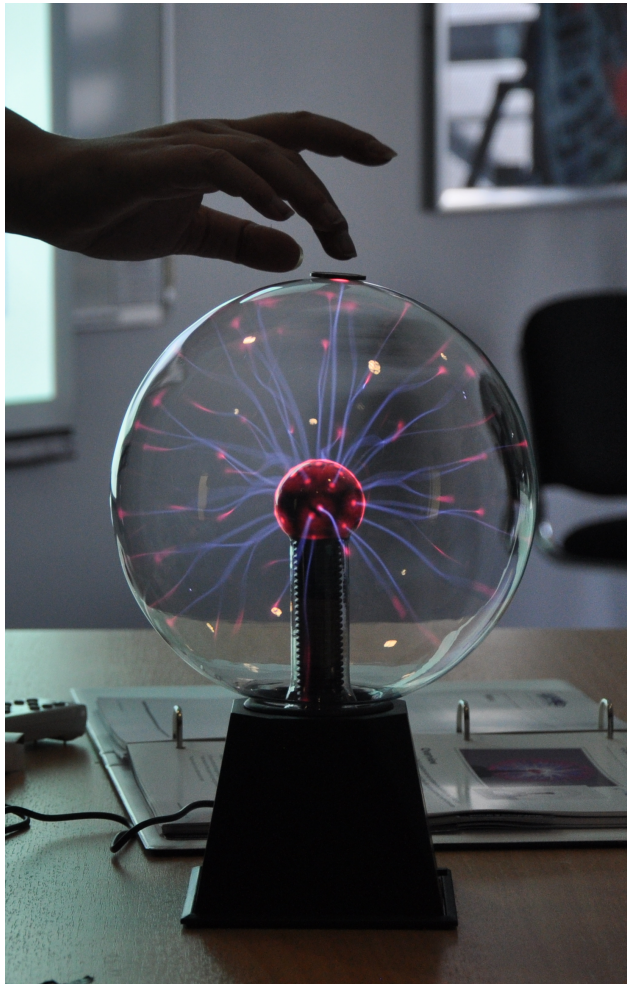


Explore Your Universe

Final Evaluation Report

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Explore Your Universe

Final Evaluation Report

1. Executive summary

'I would love to visit again. I have really enjoyed today ... I would now like to be a scientist. Thanks!' (FSW66)

1. Explore your Universe – a national strategic programme celebrating the physical sciences developed by the UK Association for Science and Discovery Centres (ASDC) in partnership with the Science and Technology Facilities Council (STFC) – has clearly been successful in achieving its stated aims of ‘inspiring a new sense of excitement amongst young people around the physical sciences by sharing the amazing stories and technologies of STFC’
2. The first year of the project (2012) saw the development of the programme and resources by ASDC and the project team. This process included the selection of the participating centres, the creation of a website, the production of a handbook and all training resources, purchasing and distributing sets of equipment and running a series of training academies with staff in the ten centres and with scientists.
3. Delivery of the science centre activities began in early 2013 and by the end of the year the programme had been delivered to 3,174 14-16 year-olds in the Masterclasses (against a target of 3,000), 9,400 10-13 year-olds in the Workshops (against a target of 6,000) and 105,088 people (against a target of 70,000) in ‘Meet the Expert’ sessions and the ‘Family show’.
4. Overall, the Explore Your Universe programme has provided 122,546 students, teachers and members of the public with a unique experience and clear insight into the nature, range and practice of contemporary physical sciences .
5. The evaluation data showed that the specialist kit ensured that the Workshops and Masterclasses were both enjoyable and memorable. Students appreciated the unique experience and, in particular, commented on the opportunity to use specialist equipment, conduct experiments ‘like real scientists’ and participate in hands-on activities in ways that enhanced their work in school.
6. Across the nation, students reported that their experience increased their interest in science and science-related careers. Teachers particularly appreciated the opportunities afforded for students to engage with aspects of contemporary science and to learn about science-related careers.
7. Teachers were very positive about the activities and would recommend them to their peers. Overwhelmingly they said that they could not offer the same experiences in their classrooms. The hands-on activities made the experiences highly memorable and would thus provide teachers with links to build on when they got back to school.

8. The evaluation data showed that family and non-school audiences enjoyed and appeared to value their experiences participating in the *Family Shows* and the *Meet the Expert* events. They could recall key facts and processes. Many attendees were intrigued both by the information they acquired and the fact that the scientists and their work were not what they had been expecting.
9. The partner science centres welcomed the opportunity that Explore Your Universe provided to enhance staff capacity and confidence and to establish strong relationships with schools and scientists. The high level of science content in the activities, together with the specialist equipment (supported by the staff training) helped to raise the profile and expertise of the centres in the eyes of many teachers, particularly secondary teachers. The centres also welcomed being part of a national programme noting the value that such a large network could afford in terms of peer contacts, increased marketing and publicity opportunities and confidence to seek future funding.
10. The scientists involved in the programme enjoyed and valued the opportunity to share aspects of their work. They acknowledged the value of public engagement and in particular appreciated the ways in which centres could facilitate communication efforts. It emerged that there is a demand for even more support for scientists to participate in public engagement. Increased public engagement would result in an increased profile for STFC-supported science.
11. All the stakeholders – the participating scientists, the science centres and the project team – should feel proud of their contribution to what has clearly been a unique, highly engaging, enjoyable and mind-changing experience. The Explore Your Universe programme met its aims of enabling a broad audience to engage with contemporary science, and also supported the capacity-building efforts and skill development of the individuals and institutions involved.
12. Whilst difficult to compare a unique programme against other national projects, it would appear that Explore Your Universe was highly cost-effective in engaging a large number of students and families. For example, with a budget of £436,662, the Explore Your Universe programme reached a total of 122,546 participants at a cost per head of £3.56. (The project's total cost of £458,662 includes administering the additional stargazing grants, which were not evaluated. This initiative takes the total numbers reached to 124,220 giving a cost per head of £3.69.) These figures compare favourably with the findings presented in the Frontier Economics report (2009) in which cost per participant for medium-sized science centres, national museums, CREST, and British Science Festival were found to be £9.00, £19.00, £13.00 and £16.10 respectively.

2. Introduction and background

'Explore Your Universe forms an excellent bridge between the cutting edge research and development of STFC and the varied learning environments of the science centres involved.'

Dr Kierann Shah, National Space Academy Manager, National Space Centre

Explore your Universe is a national project celebrating the physical sciences developed by the UK Association for Science and Discovery Centres (ASDC) in partnership with the Science and Technology Facilities Council (STFC). The first year of the project (2012) saw the development of the programme and resources by ASDC and the project team. This process included the selection of the participating centres, the creation of a website, the production of a handbook and all training resources, purchasing and distributing sets of equipment and running a series of training academies with staff in the ten centres and with scientists.

This final evaluation report is based on evaluation tools developed by King's College London, collated by the centres and analysed by a team of researchers at King's led by Professor Justin Dillon.

2.1 The aims of Explore Your Universe

The overall aim of the programme was 'to inspire a new sense of excitement amongst young people around the physical sciences by sharing the amazing stories and technologies of STFC'. As a national programme, Explore Your Universe was planned to deliver the following:

- Fully-developed Schools' Workshops for 10-13 year-olds (KS2 and KS3 in England);
- Masterclasses for students aged 14-16 years;
- A family show, targeted at 8-13 year-olds and their parents, for use across the UK;
- A 'Meet-the-Expert' session for public audiences involving guest STFC scientists
- Kits of unique equipment and resources, accompanied by specialist training, to support the above activities.

Table 1 shows the target and actual numbers reached for each activity.

Table 1. Number of participants reached per EYU activity against the targets

Activity/audience	Numbers reached	Target
School Workshop – students (10-13 year-olds)	9,400	6,000
School Workshop – teachers	960	600
Masterclass – students (14-16 year-olds)	3,174	3,000
Masterclass – teachers	265	300
Family show	59,236	20,000
Meet the Expert	45,852	50,000
Badged groups (Scouts, etc.)	3,659	-
TOTAL	122,546	79,900

2.2 The aims of the evaluation

The Explore Your Universe evaluation sought to:

- Document participants' and key stakeholders' views and responses to the whole Explore Your Universe programme;
- Enable individual science centres to examine and reflect on their own activities using a series of standardised evaluation instruments;
- Identify key findings from across the pooled data sets;
- Capture key insights and identify lessons learnt from across the pooled data sets to inform future initiatives.

2.3 Evaluation data collection

Data collection took place during 2013. The data instruments (evaluation forms, interview protocols, etc.) were designed by the research team at King's, and are presented in the appendix. Table 2 summarises the type and breadth of data collected.

Table 2: Overview of data collection

Target evaluation group	Data-collection instrument
14-16 year-old students in the Masterclasses (target of 225 forms)	Two-page evaluation form, administered by each science centre
10-13 year-old students in the Schools Workshops (target of 225 forms)	Two-page evaluation form, administered by each science centre
Teachers of 14-16 year-olds in the Masterclass (target of 30 completed forms)	Two-page evaluation form, administered by each science centre
Teachers of 10-13 year olds in the Schools Workshop (target of 30 completed forms)	Two-page evaluation form, administered by each science centre
Families engaging with the family shows (target of 20 interviews)	Short interview administered by each science centre
Families/members of the public engaging with the Meet the Expert events(target of 20 interviews)	Short interviews administered by the science centre
Scientists after the training academy and after the delivery of the activity	Two-page evaluation form developed by ASDC following the training, and email interview designed by King's.
Science centre staff	Post-delivery email interview by King's of a selected staff members
Project team (NSC, JB & ASDC)	Interviews conducted by King's

Table 3 summarises the numbers of completed evaluation forms and completed interviews across the whole project

Table 3: Total data collected

Activity/stakeholder	Numbers of completed evaluation forms or interviews received	Target
School Workshop – students (10-13 year-olds)	2,203	2250
School Workshop – teachers	232	300
Masterclass – students (14-16 year-olds)	1,680	2250
Masterclass – teachers	137	300
Family show audience	327	200
‘Meet the Expert’ audience	316	200
Scientists participating in ‘Meet the Expert’ events	26	-
Science centre staff	19	-
Project team	5	-

3. Key findings

A number of measures were put in place to ensure that the project met its aim which was ‘to inspire a new sense of excitement amongst young people around the physical sciences by sharing the amazing stories and technologies of STFC’. The project team identified resources that most science centres did not possess (including a thermal imaging camera and a solar telescope) as well as innovative apparatus such as a particle accelerator in a salad bowl. The participating science centres applied to take part and after selection sent staff to a residential training course. This training course ensured that centre staff felt confident with the apparatus and the science content. The training also stressed the responsibility that each centre had in terms of carrying out the various evaluation tasks. A website and a detailed resource pack provided all necessary information and guidance for the centre staff. Given the high quality of the resources and the effort and commitment put into training by centre staff and the participating scientists, the expectations were that the project would be very well received by the students, teachers and families taking part.

