools as possible before the festival. Each outreach visit introduced the pupils to the big story behind the festival, as well as enabling us to deliver flyers directly.

Engineers:

We engaged with engineers on social media and through direct contact (i.e. emails, calls and meetings) with PE departments and companies. Engaging with area-specific STEM Network Hubs was of great help to reach engineers.

People reached:

We reached over 100,000 people through social media and around 4000 pupils with our outreach programme. As most of the strategy was based on word of mouth, it is difficult to estimate the full total reach.

Full sets of pictures of the tour can be found here:

<https://www.flickr.com/photos/30542236@N04/collections/72157688752039365/>



PE Community:

Being awarded different high-profile awards (i.e. NCCPE, The Engineer award) was an important step in increasing the awareness of SMASHfestUK to the wider PE community. Cultural institutions (e.g. Bradford Science and Media Museum, Science Oxford, Horniman Museum, London Transport Museum) and universities are now seeking advice to redesign their methodologies and approaches to PE.

c) Further work

Please describe any part of your project that will continue after the funding period. For example extended funding, aspects of the project that have been embedded in your working practice or that of your partners/collaborators; plans to seek new funding (up to 200 words):

An important aspect of the SVSC was the development of a series of activities related to space science. The Space Camp has been further developed throughout the tour and will be embedded to a project funded by the Science and Technology Facilities Council, "Living in Space". This

co-participatory design project has been partially inspired by the learnings of this project and partners we met on the road. Further collaborations with partners we established on this tour will be on Living in Space and the revamped Survival Village for our festival in February 2018.

Living in Space (LiS)

Researching the space education/outreach landscape and exploring different ways to engage the public with space topics, led to drafting ideas for a spin-off project, "Living in Space". Living in Space is a participatory design project that culminated with a major immersive installation showcased during our festival in February, Flood 2018. The project involved a one of a kind partnership between the theatre, design and engineering departments of Middlesex University, SMASHfestUK and four schools (three in South East London and one in South Wales). The Earth and Sky Tour Space Survival Village/Space Camp offered the opportunity to work with audiences to gain further insights into how they engage, and how they would like to engage, with space-related topics (and how this might be translated into LiS), to co-create ideas and trial further activities with local groups. This included working with the Gloucester Theatre College to explore how theatre can enhance and integrate into the experience.



SMASHfestUK joined with Middlesex University, Deptford Green School, Llangatwg Community School, Haberdashers' Aske's Hatcham College, Christ The King Sixth Form School, Monster Paw Games, Kerbal Space Program, AstroCymru, and Dr. Sheila Kanani and Dr Lucinda Offer of the Royal Astronomical Society, in a project 'Living in Space' funded by the Science and Technology Facilities Council. Building on the project funded by the UK Space Agency 'Space for All' and the Royal Academy of Engineering 'INGENIOUS', exploring ideas and creating experiences with a diverse group of young people, and engineering, design, mathematics and science professional experts. Over 300 people have learned from, and contributed to the project.

Participants:

Middlesex University Product Design and Product Design Engineering, Robotics Undergraduate students = 80 + 10 staff

Middlesex University Mathematics Undergraduate students = 20 + 8 staff

Middlesex University Theatre Arts Undergraduate students = 10 + 1 staff

Deptford Green School - Design and Technology Year 9 students 'Young Innovators' = 40 + 3 staff

Llangatwg Community School Year 8 students 'Young Innovators' = 80 + 3 staff

Haberdashers' Aske's Hatcham College Sixth Form 'Young Innovators' = 10 + 1 staff

Christ the King Sixth Form 'Young Innovators' = 10 + 1 staff

Middlesex University Design Engineering and Mathematics academic staff, researchers and Graduate Academic Assistants = 20

AstroCymru - Cardiff University academic staff and researchers = 3

Swansea University staff and researchers = 5

Royal Astronomical Society = 2

Living in Space experience at Deptford:

<https://flic.kr/s/aHsmfP76EX>

Co-creating the Lining in Space Experience:

<https://flic.kr/s/aHsm7eJkPQ>

This project has greatly impacted on how we work as organisation, enabling us to identify ways of streamlining project management and production processes. In addition to this, the tour was a great source of learnings, especially on the way we engage with community groups and local institutions.

d) Collaborations and partnerships

Are the contacts with the engineers, collaborations or partnerships developed during the project likely to continue? If so, in what way? (up to 200 words):

A key objective of the tour was to develop meaningful relationships with engineers and organisations whose ethos is in line with ours. Through these connections, we wanted to put our foot in the door of those communities encountered during the tour.

As of today, we can confirm that these internal objectives have been met. Some of the engineers we have connected with have raised the interest to facilitate activities at our next festival, FLOOD! 2018. These engineers will volunteer and further develop activities such as den-building, water filtration and more.

Recently, one collaborator from the South Wales mini-festival, Dr Paul Roche, helped us deliver school outreach for the Living in Space project.

Dr Roche put us in contact with Emma Wride, the lead for AstroCymru (their outreach programme), who gave in-kind support by delivering a workshop with pupils in Neath.

Importantly, this project allowed us to build a set of contacts with local councils, groups and cultural institutions within and outside London. Partners at Gloucester Library asked to repeat the experience next year. We received similar responses throughout the tour, and we are sure that future funding will enable us to engage further with these communities.

UCL Women’s Engineering Society Engineers (4), Yasmin Ali, Cyril Molony, Dan Abraham, Mehnaz Mahaboob, Igor Topolski and Alex Zivanovic joined us for Living in Space and FLOOD! 2018.

11. Contacts for long term tracking study

The Academy will be running a long term tracking study to explore the long term impact of the *Ingenious* projects. To enable us to conduct this study you are required to provide the names and email addresses of the engineers and public engagement practitioners who took part in your project. Please note: this is a requirement of your funding agreement with the Academy as described at the initial kick-off workshop.

We will contact these individuals approximately one year after your project has finished to ask about their experiences. All contacts will have the opportunity to opt out of the survey should they so wish.

Name	Organisation	Email address
Tabitha Barraclough	University of Dundee	tabitha.barraclough@gmail.com
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Daniel Abraham	TfL	DanielAbraham@tfl.gov.uk

Many thanks for completing your Final Project Report.