National HE STEM Programme

Student Involvement in Science, Technology, Engineering and Mathematics (STEM) Activities:

A guide to good practice

"It has always been a great pleasure in running these schemes to see the great improvement in students' communication skills, their increase in self-confidence, and the huge creativity that they bring to bear in the different ways they engage with the public"

Professor Chris Budd

University of Bath
University of Bristol
UCL
Science Learning Centres

The National HE STEM Programme

The National HE STEM Programme (www.hestem.ac.uk) was an initiative that ran between 2009 and 2012 and that supported Higher Education Institutions (HEI) in the exploration of new approaches to recruiting students and delivering programmes of study within the Science, Technology, Engineering and Mathematics (STEM) disciplines. Funded by the Higher Education Funding Councils for England and Wales, the programme established over 500 projects nationally aimed at up-skilling HEI processes and activities with regards widening participation, curriculum development and workforce development. The 'Developing and Enhancing Student STEM Communicator Models' project, an output of which is this guide, was one of 40 projects funded across the South West (SW) region of the National HE STEM Programme. All outputs from the project and from other SW-funded projects are available for free at:

www.hestem-sw.org.uk

This activity was undertaken as a part of the National HE STEM Programme, via the South West Spoke. For more information on South West Spoke projects, please see www.hestem-sw.org.uk. For more information on the overall national programme, please see www.hestem.ac.uk.

Author Biographies

Professor Chris Budd

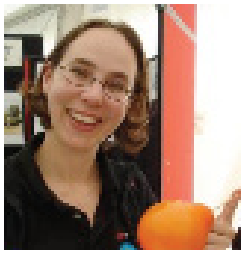
Chris Budd is Professor of Applied Maths at the University of Bath and Professor of Maths at the Royal Institution. He is a passionate populariser of maths and gives talks, workshops and master-classes on maths all over the world and he is the director of the 'Bath Taps into Science Festival'. He was awarded a National Teaching Fellowship in 2001 and used this award to set up a Communicating Maths Programme for final year Bath Maths students. This has run successfully ever since, with 20 students per year learning communication skills and applying them in different activities. Currently the Education Secretary for the London Mathematical Society, Chris will soon become the vice-president for Communications and Outreach for the Institute of Maths and its Applications. In 2011 he was awarded an honorary fellowship of the British Science Association for his work in outreach and engaging students.

Dr Karen Bultitude

Dr Karen Bultitude is a Lecturer in Science Communication at University College London, combining practitioner and academic perspectives in STEM communication. Karen is one of nine national Public Engagement mentors for the EPSRC and is passionate about embedding communication skills and training within STEM education and practice. Whilst working at the University of the West of England in Bristol, in 2006 Karen set up the Student Science Communicators programme that has continued ever since. In 2008 she was awarded the Joshua Phillips Memorial Prize for Innovation in Science Engagement and in 2010 was part of the Walking with Robots team, which was awarded the Rooke Medal for the Public Promotion of Engineering by the Royal Academy of Engineering.

Dr Helen Heath

Dr Helen Heath is the Director of Studies for the University of Bristol's School of Physics and her research work is in the area of High Energy Particle Physics. She has been involved with the promotion of Particle Physics to a wide range of audiences for many years. She was awarded a University of Bristol Science Faculty Teaching Prize for her development of a "Physics Education" unit as part of the University's Ambassadors scheme.



Dr Alison Rivett

Dr Alison Rivett has a dual role of Research & External Liaison Officer (Science Learning Centre South West) & Primary Science Outreach (Bristol ChemLabS), and previously spent five years as the Institute of Physics' Regional Officer in South West England. Alison has a wide variety of experience in developing, planning and delivering science outreach activities for primary audiences. She currently works part-time with Bristol ChemLabS to enhance primary provision, running hands-on workshops and giving exciting demonstration assemblies in primary schools across the South West and beyond. In her role at the SLCSW she is undertaking research into the impact of CPD courses and manages the Stimulating Physics Network project in the SW region.