This section presents the key findings from the evaluation. Themes from the feedback are reported more fully in the appendices, together with exemplar quotes. The overwhelming majority of the comments were highly positive; the occasional negative comments are highlighted as they signal possible areas for improvement.

3.1 Key findings from the School Workshops and Masterclass experiences

1. Students valued and enjoyed their experiences and have clearly learnt from them.
‘Lots of us learnt new things about science.’ Student participating in Schools’ Workshop
‘It was interesting and we were all involved in experiments.’ Student participating in Schools’ Workshop

2. Students report that the experience had enhanced their interest in studying science, and their interest in following a career in science.
'Increased motivation for physics – they can envisage their career paths when they know what others are doing with physics.' Teacher from Schools' Workshop
3. The specialist equipment provided an experience that substantially exceeded that which the majority of teachers were able to offer in their schools.
'It explained more and we used equipment I would never use at school' Student participating in Schools' Workshop.
4. The equipment coupled with the hands-on elements and opportunities to engage in practical demonstrations and experiments ensured that the experiences were both enjoyable and memorable.
'I liked the different experiments. I especially liked the van de graaf and the infra red camera as it made science fun.' Student participating in Schools' Workshop
5. Feedback from the teachers suggests that the activities would provide a shared reference point upon which they would introduce new concepts in school.
'Because we learnt stuff that I can recall during lessons.' Student participating in Masterclass
6. The application of phenomena to real-life science was also appreciated, particularly by teachers.
'Hopefully they've been engaged by this session and will seriously consider A level physics and that physics is an interesting career path.' Teacher in Masterclass
7. Significantly, the data suggests that teachers rarely include information about careers in science, or science-related fields, in their lessons, and yet they clearly valued references to, and examples given of, scientific careers in the programme. This finding suggests that if future programmes were designed to explicitly explain and promote careers in science they would be greatly welcomed by teachers.
8. Students and teachers were unfamiliar with the work and nature of STFC prior to the activities. After taking part in the activities, student responses to the question 'what do you think of the research they do?' were generally positive. Teachers also indicated interest in and a new respect for contemporary research. It is important to note here, however, that the evaluation form did not press for detailed responses by students and thus a more in-depth understanding of student views is not possible.
9. The following pedagogical recommendations offered by teachers are useful to both science centre staff and designers of future programmes:
 - Include more group-work;
 - Consider the length of the activities, especially for younger groups. Shorter sessions may be more appropriate as part of a busy school visit to a science centre.
 - Develop follow-up materials for use by teachers back in school.

3.2 Key findings from the family shows

1. Families clearly enjoyed the shows and recalled both key facts and processes.
'I've learnt so much more and that will help in school.' Child
'I think we'll buy a telescope.' Parent
2. The format of the questions – 'What will you tell your friends? What will you talk about? – appears to have prompted thoughtful and detailed responses suggesting that they encouraged reflection and then consolidation of learning
3. Most respondents interpreted the question asking about their understanding of science following the show by responding with reference to content rather than the processes of science. Many recalled key facts and cited a new richer understanding.

3.3 Key findings from 'Meet the Expert' sessions

1. All respondents were extremely positive about their participation in the 'Meet the Expert' events.
2. Respondents were able to recall specific and relatively complex facts.
'There is still a lot that I don't understand about the Higgs boson, however the speaker was very engaging and I think that I will now understand a lot more about this subject.'
3. It is not clear the extent to which respondent understanding of the ways in which scientists work changed as a result of the session. Many respondents did not answer the question explicitly in terms of scientific processes. Instead they mentioned surprise at the locations where scientists work, or the extent to which they travel. The findings concur with the research literature that a more probing interview are necessary to unpack public understanding of scientific practice.
4. Respondents welcomed the opportunity to engage personally with a scientist. They appreciated the chance to hear about contemporary science first-hand from scientists involved. Many appeared to be highly enthusiastic about their new knowledge and their experience.
'I would like to be a scientist when I grow up because they do lots of different things and it sounds exciting.'

3.4 Key findings from science centre staff feedback

Findings which correlate with findings from the Scientist surveys and the teacher/student evaluations and are marked with an asterisk.

1. Centre staff valued the equipment and training provided by the programme which, in turn, afforded enhanced staff knowledge and confidence.*

2. Staff welcomed new networks with peers and with their local scientific community.
3. Staff also welcomed the enhanced profile and the enriched perceptions of quality reported by the visiting public and particularly secondary school students and teachers.*
4. Centre staff valued the economies of scale enabled by the programme together with the central coordination by ASDC which afforded capacity and opportunities that they could not have otherwise achieved.
5. The Explore Your Universe programme has left a considerable legacy:
 - Activities have become embedded in science centre programming as standard;
 - Relationships between centre staff and STFC scientists are seen as mutually beneficial and collaborative*;
 - New ideas and joint working with other centres in future science engagement projects are seen as tenable and realistic;
 - Evaluation is seen as useful for reflecting on the design of future programmes: indeed science centre staff were open in recognising particular areas of their practice that will need modification in the future.

3.5 Key findings from the feedback from participating scientists

1. Participating scientists reported that they had gained a lot from their experiences with the Explore Your Universe programme. Many valued the opportunity to learn how to use a range of different demonstration kits, tools and activities and also valued the support afforded by the science centres. The scientists also valued new contacts with the centres and with peers involved in public engagement efforts.
2. In the data, a 'status' bias appears to be in place, at least in relation to those who responded to the survey, with junior staff participating in events more than mid-level or senior staff. Males and astrophysicists were also over-represented in the sample of scientists interviewed.
3. Most of the participating scientists were already committed to public engagement activities. If future projects aim at enhancing the numbers of scientists involved in engagement, then efforts should be directed at targeting mid-career academics, incentivising and accrediting participation and providing appropriate justification to the scientists' universities or employers.
4. The relatively passive role taken by scientists in developing science centre collaborations stands out as a key issue worthy of attention in the way future public engagement training and delivery projects are designed. It could be of value to explicitly outline the mutual responsibilities of partners in developing collaborations during training. It may also be useful to develop a visible and open network of science centre contact points for academics interested in public engagement opportunities in future projects.

5. The data indicates that there is a demand for training in public engagement which future projects may wish to consider. Widely publicising such training may also provide an incentive for some academics to participate in activities.
6. Whilst a year-long project cannot be expected to deliver fully-formed relationships between scientists and science centres, in this case, it does seem to have provided a valued space for academics to develop their public engagement skills in collaboration with support from science centre staff.

4. Recommendations for the future

Several valuable lessons for future projects have been affirmed and underscored during the implementation of the Explore Your Universe programme. Several of the recommendations below were key features of Explore Your Universe from its inception – for example, modularity and a central coordination. Others may be considered new lessons learnt – for example the need for a deeper focus on explaining the wealth of possible careers related to science.

4.1 Project management/programme design

- A modular programme, which allows considerable flexibility in terms of programming activities and working with the requirements of local audience allows providers to meet their aims most effectively
- There is a need for committed, central and independent coordination of such projects.
- Managing expectations (in terms of what is to be provided and what is to be expected in return) is difficult.
- Public engagement efforts on the part of scientists need to be supported and recognised by the scientist's institution (in terms of training, time allowed and promotion).

4.2 Activity design

- Teachers and students value the opportunity to experience novel equipment and to engage in hands-on activities. Such experiences are different from those offered in school making them more memorable and more special.
- There is a need for follow-up materials back at school/home.
- There is a clear need to include content about science-based careers and, indeed, the value of science learning for future active citizenship.
- There is scope to extend initiatives such as these to new audiences.

4.3. Evaluation design

- Evaluation responses offer insight but should be used with caution when seeking to claim impact. Longitudinal analyses which follow individuals from pre- to delayed post-experience needs to be carried out in order to verify whether comments made after activities match the actual longer-term impact.

- Short interviews (with 5 or less questions) can be effective in capturing participants' views.
- Young students (10/11years old) may need help and extra time in order to accurately complete evaluation forms.

4.4. The future

- Explore Your Universe has provided a considerable legacy of resources and experienced staff to support current programming in science centres and act as a springboard for new ventures. In particular, Explore Your Universe has led to the forming of stronger relationships between science centres and schools and local scientists. These relationships should be valued and sustained.
- A greater focus on the nature and breadth of science careers in projects would be welcomed by teachers.

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Appendix 1. Methodology and data analysis

The evaluation of Explore Your Universe was developed as a contextually grounded multi-site, multi-event case (Stake, 1994). The design for this evaluation followed a mixed/multiple methods approach, commonly used to provide investigative depth and analytic validity by exploring issues from more than one perspective (Tashakkori & Teddlie, 2003).

The data collection instruments were designed by the research team at King's, although the majority of the data collection was administered by the science centres. The King's team conducted the data analysis for this report.

Since the science centres were involved in sampling the various different kinds of participants, with support when needed, it is hard to determine exactly how representative participants were of the larger cohorts they were sampled from. For example, in the case of the scientists the survey was sent initially to 74 scientists, but science centres forwarded the survey to additional scientists in addition, thus understanding how representative the 26 scientists were who returned the survey was not possible.

Of the quantitative measures, some items required respondents to make a choice, for example between yes / no, or between better/ same / worse. Other items were open-ended and invited comments, opinions and suggestions from respondents. After initial analysis, it became clear that follow up interviews with participating scientists, families and other participants would not be necessary as the analysis confirmed responses were saturated (Creswell, 2003; Ritchie & Spencer, 1994). In other words, no new themes were emerging worthy of further exploration in a second interview. Furthermore, the open-ended response format had already led to a considerable volume and depth of data such that further data would be unnecessary.

Analysis

In approaching the analysis and the reporting of key findings a number of decisions were made. Firstly, it was noted that whilst a relatively simple analysis (counting and comparing types of responses) would offer some insight into the experience of visitors attending aspects of the Explore Your Universe programme, such 'headline' findings may mask the full complexity of the data. In other words, a respondent may have answered in one way to a yes/no type item, but differently in an open-ended response. In this way, counting the first response only would lead to a very different interpretation of the data. It was also noted that the amount of data received from the science centre partners (in terms of number of visitors who completed the feedback evaluation) varied considerably, and thus data from one centre could potentially skew the national picture when the results were collated.