Ed Stevens

Ed Stevens is the Widening Participation and Curriculum Enhancement Officer for the South West region of the National HE STEM Programme (www.hestem-sw.org.uk), overseeing some £500,000 worth of related activity across the region and enabling knowledge and information sharing between institutions. Ed has past experience in a range of community engagement roles across the local government, voluntary and higher education sectors. In particular, he has extensive experience of managing student volunteers and is interested in the personal and professional development of students through co-curricular activities.

Contents

1. Introduction

It is increasingly recognised that giving students opportunities to act as 'ambassadors' for their subject outside of university can be of great benefit to the individual, their institution and to the broader public. It is truly a win-win situation, with the students learning new skills and the audience (especially young people) meeting enthusiastic role models. There are also long term benefits for the institution in terms of recruitment, widening participation and enhancing both student experience and retention.

One of the great aspects of such schemes is that they can take many different forms. For example, some schemes award degree credit to the students, some give financial rewards and others are purely voluntary. Some models focus on working with schools whereas others engage a broader public audience. This diversity and flexibility allows the 'student ambassador' model to be successful in a wide variety of situations.

Participation in such a scheme can be a life-changing experience. As well as the chance to develop key transferable skills, it often encourages students to reflect on their academic learning and increases their motivation for their degree course. The opportunity to explain their subject to a diverse audience can be especially transformative to students on STEM courses, who may be less experienced in communication skills than peers studying other disciplines.

This Guide has been produced as part of a South West National HE STEM Programme project - *'Developing and Enhancing Student STEM Communicator Models'.* We compared a number of STEM communicator schemes which use student ambassadors from across a range of universities in the SW, evaluating the students' experience and assessing the benefits of each model.

In this Guide we describe STEM Student Communicator schemes run by the University of Bath, University of Bristol, University of the West of England (UWE) and the Institute of Physics (IOP). Illustrated by case studies and complemented by an in-depth evaluation, we hope they will provide examples of good practice and illustrate the practicalities of organising successful projects.

The Guide also includes tips for starting up, running and sustaining your own scheme, drawing from the experience of participants at a 'Student Involvement in STEM Activities' workshop funded through the South West National HE STEM Programme.

Links to many other similar schemes run by UK institutions and national projects such as the Undergraduate Ambassadors Scheme (UAS) and Student Associates Scheme (SAS) can be found in the final section, along with a collection of other useful resources.

Chris Budd (University of Bath), Karen Bultitude (University College London), Helen Heath (University of Bristol), Alison Rivett (Science Learning Centre South West), Ed Stevens (South West National HE STEM Programme)

2. Accredited model

Awarding degree credit is an effective and sustainable method for encouraging students to become involved in communicating STEM. There seems to be no shortage of students who are keen to become involved in this way. However, it can be challenging to construct a course which is perceived to have the same intellectual content as more traditional STEM courses. Great care has to be taken in designing and monitoring an accredited scheme to ensure that it meets strict university quality standards. It is, however, pleasing to observe that the acceptance of such units by the academic community is now much greater than it was until even recently, and the chances of being successful in setting up an accredited STEM communication course are now very high.

To reflect the experience of the team producing this Guide we describe two different optional modules which carry degree credit. The first is a semester-long unit for final year maths undergraduates at the University of Bath. The other is a 6-week unit for first year physics undergraduates at the University of Bristol.

A. University of Bath: Communicating Maths

Nature of the scheme

The 'Communicating Maths' unit MA30241 has run at the University of Bath since 2001 following the award of a National Teaching Fellowship grant to Professor Chris Budd. It started as a small-scale project-based course, but is now fully embedded within the Department of Mathematical Sciences. The unit is formally accredited as part of the University of Bath degree programme and appears as such in the handbook of courses (*Appendix One* shows the official unit description). It is still directed by Prof. Budd, but engages many other members of staff both in mathematics and beyond.

It is open to all mathematics undergraduates in their final (3rd or 4th) year (provided that they have a clean CRB certificate), and is typically taken by about 20 students. It carries the same amount of credit as any other final year unit. Students do ten units in their final year, so their mark contributes 10% to their final year degree mark total.