On the other hand, a in-depth statistical analysis of individual data sets, using techniques such as cluster analysis to determine whether certain responses were more likely to be coupled to others and thus help increase the validity of findings nationally, was considered beyond the scope of this study. It was therefore agreed that a qualitative approach to the analysis would be more effective in not only indicating the extent of outcomes reached, but also in identifying key lessons learnt which will inform future practice (Ritchie & Spencer, 1994; Stake, 2005).

The design outlined above resulted in 9 distinct data sets, which were analysed initially on their own and then compared against one another. Data analysis were carried out as follows:

- All the responses were read
- Where appropriate, relative frequencies of response types were recorded.
- Similar responses, or key themes in the qualitative data were mapped out across the 9 data sets following a process of constant comparative methods and deviant case analysis (Silverman, 2001). The qualitative software programme Nvivo 9 was used where appropriate to index the key themes within the data.
- Exemplar quotes, representative of the key themes, from respondents were selected and organised according the initial mapping of the data, data were recoded following an iterative approach.
- The analysis was conducted by two researchers (King and Osborne, or King and Dawson) to cross-check the themes identified and improve the validity and reliability of the analysis (Lewis & Ritchie, 2003).
- Data were anonymised where appropriate at the point of report writing.

Key issues for the analysis were 1) the degree to which participants could or could not be considered more widely representative of audiences, participating scientists or science centre staff, 2) the degree of research bias possible in evaluations of this nature and 3) whether it was possible in a limited research design to learn new insights about the design of informal science education activities for school and public audiences.

In relation to the second point raised here, it is important to foreground concerns about the extent to which data collected from participants involved in a project like Explore Your Universe, at the point of their involvement, whether as audiences, staff members or scientists, may be subject to a positive bias. It is well established in the science communication and museum literatures that audiences for informal science education are typically self-selecting and have pre-existing positive attitudes towards such events (Hornig Priest, 2009; Packer, 2008; Rennie & Williams, 2006; Wellcome Trust, 2008; Wilkinson, Dawson, & Bultitude, 2011). Thus, an expectation of the research team going into the analysis was that participants would respond in positive terms about their experience. This expectation was met by the data analysis, thus we conclude that the evaluation of Explore Your Universe does indeed demonstrate that programme met its stated aims, although questions remain about how refinements may be made.

More specifically, as well as audience participant feedback, the data from the scientist surveys also came from a partial and self-selected sample, so the potential for respondent bias must be kept in mind. It is possible that those who complete the survey were those who had particularly positive experiences of Explore Your Universe and there is unfortunately no way to gauge how representative the scientists who completed the surveys were of the broader group of scientists involved in the project. However, the scientist data set, audience data set and the feedback from science centre staff included a wide range of different kinds of feedback and, as mentioned above, thematic codes were saturated within these data, suggesting a degree of internal coherence within the sample. However, it should also be kept in mind that contextual case studies such as this are limited because they are project based, and the data can only represent a snapshot of time and experience.

Appendix 2. Student view of the Schools' Workshops (ages 10-13)

Key themes were evident in the data received from all the science centres. These themes are presented below with illustrative quotes.

1. An enjoyable interesting experience, and one that they would recommend

The overwhelming majority of students from all the science centres reported that they had enjoyed the Workshop and noted that they would recommend it. There was no obvious difference between males and females – although a deeper analysis might reveal particular responses relating to gender. The most common terms used were 'fun' and 'interesting'. Students also acknowledged that 'they had learnt new things'.

'Because lots of us learnt new things about science.' BSW99

'Primary year 7s would like to learn this stuff because it's cool.' GSW18

'It was interesting and we were all involved in experiments.' ASW10

'Because it is really good experience and it is interesting. I really liked it.' ISW230

A very small minority in each Workshop said that they had not enjoyed the experience, and others expressed uncertainty about whether they would recommend it:

'Some of it was really good but on others activities it was to long.' ISW50

However, it is important to note, that in many instances negative responses did not necessarily concur with the tone of comments later in the evaluation.

2. The impact of the equipment and hands-on experiences

When asked what they liked most, nearly all students referred to specific pieces of equipment and the attributes of the equipment. In particular, the students cited the van der Graaff generator and infra-red thermal imaging camera:

'I liked the different experiments. I especially liked the van de graaf and the infra red camera as it made science fun.' ISW228

'The thing with the camera that can see through things.' FSW13

Students also clearly enjoyed the opportunity to 'experiment', or 'do hands-on':

'that we got to experiment of different things and find out about magnets, particles and infra-red' GSW33

With reference to the equipment, it is important to note that almost all students responded that they had never or rarely used such equipment before.

3. Recall (as evidence of knowledge construction)

When asked what they would remember from the Workshop, students cited key facts, but also recalled participating in the demonstrations.

'A new telescope is being made called the EELT' BSW219

'When we held the magnet underneath the ferro fluid it went spiky' ESW22 Male

'Going inside the binbag and waving' (GSW28)

Some students clearly gained conceptual knowledge:

'What I liked about the Workshop was the particle accelerator because it showed you what electricity looks like and how it works.' ISW234

A small number of students also developed a broader understanding of science and society:

'[I will remember] how much involvement Oxfordshire has with physics.' BSW142

3. Comparison with other experiences

A key focus for the evaluation was to determine the value of the Explore Your Universe experience, and whether the same experience could have been gained at school. The majority of students agreed that the Workshop involved more experiments, more objects and used more 'advanced' equipment than they usually used at school:

'It explained more and we used equipment I would never use at school' FSW154

'In school we don't have asteroids' GSW13

'We don't have the equipment, so its less hands on and more boring' CSW20

'It is different because the Workshop have more objects than science lessons in school.' BSW2

A small number of students, however were particularly excited by the unique nature of experience:

'We use the thing that scientist (sic) do' ESW101.

A very small minority of students attending each science centre did not see any particular difference in the actual 'tasks', but nonetheless enjoyed the experience at the Science Centre.

'In school it is quite similar because we learn about different experiments the same as we did today' GSW37

4. Support for learning in school?

Most students thought that the experience would help them in science class. Key themes here were developing understanding or acquiring knowledge, and also helping them in their future learning:

'Because when we do space in science, I will have a head start' JSW205

'At high school we will probably go over the full thing and if I get stuck I will remember this Workshop.' GSW11

However, some children noted that they were not sure what they would be doing in class, and so had doubt as to whether it would help them:

'Because I don't think we will do anything like this.' BSW60

5. Future interest and career in science?

Whilst the Workshops were designed to be age appropriate and linked to the curriculum, the aim of Explore Your Universe was to introduce students to the depth and breadth of science application.

Quantitative data suggests that the experience was effective in increasing students' interest in studying science, and also pursuing a career in science.

However, to really unpick students' attitudes and determine the impact of the experience, a longitudinal data would be necessary, coupled with a richer understanding of the student's views pre and post the experience. Indeed to illustrate the difficulty of drawing definitive conclusions about the impact of the experience on future intentions to study science and future intentions to pursue a career in science, a small subset of data is cross referenced in the table below

Table 4: Responses of 69 year 7 children visiting Our Dynamic Earth for an Explore Your Universe Workshop

	More likely to consider a career in science	Less likely to consider a career in science	Already knew wanted to work in science	Already knew didn't want to work in science
More interested in studying science	21	2	1	7
Same, already wanted to study science	2	3	4	4
Same, don't want to study science	0	0	1	21
Less interested in studying science	0	0	0	3

Boxes shaded yellow seem contradictory: the same students indicate that they are now more interested in science, but also less likely to consider a career in science. This contradiction may be explained by respondents misunderstanding the question, or mis-recording their answer. Either way, this small analysis underscores the complexity of this data.

However, it is significant to note that many teachers accompanying students did comment on the value of the Workshop for providing greater context and information about careers in science and science-related professions. Indeed, a few students also recognised that the Workshop might be relevant for career-making decisions:

'It is very interesting and useful for many 14 – 15 year olds as they might consider their careers upon this.' JSW165

6. Knowledge of STFC science

Almost all students reported not having heard of STFC before the Workshop. Following the Workshop, however, comments were very positive, when given, with descriptors such as 'cool', 'interesting', 'good' and 'useful' being used most commonly. It should be noted here, however, that the question design did not fully probe student understanding of STFC-supported science. For a richer understanding of student perceptions of STFC-supported science and contemporary science research more generally, a more detailed interview or focus group would be necessary.

Appendix 3. Teachers' views of the Schools' Workshop

In almost all instances the teachers rated the content and the expertise of presenters as good or very good. The following themes were evident in the teachers' other responses.

1. The value of hands-on experiences and the equipment

Teachers rated the opportunity for students to be involved in hands on experiments. They valued the specialist equipment, with almost all saying that they did not have, nor could they afford the equipment in school:

'[I couldn't do this at school due to] lack of equipment and resources and safety implications.' FTW22

Although some noted that they could do most of the Workshop themselves, these teachers also acknowledged that presentations by 'other specialists make things more memorable.'

2. Impact on motivation towards science

The teachers appreciated the ways in which the Workshops highlighted the significance and application of the physical sciences and noted that they felt these aspects would lead to greater motivation towards science:

'It has made some aspects seem more relevant and applicable. It has inspired some to learn more.' ETW10

'The practical activities encourage the children to feel at ease with science as something they can investigate constantly.' FTW9

'Increased motivation for physics – they can envisage their career paths when they know what others are doing with physics.' JTW21

'it definitely stimulated many in the class. The children were speaking about electrons and 'invisible light' on Monday morning. So it should be a positive long term effect.' CTW3

Some felt that the special experience of being in a science centre would also add to the experience:

'I think that it will have piqued their interest more than school.' GTW2

3. Teachers' support of science-related careers

Interestingly, teacher responses to the question about how they teach careers were relatively noncommittal and bland. It would seem that science teachers rarely explicitly discuss the possibilities associated with scientific careers with students aged 10 – 13:

'Too early to start' with reference to year 7 students.' JTW8

'Really only as it comes up' ETW12.'

'it comes into lessons incidentally.' ETW8.

4. Teachers' understanding and view of STFC

Most teachers had not heard of STFC prior to the Workshop, although most were complimentary afterwards:

'Fascinating – was unaware of STFC although aware of research they are involved in.' FTW24

5. Teachers' recommendations

On the whole, teachers were very impressed by the Workshop and valued the experience it gave their students. Some teachers also offered recommendations which are grouped in themes below:

i. Organisation of learning opportunities

Several teachers commented on the need for more group work rather than demonstrations with one student at the front. Some also suggested shorter demonstrations, and the need to not 'over-pack' a day with activities.

ii. Complexity

A number of teachers thought that the schools Workshop was too complicated for younger children, or pitched too high:

'For this age range, they need to be less talking and a narrower focus with greater explanation.' BTW14

'Mainly pitched at good level for G&T students but these were year 7: lots of topics could not be explained properly in such a short time: e.g.: links to static electricity why prefer to be earthed / EM spectrum (could block out parts of diagram). BTW5

iii. Follow up and longer term impact

Several teachers would have liked a hand-out or weblinks to support their follow up in class. This would seem particularly useful given that the majority of teachers were noncommittal in their responses on how they would follow up on the content presented during the day.

Some also asked for more information about jobs, and were keen that women scientists were showcased.

Appendix 4. Student views of Masterclasses (14-16)

The analysis of the students' responses to the Masterclasses indicated a number of themes presented below:

1. An enjoyable and interesting experience

Students enjoyed and valued the Masterclasses, with the most common descriptors being: 'Interesting', 'informative' and 'easy to understand'.

'I learnt a lot about things I otherwise wouldn't in an interactive way.'

'it was fun so it is nailed into my head.' JSM108

Several were quite thoughtful about the value of the session and the ways in which showcasing current science can inspire young people:

'It would make kids excited about science which is being worked on right now.' FSM155

'It gives a good insight into the space industry and what's going on at the moment, such as the EELT and new infra-red telescopes.' BSM2

'It is quite informative about what is happening Space-wise right now. It's good to know the situation before considering studying it.' BSM15

2. Recall (as evidence for knowledge construction)

Masterclass students offered a number of facts in responses to the question 'what will you remember?' They also cited the experience of using the equipment.

'Infrared shows how heat is transferred in different materials.' BSM206

'Radio waves can be up to 200m long.' BSM223

'That as starts travel further and further away the wavelength is stretched.' ESM7

'When Jake touched the light and it glowed.' FSM89

3. Comparison with school science

Many in this age group had experienced aspects of the EYU kit in school. Nonetheless, they still appeared to appreciate the opportunity to engage with the equipment:

'We are not allowed to use some of this equipment.' FSM17

'It is different as it is much more practical than note taking in class.' DSM3

4. Support for science learning in school?

Most of the students acknowledged the value of the Masterclass for their learning in school:

'it was clear and funny and I learnt a lot. It made everything previously not understood clear and easier to understand.' JSM167

'Because we learnt stuff that I can recall during lessons.' CSM54

5. Future interest and careers in science

The following findings are from a sample of responses collated from 5 Science Centres, (n = 320).

44.6% of students are more interested in studying science as a result of the EYU programme

39.9% were already interested in studying science;
 10.9% were not interested in studying science;
 0.31% are now less interested in studying science;
 (4.68% no reply).

In terms of interests in science-related careers, the following findings emerge (N = 320).
 40.9% more interested in a career in science as result of the EYU programme;
 21.5% already knew wanted a career in science;
 28.7% already knew that didn't want a career a science;
 5.3% less interested in a career in science;
 (1.56% no reply).

However, to gain greater confidence in these responses, it is important to cross check responses. In the table below, responses from 40 students attending the Masterclass at Catalyst are analysed:

Table 5. Responses of 40 students attending the Masterclass at Catalyst (2 no replies)

	More likely to consider a career	Less likely to consider a career	Already knew wanted to work in science	Already knew didn't want to work in science
More interested	11	1	1	1
Same, already wanted to study science	5	1	5	2
Same, don't want to study science	1	0	0	10

Here, only 3 replies (shaded) appear contradictory. This suggests that the majority of the students participating in the Masterclass understood the evaluation questions and answered reasonably.

6. Understanding of STFC

In general, students had not heard of STFC prior to the Workshops. Afterwards students responded positively to the question asking what they thought of STFC research. Typical comments included the terms 'awesome', 'cool' and 'interesting'. Some students gave more detailed responses:

'I think it's highly important and rather ground-breaking in some areas.' ASM45

'They're involved in many new ventures that will help explain our universe and the way in which it works.' ISM19

Appendix 5. Teachers' views of the Masterclasses

Nearly all of the teachers rated the content of the Masterclass and the expertise of presenters as good or very good. The following themes were evident in their responses:

1. Value of hands-on engagement with real world applications

Teachers welcomed the format of the Masterclass, and noted its value for widening students' understanding of science in practice. For example, teachers valued:

'Opportunity for pupils to have a different learning experience.' ETM1

'Because it helps students realise that science is a lot more vast than the classroom.' BTM3

'It is advantageous to see scientists working with unfamiliar kit with the children in order to convince them that science is fun.' BTM6

'Idea that science learned in school has practical application.' CTM2

2. Equipment and expertise

Teachers acknowledged the value of the equipment. One teacher also noted that the presence of a female physicist was appreciated:

'We have some resources but no Infrared camera and so this was very useful for the pupils to see.' BTM7

'Some equipment and contexts we can't / don't use in school.' DTM16

'Also good that we had a women physicist to talk to the girls.' JTM7

In a similar vein, many of the teachers noted that the content replicated that which they would cover in school:

'A lot of the content is already covered in school so in a sense it was 'revision' for the pupils but it did allow them to consolidate/explain what they already have learnt and expand on their previous learning to some extent.' ETM1

3. Teachers support of science-related careers

When asked how they support their students' understanding of careers in school, many teachers responded in broad non-specific ways:

'When opportunities arise linked to curriculum content.' CTM5

'When appropriate. Depends on when the subject of careers pops up.' DTM14

Significantly, whilst teachers did not seem to discuss careers in science in their usual lessons, they nonetheless welcomed and appreciated the way in which the Masterclass showcased science careers:

'Many students will now have a greater appreciation of the range of scientific careers.' CTM5

'Show them real-life applications and therefore careers linked to these.' DTM15

'Hopefully they've been engaged by this session and will seriously consider A level physics and that physics is an interesting career path.' JTM7

'It was a very positive influence on their view of physics as a modern technological subject.' ETM8

4. Knowledge of STFC

Few teachers had heard of STFC prior to the Masterclass. Following the session, however, some teachers had clearly been interested in the stories of STFC-supported science presented, particularly commenting on the applications of science for society:

'Excellent and inspiring re:future application' BTM10

'Valuable - great to find out about the major developments they are involved in.' GTM18

Appendix 6. Family show

Responses to the family show were captured using a very short interview protocol as it was recognized that families would be unlikely to have much spare time to complete a detailed evaluation during their visit. The interview asked what family members recalled and were most likely to tell their friends about; which aspects they would talk about at home; and whether they now had a better understanding of science.

Aspects of the show most recalled and most likely to be shared with friends:

The majority of respondents described pieces of equipment, demonstrations and learning new facts:

'When I went up to the front and did the sunscream hand print that stops the UV light.' BFS17

'Learning the shapes of constellations and star clusters.' GFS4

A few respondents also recalled learning about particular processes:

'I will most likely tell my friends about the techniques used to find objects in the sky.' GFS16

'Infrared light- it was really cool and I liked learning how they can be used.' BFS10

Aspects of the show that will be talked about:

This question prompted detailed responses from many. It may be that by challenging respondents to think about whom they would tell about their experiences may prompt greater reflection and consolidation of the information.

'We'll tell our mum about it. Child 2 - I'll tell her about liquid nitrogen and how it looks so cool. Child 1 - I'll tell her about the balloons and how the gas inside turned to liquid and how it looked so funny when they put more and more balloons into the pot.' BFS21

'I'll tell Dad about the cool experiments.' AFS4

Wider value of the family shows

Other exemplar responses indicating the value of family shows are as follows:

'Enthusiasm of presentation. Interesting, exciting to learn about British inventions.' CFS72

'I've learnt so much more and that will help in school.' CFS83

'I think we'll buy a telescope.' GFS5

'Will use parts of it to show my son how physics is relevant in everyday life.' JFS12

'In school I liked [science] a bit. Now this Workshop's changed my mind a bit.' JFS20

Understanding of science

For the most part, respondents said that they had a better understanding of science having seen the show, however, it would seem from the range of responses that most answered this question in terms of increased content knowledge rather than increased understanding of the nature of science or how scientists work.

'We learned lots we didn't know before (and daddy had never seen a superconductor or ferrofluid before).' CFS64

'Everything in the show was new to me.' DFS18

'I learned more about astronomy than what science is about in general.' GFS16

Appendix 7. Meet the Expert sessions

Responses to the short interview following the Meet the Expert event were very positive. Audience members were particularly pleased to meet an expert in person and indeed this personal connection appears to be key in prompting many of the positive replies.

Aspects most recalled

Respondents cited key content and particularly appeared to value learning about local and current scientific research:

'The quantum quizzics - the part where they were using the actual experiment in the lab and receiving data. I'd heard about the experiment in the news and it was nice to see it become reality.' AME4

'There is still a lot that I don't understand about the Higgs boson, however the speaker was very engaging and I think that I will now understand a lot more about this subject.' CME16

'That a lot of science appears to stem from Manchester!' CME14

Aspects most likely to be shared with others

For many respondents, the personal contact with the scientist seemed particularly appealing:

'That I shook hands with a scientist who studies really far away galaxies.' GME1

'I will talk about how being a scientist means that you can visit a lot of different countries!' CME21

'Our scientist was from Daresbury Labs. I did not know that there were lots of scientists in Daresbury Labs.' CME18

Understanding of how scientists work

Respondents were clearly intrigued by the scientists they met. Many of the traditional stereotypes about scientists were dismissed:

'I've never met a scientist before! Was good to see Science in Action!' CME2

'They just seem like ordinary people but are younger than I thought they would be, I thought all scientists were old - like my parents.' IME2

'This was packed with new 'How its done' info'. CME12

'I would like to be a scientist when I grow up because they do lots of different things and it sounds exciting.' CME19

'I didn't really know before what an astronomer did but I know now.' GME11

Appendix 8. Feedback from science centre staff

19 completed questionnaires were received from Science Centre staff identified as being directly involved with the Explore Your Universe programme. The questionnaire (available in the appendix) sought reflective responses from a series of open-ended questions.

For the analysis, responses were initially grouped by question, and then examined to identify any common themes. Following an iterative process, the broad groups of responses were collapsed into a series of categories 1–9 below. The key themes within each category are then listed, with common comments summarised and often illustrated with a direct quote. The numbers in brackets refer to the frequency of comments relating to the theme.