Syllabus

The students are required to complete four different tasks (some individually and others as part of a team):

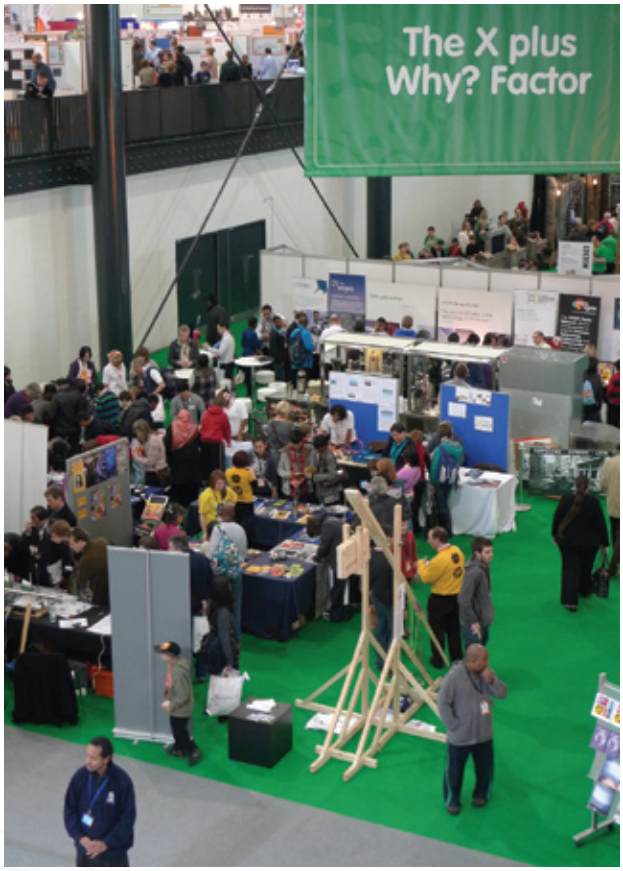
1. All students work in a team of four or five to put on an exhibition for 'Bath Taps Into Science', a hands-on science fair which takes place in Bath during National Science & Engineering Week every March.

2. All students work in teams to deliver a Royal Institution Mathematics Masterclass to gifted and talented students in years 8 and 9. These typically take place in several locations such as Bath, Reading, High Wycombe, Exeter etc. The students are required to observe a Masterclass before delivering one.

3. The students choose a third hands-on activity from a range of options. These change from year to year but always include: observing and delivering a lesson in a primary or secondary school; taking part in the Big Bang Fair; presenting maths in a theatre show; working with a mathematics journalist; or working with special target groups such as the University of the Third Age, or people with disabilities. Options arise through local contacts, such as STEMNET (www.stemnet.org.uk) and are presented to the students for consideration before the course starts.

4. All students work individually to produce a permanent piece of work for a carefully chosen target audience. This could be a website, a poster, a newspaper article or a film on YouTube. Over the years this has built up into a very useful resource collection within the department.

The students are required to attend a series of two-hour long training sessions on: Child Protection and Health & Safety; producing a science fair exhibition; producing a Masterclass; and evaluating activities. The training sessions are either delivered in-house or by expert external advisers (including local teachers). Students also attend a series of practice sessions for their various activities including a full dress rehearsal (with young people in attendance) for the Bath Taps Into Science Fair.





Student Selection

Approximately twice as many students apply to do the course as are accepted onto it. Interested students have to write a paragraph explaining why they want to do the unit, which is then assessed by Prof. Budd and the Bath Director of Studies for Mathematics. To select the students we are looking for a strong desire to communicate mathematics to the public (such as experience in similar activities and/or a burning desire to become a teacher) which they can articulate clearly. The accepted students attend a compulsory CRB briefing in early January, before starting the course proper at the beginning of the second semester in early February.

Student Assessment

The students are all assessed on a portfolio of work approximately 40 pages long describing their three hands-on activities, together with the permanent piece. The mark scheme is made available to the students in advance (a copy is provided here in *Appendix Two*) and the portfolio is double-blind marked by Prof. Budd and an independent marker from the Department of Mathematical Sciences.