For some areas, the themes are divided into two sets: The first set of themes document types of staff experiences that we might expect given the programme design. The second set of themes, or often just singular comments, indicate more unexpected outcomes.

1. THE IMPACT OF EXPLORE YOUR UNIVERSE IN TERMS OF PERSONAL AND PROFESSIONAL GAIN

1a. Given the aims of the programme and as a consequence of the training provided the following themes of ‘more knowledgeable staff’; ‘stronger networks’ and ‘new equipment’ might be expected.

More knowledgeable staff

- The programme enriched teams’ ability to present this topic (x7)
- Staff had ‘enjoyed relearning physics (x3)
- Staff were now better informed about STFC projects (x2)
- Staff were more knowledgeable about the work of local researchers (x2)

‘It has increased my knowledge of the role that Scotland is playing to further space exploration.’

Stronger networks

- Staff now have direct contact with staff at local labs/ STFC staff (x3)
- Staff noted that they had found networking with colleagues during the course of the programme to be particularly beneficial (x9)

New equipment

Staff acknowledged that they had gained equipment that could not otherwise be justified/afforded (x3)

It was noted that the equipment was useful in helping to explain concepts (x4)

‘The equipment helped me as a presenter make science more exciting and build a better rapport with my visiting students.’

‘We have been given equipment which schools do not have and so we are able to take what they are learning in the classroom and bring it to life.’

1b. A second set of themes were also identified in the responses. These do not refer to the explicit aims of the programme, but instead highlight unexpected and perhaps long-term outcomes.

Programming

Staff noted that programme had made them reflect on their current provision. (x1)

'It has opened my eyes to ways in which we can extend and alter our offer to educational groups and the general public.'

Marketing

Respondents referred to their new knowledge around marketing of programmes (x2)

'I have experimented with and gained a better understanding of how to market a project to a large and specific audience.'

Operations and strategy

Staff reported being better informed about national projects and how to run them (x2)

2. BENEFITS TO INSTITUTION

2a. Again, given the aims of the programme, one might expect the following:

Reaching new audiences, especially schools

Staff reported reaching new audiences (x6)

The programme was described as raising the profile of the institution and highlighting its value for school audiences (x7)

'We usually find it difficult to get into secondary schools, so having this project, and being able to offer a session with very high quality kit for free, has allowed us to get our foot in the some doors.'

'The equipment and higher level nature of the activities has enhanced the perception of our staff knowledge in some schools.'

Serving audiences better

It was felt that visitors to Explore Your Universe programmes now have a better understanding of contemporary research (x3)

Enhanced profile

Responses noted the increased profile of the institution (x5)

'Being able to present our visitors with cutting edge information has increased our position as a place where people can engage with CURRENT science'

Enhanced capacity

Respondents noted that they now have new or enhanced ways of working that can apply in the future including outreach work (x7)

It was felt that the Explore Your Universe programme had broadened the standard repertoire (especially physics related) (x 7)

Staff felt that they are now better able to recruit for 'Meet the Expert' (x 5)

Some respondents noted that their education teams had an increased capacity to address complex content (x3)

2b. Whilst not a direct aim of the programme, the following themes were clearly evident in the data:

Staff development

Several centres reported staff professional development as a key benefit of the programme (x6)

Evaluation

Several respondents noted that that evaluation data was useful for providing insight into confirming, or otherwise, pedagogical approaches (x4):

'Bespoke evaluations helped us to get a better insight into our various audiences and what elements were most effective in keeping them focused and understanding.'

3. THE VALUE OF THE NETWORK

Collaboration

When speaking about the value of meeting colleagues and also scientists, staff phrased the relationship in terms of collaboration (x6):

'I feel that this project strengthened our relationship and has made collaborative working in the future even more likely.'

One institution noted the two-way focus (x1)

'Having direct links with experts and teachers is a valuable way of maintaining scientific integrity in our projects.'

Science centres seen as resource by scientists

Respondents also highlighted a perhaps more unexpected outcome of the programme in that scientists were now more aware of the value of science centres (x2)

'A great outcome is that scientists are now aware that [name of institution] is available to them if ever they want to teach the public or trial engagement activities with a wider audience.'

'We found that many researchers are looking for a place to access public audiences and they put a lot of effort into developing bespoke activities for our events and were very eager to continue the relationship fostered through EYU.'

In recognition of this new relationship, one science centre described a potential initiative thus:

'We'd like to repay the scientists involvement by supporting them with CPD training and seminars relating to public engagement.'

4. VALUE OF HAVING PARTICIPATED IN A NATIONAL STRATEGIC PROGRAMME?

Several themes were identified in the responses referring to the national nature of programme:

Economies of scale

All respondents noted in some form that the programme had afforded them an opportunity (in terms of sourcing or funding equipment / organizing training / creating activities) that they would not have been able to do by themselves (x 19)

'if an organization like ASDC didn't do these kinds of large-scale projects , no one would because no one would have time.'

Networking

The value of networking with other centres was acknowledged by respondents (x9), with many noting that being part of a network was 'motivating' (x4):

'We now work more closely with centres closer to us and share ideas and techniques.'

'I think it is important to remain highly visible to one another for opportunities to work together nationwide and this project has been a catalyst in that sense.'

Skills/confidence

The broader network was seen by some to be particularly important for supporting skill development (x3):

'It has been a great chance for me to embark on a project with many different elements safe in the knowledge that there has been a good level of support available from [my institution] ASDC and other science centres involved.'

Marketing

Respondents noted that the combined marketing force helped them to reach wider audiences (x 3)

It was also noted that a raised profile is important for securing future funding (x 4)

'To obtain this level of funding is beyond the capability of individual centres.'

'Its helpful for generating media attention as being part of a national programme is of interest to the press.'

'Being able to guarantee a large exposure in terms of numbers can secure a very good investment from the funding partners.'

Evaluation

Respondents noted the value of large-scale, national evaluation results for informing practice in the field (x2)

5. LEGACY

Responses referring to the legacy of the programme could be divided into the following themes:

Future collaborations

Respondents noted the potential of future collaborations with other partners in the programme making specific mention of sharing ideas around use of equipment (x3)

Equipment and activities embedded as standard practice

Nearly all staff commented that the Explore Your Universe activities would replace parts or the whole of their existing programme (x 13)

Others noted that the equipment would be used in other activities (x4)

Respondents also noted that they had plans to run more 'Meet the Expert' events (x3)

'We have scheduled a legacy meeting with teachers and experts so as to see how to

best move forward with the equipment we have.'

'One member of team has been assigned the job of continuing the Explore Your Universe legacy.'

New programmes

One respondent noted that the Explore Your Universe programme was the stimulus to develop new Professional Development programmes for teachers. (x1)

6. BROADENING THE PROGRAMME

When asked how they might extend or broaden the programme, respondents replied with a wide range of suggestions.

- Extend to an adult audience (x4)
- Develop further for secondary schools (x4)
'ever-challenging 14–16 group as it is difficult to capture their attention every time with sometimes quite abstract and difficult to visualise physics concepts'
- Extend for use outside, after dark, and for use in winter (x3)
- Use equipment to demonstrate different areas of science (x2)
- Provide resources for badged groups (brownies, scouts, guides etc) (x3)

7. The role of the ASDC

All 19 respondents were extremely positive and appreciative of ASDC's role in coordinating the EYU programme noting:

- ASDC staff were 'accessible' (x3)
- ASDC staff provided information and support (x2)
- ASDC were excellent project managers and coordinators (x 4)
- Respondents also noted that the EYU training had been very well run, and had proved very useful (X5)

8. HIGHPOINTS

Finally, when asked for their highpoints from the programme, respondents noted the following:

- Inspiring visitors with 'kit' (x 7)
- Learning about local research (x 2)

'Getting high quality physics equipment and building close relationships with STFC funded researchers.'

- Gaining contact with secondary schools (x 2)
- Developing links with other science centres (x 2)
- Running the Meet the Expert events, and the potential for future events (x 4)

'The collaborative and symbiotic nature of the relationships that have formed throughout the course of the project have been a definite high-point.'

RECOMMENDATIONS FROM SCIENCE CENTRE STAFF

As is evident from the data above, Science Centre staff very much value their participation in the Explore Your Universe programme. They are clearly keen to continue

the legacy of the project, with many respondents offering recommendations for future practice:

Modularity

A couple of centres commented on the potential of modular design for greater flexibility (including the need to cope with late arrivals /different abilities) (x2):

'Science centres should pay to their own strengths and perhaps custom kit packages can streamline the project for each science centre and reduce the overall cost'

Addressing the realities for smaller centres

Staff from the smaller centres commented on the difficulty of meeting all the project requirements given limited staff, facilities etc (x3):

'We would, however, very carefully consider the required targets of a future project. In striving to meet the ambitious Explore Your Universe targets we expended far more resources in terms of time and advertising than we had anticipated'

'Being a small centre the additional workload has been substantial, probably more than we had envisaged, and this had caused additional pressure for staff'

Both big and small centres noted that aspects of paperwork (including evaluation reporting) were time-consuming and expensive (x3)

Timing

Respondents suggested that it would be better to run this over a school year rather than a calendar year. (x2)

Evaluation

Respondents noted that the evaluation process was quite time-consuming for visitors (x4)

Some commented on the design of student evaluation forms were too complicated given the limited time students have in the Workshop (x2)

Lessons to learn regarding equipment

While respondents welcomed the equipment, some additionally noted that the storage of certain materials (liquid Nitrogen) had been difficult (x2), and that they had experienced problems getting everything in time (x2)

Appendix 9. Feedback from participating scientists

Of the 74 scientists who participated in the EYU programme, 26 filled out the email questionnaire (just under a 20% return rate).

The questionnaire was designed for dissemination via email and was therefore short. The questionnaire included background demographic questions as well as more open-ended questions about the participants' experiences during Explore Your Universe and their attitudes towards public engagement with science more broadly.

Data are presented below, in 3 key areas: demographics of participation; scientists views; and missed opportunities. For each area, a number of key themes are identified, and thereafter discussed.

1. Demographics of participation

Survey participants were a self-selected snapshot of scientists involved in the Explore Your Universe programme.

Table 6 below, provides an overview of participants backgrounds as well as their involvement with Public Engagement activities before and during Explore Your Universe.

Table 7 outlines their subject specialisms.

Table 6: Survey participants by academic status, gender & PE involvement before & during EYU

Time in career	>5 years	5-10	11-20	<20 years
Number of Participants	13	7	3	3
Gender (F = Female, M = Male)	3 x F, 10 x M	5 x F 2 x M	1 x F 2 x M	1 x F 2 x M
Job Titles	PhD Student (7) U/G Student (1) Post-doc)(3) Senior Software Engineer (1) Project Manager (1)	Lecturer (2) 1 x Planetarium Astronomer (1) Astronomy Programmes Officer (1) Project Engineer (1) Research associate (1) Post-doc (1)	Research Associate (2) Professor (1)	Professor (1) Retired senior lecturer (1) Systems engineer (1)
PE training before?	Yes = 7 No = 6	Yes = 4 No = 3	Yes = 2 No = 1	Yes = 0 No = 3
PE before?	Yes = 11 No = 2	Yes = 7 No = 0	Yes = 2 No = 1	Yes = 2 No = 1
PE training in EYU?	Yes = 10 No = 3	Yes = 5 No = 2	Yes = 0 No = 3	Yes = 3 No = 0
Went on to work with an EYU Science Centre? (after the training)	Yes = 10 No = 3	Yes = 6 No = 1	Yes = 3 No = 0	Yes = 1 No = 2

Table 7: Respondents by subject expertise

Subject	Number of participants
Astrophysics	10
Particle physics	3
Planetary Science	2
Space systems engineering/technology	2
Astrochemistry	2
Other: Medical Physics Computing	7

Instrumentation Physics U/G High energy physics Ocean science Neuroscience	
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Survey respondents reported working with Our Dynamic Earth, Edinburgh (n = 5), Dundee Science Centre (n = 3), Stratosphere, Aberdeen (n = 2), Catalyst, Cheshire (n = 2), Glasgow Science Centre (n = 2), Jodrell Bank (n = 1) and the STFC Daresbury Laboratory (n = 1).

It is worth noting that two respondents were staff at the Greenwich Royal Observatory, but were actively involved in the science centre side of the project.

Notably absent from this list are four of the other science centres in the partnership; At Bristol, Intech (now Winchester Science Centre), Science Oxford and the Observatory Science Centre in East Sussex. Their absence may however be a result of the self-selection of survey respondents.

Of the respondents who worked with a science centre, most undertook one or two Explore Your Universe activities, including participation in 'Meet the Expert' events, school workshops, public talks, equipment demonstrations, telescope observations, and providing support for exhibitions and family shows.

- **More 'junior' scientists participated in Explore Your Universe than 'senior' scientists.**

Research has found that academic status differences influences who can and cannot take part in public engagement (Bauer & Jensen, 2011). In this study, while both ends of the career spectrum are represented, there is a skew towards the less established, PhD students and early career researchers participating more.

Participants noted that a lack of 'time' and 'information about opportunities' were key factors that limited their involvement in public engagement. Research by Bauer and Jensen (2011) found that the more junior and more senior academics were less pressured in terms of time and workload, thus more able to take part in public engagement. The findings of this study suggest a similar pattern, except in this case with those in more junior positions being more involved. For example, one more senior academic suggested she had 'too many other commitments' to participate in public engagement prior to this project. It may be the case that it was easier for PhD students to take part in public engagement generally and Explore Your Universe more specifically because of their more junior status, as compared to their more senior colleagues.

- **Public Engagement seen as a personal investment by scientists rather than valuable for their career**

Notable amongst the open-ended questions were concerns about the value of public engagement within an academic career. While some participants were able to articulate ways in which public engagement benefitted their career (mostly through the development of better communication skills and confidence), others suggested it offered no explicit benefits in terms of an academic career. As one participant

explained, she carried out her public engagement work in her own time for the following reasons:

'I have found that my current university does not value public engagement and science communication...it is also viewed as a 'lesser' skill to 'research'. In conversations with a previous line manager [they] suggested that it was not possible to be a good researcher, publish papers AND be a good science communicator.'

This extract speaks to the high degree of personal investment necessary for some academics to be involved with engagement activities. Across all 26 respondents a highly personalised degree of motivation was reported, such that participants carried out engagement because they felt they gained personally from it, particularly in terms of enjoyment, meeting new people and developing additional skills.

For 2 PhD students who responded, getting involved in public engagement was also seen as a route to an alternative, non-academic career as a professional science communicator.

- **The majority of respondents were already committed to Public Engagement**

All but 4 respondents had been involved with public engagement before taking part in Explore Your Universe. These respondents were strongly already personally motivated to be involved with Explore Your Universe and this may explain the level of their prior experience and their willingness to participate in programme (and indeed respond to the survey).

This finding suggests that the Explore Your Universe programme served to consolidate or develop the communication skills of academics already invested in public engagement. However, it would also appear that Explore Your Universe was not particularly successful in attracting new faces from amongst the academic community to participate.

If the aim is to broaden the network of scientists engaging in similar initiatives, findings suggest that there are systemic barriers to involvement, and that a relatively short-term opt-in project such as Explore Your Universe will only attract those already motivated. These findings also raise questions about the perceived value of public engagement and support provided for it amongst the scientific community.

- **Males and astrophysicists were over-represented in the sample**

From the tables above it is clear that more men than women participated in the programme. There is also a dominance of astrophysics specialists, although this may be expected given the subject matter of EYU.

2. Views of the scientists

2a. Explore Your Universe training programme

- The Explore Your Universe programme training was broadly valued by participating scientists who cited benefits of new contacts and new information.

The 18 respondents who took part in EYU training reported feeling positive about their training experiences. Motivations for taking part in the training ranged from wanting to get ideas for public engagement, a desire to improve their skills more generally, to being asked to attend by their work place.

The experience of training appeared to have been very positive, respondents reported gaining the new ideas they had wanted, being able to meet other academics interested in engagement as well as science communication professionals.

Learning how to use the Explore Your Universe demonstration tools as well as science centre 'tricks' was highly valued, as were other tangible resources provided on the day such as the Programme Handbook.

Respondents varied in the extent to which they felt that attending the training day had improved their confidence in public engagement. Some suggested it had made little or no difference, while others reported that the training 'definitely improved my confidence'.

Determining an impact on levels of confidence is difficult to obtain without a baseline measure of the confidence of respondents going into the programme. Indeed the variation may be related to the different levels of prior experience amongst those who participated. For example, as one respondent put it:

'Confidence is not a major issue with myself due to past experience, but for those new to outreach I can see the benefit of being exposed to others in a similar situation as, especially in small departments, the number of people involved in outreach can be small and you can easily feel isolated.'

2b. The role of partner science centres

- Nature of support

Respondents were positive about their public engagement experiences at the science centres, reporting that they had received a valuable level of support from the staff (with regards planning support, materials and enthusiasm) and described wanting to work with science centres again in the future.

The Explore Your Universe 'kit' was also acknowledged:

'It gave me the resources I needed to be able to start communicating science. Without the kit I wouldn't have been able to do much.'

- Access to audiences

Science centres were also recognised by some respondents as providing a 'ready made audience for science outreach' as well as 'access to resources you might not otherwise have'. This finding concurred with the feedback from science centre staff.

Respondents also appreciated the high status of public engagement in science centres, particularly for one participant, in opposition to their day-to-day experiences in a university context:

'It was a positive experience to be involved with other people who are interested in and value outreach which cannot be said for every academic I come into contact with.'

2c. Impacts on scientists themselves

- Personal enjoyment

The majority of survey respondents had a positive experience of working with science centres and seemed keen to do so again.

Respondents also reported their personal enjoyment of their science centre experiences and described that enjoyment as a personal reason for continuing to build relationships: 'I like the atmosphere of science centres – literally, I love the sounds of the places!!'

- Increasing the profile of public engagement

Explore Your Universe seemed to have provided respondents with a safety net with which they could pursue their engagement and outreach practice, meet like-minded people, and, also, demonstrate the value of their engagement work to their own institutions. As one participant described it:

'Previously I had not participated in a public engagement event where we were involved in the planning and organisation side. It was useful in supporting the development of an event directly based on our work, which obviously is useful in terms of justifying the time involved in preparing it to others in the department...'

It [Explore Your Universe] has provided a basis for being involved in future events, and in particular a contact with the local science centre to arrange other events.'

- Legacy

All the respondents stated that they hoped to continue to be involved in Public Engagement initiatives in the future. 24 of 26 were able to describe clear and detailed plans for their own future efforts.

3. Missed opportunities

Interestingly, despite the aim of Explore Your Universe to create links between the academics and the science centres, a proportion of those who attended Explore Your Universe training did not go on to provide input or delivery for Science Centre PE activities (n = 8).

A number of reasons were given for not taking part in Explore Your Universe activities at a science centre, namely, a lack of time, changing jobs, uncertainty about what the science centre would be like and a lack of contact. For instance, as one respondent put it 'although I should be on the list, no one has ever contacted me'.

For those who were actively involved in Explore Your Universe, it was the predominantly the science centre who made the initial connection, meaning that the academics netook a more passive role in the programme. Indeed, one respondent described the programme in these terms:

'It was an enjoyable training session, but has not gone any further yet due to lack of contact from the science centres'.

For operational reasons, it clearly made sense for centres to lead on making relationships, however, for future projects it may be beneficial to have a central 'hub' to which scientists could apply and thereafter be allocated to particular centres.

10. Feedback from EYU project team

Four telephone interviews were conducted with key members of the Explore Your Universe project team. Email surveys were sent to three further members of this team, with one reply. The analysis presented below groups responses to the key question areas and identifies any common issues in the responses, highlights lessons learnt, and draws attention to particular views or insights that may be significant for similar or related initiatives in the future.

1. HOPES FOR THE PROJECT

When asked about their initial hopes for the Explore Your Universe programme, all the respondents cited the aim of bringing physical sciences content (with a focus on STFC stories) to a larger audience. Three of the five also noted the opportunity for the participating science centres to benefit materially and in terms of new contacts. The following quotes, grouped into themes, illustrate the respondents' hopes:

Reach

'To reach a whole lot of people.'

'Youngsters switched on to science.'

'For young people to see and experience things that they don't get to do in schools.'

Promotion of science

'People to be inspired and have more of an idea about great stuff on their doorsteps.'

Raising the profile of STFC science

'Showcase STFC that doesn't normally get showcased.'

'STFC would be more accessible to science centres involved.'

Programme seen as beneficial to the partners

'Particularly keen on science centres getting something beneficial to them.'

'I wanted staff to see the handbook [and the activities] and think that it was really high quality public engagement.'

'I wanted success – not so much on numbers but in terms science centres sharing best practice.'

Finally, one respondent noted the hope of establishing greater relationships between science centres and scientists:

'I hoped that science centres around the UK would be surprised that [so much amazing] science was happening near them.'