Special attention is given to the manner in which the students critically evaluate their activities and the use they make of the evaluation techniques they have learned. In the final mark 80% comes from the portfolio, and the other 20% is after observation of the students' activities. This might, for example, be given by a teacher observing a lesson delivered by the students.

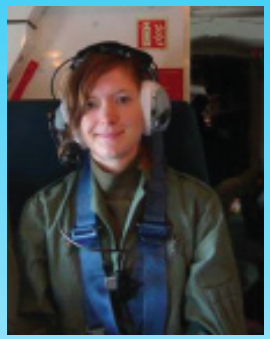
Course accreditation and Quality Assurance

The course has been accredited through the Faculty of Science Teaching Committee and is subject to the usual monitoring procedures of all such courses. All students on the course have to complete an online University evaluation form and the feedback results are discussed with the lecturer in the Departmental Teaching Committee and the Staff Student Liaison Committee.

Embedding within the HEI teaching programme

The course has run for long enough to not only have become a permanent part of the University of Bath teaching programme, but to have spawned similar courses for undergraduates and postgraduates in other departments. For example, a Communicating Physics course is now being set up in the Department of Physics. In 2010 the Communicating Maths cohort was recruited en masse for the University of Bath's contribution to the Royal Society Summer Exhibition. It is now hard for the University to contemplate running activities such as Bath Taps Into Science and the schools liaison programme without the help of such students.

Case Study: Caroline



Caroline took the Communicating Maths course and was also a Student Ambassador at Bath University. During the course she worked with Dr Maths to write a newspaper article on the maths of the lottery (which was subsequently published), delivered a Mathematics Masterclass on "prime numbers and their properties", ran a Bath Taps into Science exhibit on "reflections" and produced a permanent piece of work on the maths behind coincidence entitled "Should I be shocked?". Following the award of her degree she joined the Ministry of Defence as a graduate recruit, and she continues to work there in Operational Research. With the support of the MOD she has continued to work in communicating STEM to the public, and regularly gives talks on mathematics to schools and other bodies. She greatly enjoys being involved in such activities and has experienced a wide range of other benefits:

"It's good fun. I did consider a career in teaching but I wanted to try my hand at doing something else and this opportunity to join the MOD was really good so I wanted to stick with that. So I saw STEM as a chance to continue my work in schools, which I really enjoy. And, you know, you get to meet like-minded people, have a bit of fun and a break from the office is one thing, you can get out and about and remind yourself why you did your degree in Maths in the first place and what you liked about it."

Caroline also values the training that the Communicating Maths course gave to her, and says that the skills that she learned from the course were very useful in her job interviews:

"When you're a student and you're doing your degree, you've got to be constantly thinking in the back of your mind about your CV. And just in everything it shows you're willing to get stuck in. Obviously, it's a confidence builder, you improve your presentation skills, the way you put yourself forward, your ability to work in a team; it shows a lot of competencies that employers are looking for."

B. University of Bristol

Nature / syllabus of the scheme

Communicating Science is a newly-developed 20 credit point Open Unit run by the School of Physics at University of Bristol for first year undergraduates. It has an emphasis on designing and delivering outreach activities as well as reflection on the outcomes of the activities. Students take six afternoons of workshops which include Health & Safety and Child Protection training and some of which are delivered by external speakers, such as school teachers and the University's Centre for Public Engagement.

During the course, students have to deliver a "tried and tested" activity which has been used successfully in the past. This allows them to concentrate on their presentation skills. They then devise and deliver a new activity (as a group or an individual) before producing a more permanent piece of work.

Student selection

For this unit students are self-selecting, since there is a wide-range of Open Units available and the numbers applying have not yet exceeded the spaces available given that the course is in its infancy.

Student assessment

Assessment is based on the quality of the activities designed and delivered by the students and also, on reflective accounts of activities. Students are required to complete each element and must submit a risk assessment for their new activity.