2. CONCERNS

Respondents were honest about their initial concerns for the programme. Their comments are grouped under themes below. However, it should be noted that all the cited concerns are arguably to be expected given a project of this size. It is also interesting to note, that when concerns were cited, most also listed the ways in which they had sought solutions.

Coverage of the science content

'I was aware of how broad the remit was and wondered how we were going to showcase it all.'

'How do we focus this, have something tangible?'

'Sheer content from atoms to astrophysics.'

'The research teams chose specific things in a big sea of content.'

Choice of equipment

'I wondered: could we have been cleverer and produced more flexible or more bespoke kit?'

'I'll always reflect on whether it was the best set.'

Managing expectations and workloads of science centre partners

'Deliverables were very high given the grant.'

'Evaluation asked a massive amount from them.'

'I know that not all the science centres have physics specialists.'

'I was worried how the science centres would gel.'

3. BENEFITS

The following benefits of the Explore Your Universe programme are presented in the key themes:

Skills at the individual level

'A lot of knowledge and confidence around taking on a new subject.'

A further benefit, described as a 'fringe' benefit by two respondents involves an increase in an individual's standing within their organisations due to their participation in the training and their coordination of a nationally funded programme: *'Cudos among peers.'*

Networking

'Collaboration between science centres – this wasn't initial focus but became a powerful one.'

'Deliverers rarely get to go out and meet other people – especially junior staff. By the time they are running the centres they will know each other.'

'Smaller centres more aware of research and feel that they can link in with external organisations.'

Kit and training

All noted the contribution of nearly £7,000 of equipment makes a big difference in small centres:

'I know for a fact from direct conversation that for some of the smaller centres the project has revolutionised their delivery. With such a great set of kit and the relevant activities that go with it, it has allowed them to not only focus on physics, but roll out activities very easily.'

'Many have told me that thanks to the training that went along with the kit, and the support that the specialists in the team could offer, they were able to massively increase their own understanding of the physics involved and were much more confident in delivering physics topics to the public.'

4. WHAT HAVE YOU GAINED?

All the respondents were very positive about their experiences of working on the project, and in particular of working with the project team:

'Working closely with the ASDC team and Jodrell Bank was a massive highlight, as it was so good to work with such a switched on, enthusiastic team of people who all shared the same vision.'

'Michaela was a dream to work with.'

In addition, respondents cited the following:

New personal knowledge

'I got to enthuse about particle accelerators.'

'Learning cool space stuff.'

'I feel that I have grown as a communicator.'

New workplace insights

'Greater insights into how different personalities work in different situation.'

'How we balance the need of funders and visitors.'

'How quickly you can deliver a project if you get the right people in the room.'

New professional relationships

New 'excellent' contacts, and knowing more about science centre working:

'But the greatest gain was no doubt in simply spending so much time with people from other science centres, sharing ideas and fostering a spirit of collaboration and understanding.'

5. IF BROADENED?

When asked how they might extend the Explore Your Universe programme, respondents suggested the following:

Audience

- Post-16 market
'Natural extension would be to look at KS5 – strong curriculum links there.'
- Primary
'But what is a good level to discuss complicated science to primary students?'
- More girls, more disadvantaged students

NB – respondents also noted that extension to a broader schools audience is dependent on school systems (eg age/time of exams, curriculum links etc)

Content areas and greater depth

'More on particle physics eg coming up with things that aren't just computer simulations.'

'Explore Your Universe was quite general – there is scope for more detailed analysis, particularly with particle physics.'

Focus on careers/role models

Some respondents cited the use of role models and greater information on careers. Another noted that whilst career information (and to a certain extent positive role modelling) were an aspiration of the Meet the Expert events, this was not an explicit aim.

Geographical spread

Better geographical spread including Wales and N Ireland

6. VALUE OF A NETWORKED PROGRAMME

The following benefits of a network were noted:

Capacity and confidence building

'With 15 partners, next time one wants to apply to a grant they will know each other.'

'Partners feel the support is there which is psychologically important.'

Sharing good practice

Working together to avoid the reinvention of the wheel:

'..it allows centres with specialist staff to shine, and to bring that specialist knowledge and understanding to other centres to increase knowledge and skills base, and improve the overall quality of programmes.'

'if we have just given them the kit and told them to get on with it there would have been issues'

7. VALUE OF NATIONAL PROGRAMME

All respondents answered positively about the value of a national programme:

Broader geographical spread enables greater access:

'We want youngsters who are inspired by science - not to feel that they live in part of the country that don't get much science.'

Quality and quantity

'Many heads are better than one.'

'Sheer numbers and greater consistency to all corners of the country.'

'Science centres can share larger-scale evaluations.'

National funder, national organisation

It was also noted that if the programme is nationally funded for a national audience, then it becomes possible to access the nation's best people to develop the content.

'A national project suits aims and objectives of a national organization'

'STFC is national science – to promote STFC have to look nationally'

8. VALUE OF ASDC

The key role played by ASDC as the hub for contacts, and in coordinating the project was noted by all respondents. The following themes were particularly evident in responses:

Independent coordination

'They have the contacts and the existing relationships that no one else has – one step they don't need to repeat'

'You need someone independent and central to push things along.'

'ASDC is doing it for the greater good rather than for institutional gratification.'

'Well placed to herd cats – tough for an individual to do this '

Capacity

Background knowledge and skills / partnerships

Position of ASDC has meant that it can access expertise from national level

Contacts

'Everyone I spoke with at the training academy would like to share ideas and their practice and ASDC is the hub for that'

9. GENERAL COMMENTS

A number of general comments were received and may be categorized into the themes as follows:

Demands of supporting public engagement

It can be hard to support Meet the Expert events in terms of finding available experts:

'Unless SFTC make public engagement a criteria for promotion there is only so much that we can do'

Views on team and funder

All respondents were extremely positive about the key project team, about their funder and about the programme:

'STFC have kept tabs on us, but also let us get on with it'

'STFC have a good understanding of how much things cost to get a high quality result. '

'Congratulations across the board – this has been a great team to work with'

'I am incredibly proud of the work that we have done, and that it has been a hugely enjoyable experience to be involved in this project. I genuinely feel that it has achieved great things and hope that I get to be involved in similar projects in the future.'

Resources

'Handbook was a masterstroke'

Unseen outputs

Respondents were keen to emphasise the impact of the Explore Your Universe programme more broadly:

'This isn't particularly innovative in terms of content, but is in terms of delivery.'

'Benefits are far more wide reaching than the actual project. It was 1 year of development and 1 year of delivery, but now centres have embedded high end UK science into their programmes.'

INSTRUMENTS

1. Student Workshop (10 – 13) Student questionnaire



*We would like to find out what you thought of today's Workshop.
Please complete this form and return it to a member of staff. THANK YOU*

1. What year are you in?

2. Are you male or female?

3a. *Would you recommend this Workshop to other people your age?*

Yes No Not sure

3b. *Why?*

4. What did you like most about the Workshop?

5. What were the two things (bits of knowledge, or experiences) that you think you'll most remember from this Workshop?

(i)

(ii)

6. Have you used this type of equipment before at your school (please tick one box)?

Often Occasionally Rarely Never

7. How do you like to learn science? Please rank the following sources of learning from most preferred (1) to least (4). (Please circle your response)

- (i) Watching TV 1 2 3 4
- (ii) Lessons at school 1 2 3 4
- (iii) Doing hands-on activities like the one today 1 2 3 4
- (iv) Books, magazines 1 2 3 4
- (v) Using the internet 1 2 3 4
- (vi) Other (please explain below) 1 2 3 4

.....

(NOTE – this question was not analysed for this evaluation)

8. In what ways, if any, is this Workshop different from the science practicals you do in school?

9. Do you think your experience today will help you with school science classes?

Yes Not sure

9b. Why?

10. Did the Workshop today make you feel... (tick only one option)

- More interested in studying science
- The same, I already wanted to study science
- The same, I don't want to study science
- Less interested in studying science

11. Did the Workshop today make you feel that... (tick only one option)

- I'm more likely to consider a career in science
- I'm less likely to consider a career in science
- I already knew that I wanted to work in science
- I already knew that I didn't want to work in science

12. Had you heard of STFC before this Workshop?

s

b

What do you think of the research they do?

13. Do you have any other comments or suggestions that you'd like to share with us?

2. Schools Workshop (10 – 13) Teacher questionnaire



We would like to find out what you thought of today's Workshop. Please complete this form and return it to a member of the centre staff. Thank you for your assistance.

1. How many and which year group(s) of students have you brought today?

Number of students	Year Group (s)

2. How would you rate the following aspects of today's Workshop?

	Very Good	Good	Poor	Very Poor
The content of the Workshop				
The equipment provided				
The expertise of staff running the Workshop				
The venue of the Workshop				
Overall, how would you rate the Workshop				

3. What did you particularly like about today's Workshop?

4. Which aspect(s) of this Workshop are you not able to deliver in school, and why?

5. Which aspects do you think interested your students the most?

6. What, if any, effect do you think such activities will have had on your student's long-term motivation for science?

7. Will you talk about the Workshop with the students when back in school?

Yes Not sure

7b. How?

8. How do you discuss the nature of science careers / the work of scientists in your lessons?

9. Would you recommend this Workshop to other teachers like yourself?

Yes

9b. Please give reasons for your above answer

10. Do you feel that this Workshop was good value for money?

- Yes
- No
- No, there are better ways that students can learn this content and gain this experience

11. Had you heard of STFC before now?

- Yes
- No

What do you think of the research they do?

12. How did you hear about the Workshop (*Tick all that apply*)

- Pamphlet/letter sent to your school
- Personally contacted by someone from this centre
- Word-of-mouth recommendation from colleague
- Through STEMNET
- Science Centre website
- Other {please specify}

13. Do you have any other comments or suggestions that you'd like to share with us?

3. Schools Masterclass (14 – 16). Student questionnaire



*We would like to find out what you thought of today's Masterclass.
Please complete this form and return it to a member of staff. THANK YOU*

1. What year are you in?

2. Are you male or female?

3a. *Would you recommend this masterclass to other people your age?*

Yes No Not sure

3b. *Why?*

4. What did you like most about the masterclass?

5. What were the two things (bits of knowledge, or experiences) that you think you'll most remember from this masterclass?

(i)

(ii)

6. Have you used this type of equipment before at your school (please tick one box)?

Often Occasionally Rarely Never

7. How do you like to learn science? Please rank the following sources of learning from most preferred (1) to least (4). (Please circle your response)

- (i) Watching TV 1 2 3 4
- (ii) Lessons at school 1 2 3 4
- (iii) Doing hands-on activities like the ones today 1 2 3 4
- (iv) Books, magazines 1 2 3 4
- (v) Using the internet 1 2 3 4
- (vi) Other (please explain below) 1 2 3 4

.....

8. In what ways, if any, is this masterclass different from the science practicals you do in school?

9. Do you think your experience today will help you with school science classes?

Yes Not sure

9b. Why?

10. Did the masterclass today make you feel... (tick only one option)

- More interested in studying science
- The same, I already wanted to study science
- The same, I don't want to study science
- Less interested in studying science

11. Did the masterclass today make you feel that... (tick only one option)

- I'm more likely to consider a career in science
- I'm less likely to consider a career in science
- I already knew that I wanted to work in science
- I already knew that I didn't want to work in science

12. Had you heard of STFC before this masterclass?

s

b

What do you think of the research they do?

13. Do you have any other comments or suggestions that you'd like to share with us?

4. Schools Masterclass (14 – 16), Teacher questionnaire



We would like to find out what you thought of today's Masterclass. Please complete this form and return it to a member of the centre staff. Thank you for your assistance.

1. How many and which year group(s) of students have you brought today?

Number of students	Year Group (s)

2. How would you rate the following aspects of today's Masterclass?

	Very Good	Good	Poor	Very Poor
The content of the workshop				
The equipment provided				
The expertise of staff running the workshop				
The venue of the workshop				
Overall, how would you rate the workshop				

3. What did you particularly like about today's Masterclass?

4. Which aspect(s) of this Masterclass are you not able to deliver in school, and why?

5. Which aspects do you think interested your students the most?

6. What, if any, effect do you think such activities will have had on your student's long-term motivation for science?

7. Will you talk about the Masterclass with the students when back in school?

Yes Not sure

7b. How?

8. How do you discuss the nature of science careers / the work of scientists in your lessons?

9. Would you recommend this Masterclass to other teachers like yourself?

Yes

9b. Please give reasons for your above answer

10. Do you feel that this Masterclass was good value for money?

Yes

No

No, there are better ways that students can learn this content and gain this experience

11. Had you heard of STFC before now?

Yes
 No

What do you think of the research they do?

12. How did you hear about the Masterclass (*Tick all that apply*)

- Pamphlet/letter sent to your school
- Personally contacted by someone from this centre
- Word-of-mouth recommendation from colleague
- Through STEMNET
- Science Centre website
- Other {please specify}

13. Do you have any other comments or suggestions that you'd like to share with us?

5. Family Show, Participants' questionnaire



“Please can you spare just 3 minutes to answer a couple of questions about what you thought of today’s Explore your Universe show?”

“We’ll direct the questions to the children and would be delighted if you would add, embellish and contribute too.”

1. Which part of the show are you most likely to tell your friends about?
2. Do you think that you will talk more about this at home? Which parts in particular?
3. Now that you have seen the show, is your understanding of what science is about better, worse, or the same as before? How / in what ways?
4. How much do you enjoy doing science at school?
(ask to elaborate / expand upon answer as necessary)
5. Finally, how often do you as a family visit science and discovery centres, or science museums?

Your answers will be used to help us evaluate the Explore your Universe Programme and to improve the activities we present in our science centre

6. Meet the Expert, Audience participants' questionnaire



“Please can you spare just 3 minutes to answer a couple of questions about what you thought of today’s Explore your Universe Meet the Expert?”

“We’ll direct the questions to the children and would be delighted if you would add, embellish and contribute too.”

1. Which part of the ‘Meet the Expert’ event are you most likely to tell your friends about?
2. Do you think that you will talk more about this at home? Which parts in particular?
3. Now that you have taken part in our ‘Meet the Expert’ is your understanding of how scientists work better, worse, or the same as it was before? How / in what ways?
4. How much do you enjoy doing science at school?
(ask to elaborate / expand upon answer as necessary)
5. Finally, how often do you as a family visit science and discovery centres, or science museums?

Your answers will be used to help us evaluate the Explore your Universe Programme and to improve the activities we present in our science centre

7. Participating Scientists' Survey

Dear Colleague

I'm sending you this email because you have been involved in the 'Explore Your Universe' National programme funded by STFC. Many of you will have taken part in one of our 'Scientist Training Academies' in Dundee, Bristol or Jodrell Bank and others will have engaged families or schools through contacts at your local science centre, museum or STFC facility.

Researchers at King's College London are evaluating the 'Explore Your Universe' national programme and would love to find out what you did, what motivated you to engage and how you felt about it.

We know you are busy people so we thank you hugely (in advance) for telling us about your involvement. It will form part of the final evaluation of the project and report to STFC, and will also shape our future training and engagement programmes. The evaluation questions are below.

- Please delete the **yes/no** answers as appropriate and type your other answers next to the questions
- Please send the completed email to Emily.dawson@kcl.ac.uk by **30 September 2013**

If you have any further questions or wish to comment in more detail, feel free to get in touch at Emily.dawson@kcl.ac.uk , 0207 848 3154 or via ASDC at Michaela.Livingstone@sciencecentres.org.uk , 0117 915 0184.

Many thanks

Dr Penny Fidler, CEO of ASDC and Programme Director

Explore Your Universe National Programme Scientist Evaluation

1. Your Name:
2. Your Job title (please describe your post, e.g. PhD, post-doc, professor, research associate, senior lecturer)
3. What is your area of research (e.g. Astrophysics, Medical physics)
4. How long have you been working in your field?

Before this project...

5. Have you previously had any training in delivering public engagement with science activities?
Yes/no
6. Have you previously been involved in public engagement with science activities? **Yes/no**

If yes:

- a. What made you get involved?
- b. What kinds of activities have you been involved with before?
- c. What benefits (if any) do you think you gained from doing these earlier activities?
- d. Do you think it helped you with your academic career? How?

If no:

- e. What has stopped you from being involved in public engagement before?

In this project...

7. Did you take part in any of the Explore Your Universe activities in a science centre? **Yes/no**

If yes:

- a. What, if anything, did you get from being involved with the science centre?
- b. How did you get involved with the science centre? (Did someone from the science centre approach you, did you approach them, was it through another colleague etc? Please explain)
- c. What support did you get from the science centre for doing public engagement?
- d. How many times were you involved with the science centre?
- e. What kind of activity(ies) were you involved with?
- f. How do you think working with the science centre will benefit your academic career?
- g. In what ways did the Explore Your Universe programme differ from public engagement that you have done before?
- h. Which science centre(s) did you work with?

If no:

- i. What stopped you getting involved with a science centre?
- j. What do you think would need to be different for you to work with a science centre?

8. What, if anything, do you think being involved in the Explore Your Universe programme has done for you?

9. Did you take part in the Explore Your Universe training academies? **Yes/no**

If yes:

- a. Why did you attend the training academy?
- b. What, if anything, did you get from taking part in the training academy?
- c. What effect, if any, do you think attending the training academy had on your confidence to do public engagement?

If no:

- d. Why did you not attend the training academy?
- e. Would you have wanted to attend the training academy? **Yes/no**

In the future...

- 10. Would you like to get involved in science centre activities again? **Yes/no**
 - a. Why?

- 11. What kinds of public engagement venues do you prefer to work with? (if more than one, please list & rank)

- 12. Is being involved in public engagement with science something you plan to continue doing?
Yes/no
 - a. **If yes:** Please briefly describe your plans for continuing with public engagement with science, including any training, future events or anything else.
 - b. **If no:** Please explain why you are not planning to continue?

If you have any further questions or comments , feel free to get in touch with Dr Emily Dawson at Kings, Emily.dawson@kcl.ac.uk or 0207 848 3154, or Dr Michaela Livingstone at ASDC, michaela.livingstone@sciencecentres.org.uk or 0117 915 0184.

**Many thanks,
The Explore Your Universe Team**

8. Science centre partners, key stakeholder staff survey

**Explore Your Universe National Strategic Programme
Evaluation for science centre staff**

Your Name:

Your Job title:

Did you participate in the training academy?

Yes [] No []

Please briefly describe your role in the Explore Your Universe programme:

1. What have you personally and professionally gained from your participation in Explore Your Universe?

2. What has your organisation gained by participating in Explore Your Universe? (Think about your staff, your organisation's profile regionally and nationally, your visitors and school groups, etc.)

3. To what extent has the Explore Your Universe programme developed your organisation's capacity and capabilities?

4. To what extent has your participation in the Explore Your Universe programme enhanced the confidence and competence of staff involved?

5) Has your organisation made any new connections with scientists, experts, industry or other organisations as a result of your involvement in Explore Your Universe?

Yes [] No []

Please explain your answer

5a) If yes, how might this new relationship benefit your organisation in the future?

6) What do you feel is the value of having participated in a national strategic programme for both you personally and your organisation?

7) What do you feel is the overall value of ASDC running these types of programmes nationally?

8) Have you had contact with colleagues in other centres during or as a result of the Explore Your Universe programme?

Yes [] No []

If yes, please describe giving specific detail

9) To what extent are you satisfied with the role of ASDC throughout the project (including for example, the training, project management, process, equipment)?

10) How has your centre embedded this programme and what will be its legacy after December 2013? Please provide details.

11) If this programme was extended, would you like to be involved?

Yes [] No []

If yes, what audiences and areas would you like to be broadened and developed?

12) Would you like to work on an ASDC-coordinated project again?

Yes [] No []

Please explain your answer

13) Have you been inspired to include the STFC content and stories from this programme in other workshops and activities developed by your organisation? (if yes, please give details)

14) Overall, what have been the highlights of the programme for your organisation?

Do you have any other comments that you would like to be passed on to the ASDC team?

9. Key project team survey (by telephone/email)

Explore Your Universe National Strategic Programme

Email evaluation for key project team

- Please describe your role in the Explore Your Universe programme:
(How did you get involved?)

- What hopes did you have for the project?

- What concerns, if any, did you have before the project began?

- In what ways do you imagine (did you hope) EYU will have affected participating science centres?
In terms of:
 - Programming?
 - Staff capacity (and confidence)?
 - Institutional profile?

- What, if anything, have you gained by being part of the project team?

- If this programme was extended, what audiences and areas would you like to be broadened and developed?

- If you could go back to the beginning days of the project, what would you do differently?

- What do you feel is the value of a national strategic programme such as EYU?

- What do you feel is the overall value of ASDC running these types of programmes?

- Do you have any other comments / thoughts that you'd like to make regarding the EYU programme and its operation?