Course accreditation and Quality Assurance

As a first year Open Unit, this module offers students the opportunity to broaden their skills. Our previous experience of dealing with accreditation of programmes that include an outreach element was very positive. We introduced a 30-credit point Physics Education unit as an alternative to a final year project for B.Sc. students. The Institute of Physics, our accrediting body, was happy to endorse this option as being suitable to fulfil their requirements.

Embedding within the HEI teaching programme

Creation of an Open Unit rather than a mandatory part of a programme gives some freedom in the design and implementation of the unit. Students are opting to take the unit and therefore are enthusiastic. Another positive was that at Faculty level a name change from "Communicating Physics" to "Communicating Science" was requested to encourage a wider take up beyond physics. It is hoped that the students graduating from this course will provide a group of keen communicators. Indeed, some have already run talks for the University Widening Participation Office.

"The unit has been entertaining, interactive and educational. I have learnt new skills and now have a better appreciation of the safety element to planning an activity. My public communication skills have been developed with many audiences from all walks of life, age, creed and scientific ability. Furthermore, my communication skills have been enhanced between different members of academic and administrative staff within the university itself, which has therefore helped with networking. I have thoroughly enjoyed the unit and learnt skills and demonstrations that are fun and educational that help me in promoting science to society all the time!"
Alex, 1st year Physics Student

"Communicating Science was a very welcome opportunity to become involved in outreach through the University. It was refreshing in that it was a unit with no lectures, but instead tutorials, which were more intimate and allowed for discussion. Connecting with younger students and the public, I feel, was an enriching experience that allowed us to venture out of the 'student bubble'."
Hilary, 1st year Physics Student

3. Paid Model

Despite the increasingly tight funding climate, many institutions find that employing students (usually on a casual hourly basis) is an effective way of ensuring commitment to a STEM communicators' role. At the University of the West of England (UWE, Bristol) the precedent had been set through the prior existence of 'Student Ambassadors' – current students who were paid to assist with marketing and outreach activities, such as acting as tour guides on open days, or assisting in welcoming visitors. The UWE Student Science Communicators (SSCs) grew out of this system, but underwent slightly more rigorous recruitment and training procedures in order to ensure that they were ready for the role.

Of course the important question that most people are interested in is 'how can we afford this expense'?! At most institutions this work is funded via institutional marketing budgets, with the payments equating to a little more than minimum wage. Compared to other marketing expenses this cost is relatively minor, but it means that it is possible to ensure that a contract of expectation is set up between the institution and the students, clarifying what their involvement will entail, and ensuring clear penalties for not being up to standard. This does not mean that the students are not altruistically motivated to get involved – all of the paid students involved in our research indicated that being paid assisted them to take up the opportunity, but that it was not the main motivating factor (see *Section 5* for further details relating to student experiences).

Selection and recruitment

At UWE, Bristol the SSCs were recruited via a rigorous application and interview process. The timing of the recruitment depended on when the activities were scheduled to take place; over the years we found that it was best to finalise recruitment approximately 2-4 weeks prior to the first event. It was also important to ensure that there were plenty of events in the first few weeks (at least one event per week) in order to maintain momentum and enthusiasm, and give the students the best opportunity to develop their confidence and skills as quickly as possible.

Applicants completed forms detailing why they were interested in the role, as well as any relevant previous experience they had (an example application form is included in *Appendix Three*). Short-listed candidates were then invited to short interviews, from which the final team were selected. This process provides numerous advantages to both the students and the activity organisers. For the students it mimics real-life application and interview processes, giving them feedback and practice for entering the job market after graduation. It also gives them the opportunity to ask questions and reassures them that they fully understand the role and want to participate. From the organiser's perspective the processes ensure that the final team are dedicated to the role – the 'prestige' of being selected should not be under-estimated! It also provides the opportunity to build a team consisting of complementary backgrounds and skills – we worked hard to ensure that students came from a range of degree programmes, year levels, and more general life experiences.

Between 6 and 10 students were usually recruited each year; this provided a good number to cover multiple events and allow for other commitments, whilst still enabling all the students to be regularly involved. A further advantage of recruiting a small team was that they got to know each other relatively well, and became much more confident working together. This situation provided encouragement for the students to expand away from the initial set of demonstrations provided, to cover elements that they were specifically interested in, or related to their degree programme. It also provided an element of quality control in that relatively regular involvement meant the students quickly became very skilled in performing the activities.

Training and Support

In comparison to more standard 'student ambassador' roles, paid STEM Communicators are likely to require much more training and support, especially early in their involvement. This does not need to be exhaustive however: at UWE, Bristol we ran a single half-day session approximately a week before the first delivery events. The training schedule is included in *Appendix Four* and covered elements such as:

- Introduction to the role and each other
- Logistics – CRB checks, health & safety, risk assessment sign-off, payment arrangements etc.
- Arranging the space – setting up at a venue
- Demonstrations – introduction to and practice of the suggested demonstrations
- Working with audiences – attracting attention, using volunteers, working as a team, what to do when something goes wrong
- Discussion of outstanding concerns

The training deliberately brought in opportunities to address specific student concerns throughout the session. In addition, Karen Bultitude acted as a dedicated contact person whom they could speak to if there were any problems at any time. As an academic with a great deal of experience in delivering such activities, Karen was able to advise on any questions that arose; she also attended the first couple of events in an oversight capacity, assisting the students where appropriate but fundamentally encouraging them to take ownership of the events. Once the students had sufficient skills and confidence they were able to run the events themselves, meaning many more events could be delivered than would have been possible otherwise.

Resources

Additionally, there were a variety of resources that were distributed to the SSCs. These included:

- SSC manual – a summary document containing full contact details, overview of the role, top tips for success, and instructions (including explanations) for 20 tried and tested demonstrations.
- A rigorous risk assessment (each SSC was required to certify that they had read and understood this risk assessment prior to conducting their first activity; an example risk assessment is available in *Appendix Five*).
- Contact details for all the other SSCs.
- An overview of the upcoming opportunities, so that they could sign up to participate.
- Links to other suggested demonstration sources.

Equipment and consumables

A central 'demo kit' was stored at the University; this was set up at the start of the year to contain all the ingredients required for the 20 initially suggested demonstrations. Part of the SSC's role was to source the necessary consumables in advance of each event; since they were the ones impacted if equipment wasn't available, this usually proved manageable. The only slight problem that was encountered was that occasionally perishable ingredients were left in the kit box after an event, and only discovered some time later! However this proved a good learning experience – the smell of rotten vegetables and eggs served as a good reminder not to let it happen again!

All reasonable consumables and travel and subsistence expenses were reimbursed upon submission of receipts, and the students who purchased the ingredients prior to each event were paid slightly extra in recognition of the time involved.

Case study: Matt

Matt studied Conservation Biology at UWE and throughout his degree was keen to get involved in wider activities in the local community. Part of this motivation came from Matt's own experiences as a mature student:

'When I started at UWE I was new to studying and quickly recognised a big gap between academia and the wider community. I think it's important to bridge that gap and to make sure that the whole university experience isn't viewed as just lots of students in labs and lectures; that going to university can and should be fun for everyone.'

Matt's involvement in STEM communication activities enabled him to work with local organisations and provided evidence of key practical skills; both major benefits when he applied for a role in education event management with the Bristol Natural History Consortium:

'I definitely think that being involved in the SSC program has assisted me towards my current role, allowing me to establishing many links within the sector and gain experience. It's a fantastic opportunity to learn, get inspired and just to meet great people – overall a really valuable hands-on experience.'

Matt had also helped as a volunteer with the local Wildlife Trust doing activities with schools. He found the experience of being a member of a small dedicated team, rather than a wider network of volunteers, particularly stimulating:

'I definitely felt involved in the activities as an SSC, for example with similar activities I've been involved in through volunteering, it was more a case of turning up and everything would be sorted out by someone else. As an SSC I'd often be liaising with other SSC's and event organisers, collecting materials and feeding back how the event went to academic staff. '

As with many other paid ambassadors, the financial incentive was important in reducing other barriers to his involvement. However it was not the main reason he got involved in being an SSC:

'Being paid definitely helped but – speaking for myself and other students – It was not the main motivation for getting involved. A lot of us were genuinely very interested and keen to help; the role complemented our studies and added another element to the university experience. It was really good to meet other students who had similar interests in education, getting out of there and passing on what we had learnt from our studies and importantly making science and other STEM disciplines both fun and interesting to learn.'

4. Voluntary Model

Involving volunteers in science communication activities can be a rewarding experience for all concerned. When carefully planned and resourced, it brings many benefits to both the organisation and the volunteer.

The Institute of Physics (IOP) South West regularly organises 'physics busking'-style outreach events which utilise student volunteers from university physics departments in the region.

A typical example from National Science & Engineering Week 2011 saw undergraduate & postgraduate physicists from three Universities participate in three different events over a total of seven days, engaging with around 1000 children and adults in total:

- University of Bristol students 'busked' simple and fun physics demonstrations as part of a public event in an inner-city area of Bristol
- University of Bath students demonstrated creative, craft-based physics activities at the Bath Taps Into Science Fair
- At North Wyke Research Station's Primary Science Week in Devon, physicists from the University of Exeter delivered a 'Sounds like Physics' workshop for local school pupils.

All of these activities were coordinated by the Institute of Physics' South West Regional Officer, who liaised with the event organisers, planned the activities and provided kit and training.

Recruitment, training & support

Students were recruited via emails sent by contacts within the physics departments (a departmental administrator, teaching fellow or the Head of Department) to ensure that the whole cohort was reached, rather than just students who were members of the Institute. This exercise also helped build relationships between the Institute and key staff within departments who could support and promote outreach.

All students were invited to take part, whether they had had prior experience or not and they could choose to volunteer for a whole or half day. Short (approximately one hour long) training sessions were held a week or so beforehand so the volunteers could practice the activities and also be briefed on health & safety aspects and the 'dos and don'ts' of public engagement.

An IOP staff member attended each event to support the volunteers and provide guidance and supervision (as well as cups of tea). Afterwards (both verbally at the end of each day and in a 'thank-you' email) volunteers were asked to feedback on their own personal experience and make suggestions for improving the activities in future.

Blogs about each event were written by the IOP Regional Officer and provided a good opportunity to acknowledge the volunteers' contributions and share pictures and feedback with them and their departments.

Benefits of the voluntary model

Volunteering at an event organised by someone else provides an extremely valuable opportunity for students to 'dip a toe' in outreach, without a big commitment on their part.

STEM students in particular often feel that engaging people with science is important, but are not necessarily aware that they have the skills to do it themselves. They may sometimes be less confident or outgoing than average, but generally find that their natural enthusiasm for their subject shines through and enables them to readily connect with audiences. New volunteers are often surprised at how much they enjoy the experience of communicating science, having been apprehensive beforehand (as discussed in *Section 5*).

In addition STEM students often have very full timetables of laboratories and lectures and so may lack the time to commit to longer-term programmes or projects which require significant extra effort on their part. By offering flexible opportunities which are open to all and need minimum prior training, the number and diversity of student volunteers is much increased.

Even a single event can help identify students who do have the time and interest to get involved with more STEM Communication activities in the future. Departments and event organisers also benefit through building relationships and sharing ideas and resources, as well as from the (hopefully) positive publicity an event generates.

Considerations when working with volunteers

Involving volunteers in STEM Communication activities should not be seen as a no-cost solution. Even for one-off events, training, supervision and coordination is required to ensure the best possible experience for volunteers and the overall quality of the event. Any out-of-pocket costs incurred by volunteers should always be reimbursed, e.g. for travel, subsistence etc. However, payment of any kind shouldn't be offered, to avoid any repercussions in terms of minimum wage requirements and employment law.

Flexibility is often the key to recruiting volunteers, both in the timing of the event and in any preparatory meetings etc. Offering volunteers a choice (within reason) of when they participate can help ensure maximum participation. In addition, it is always wise to recruit more than the bare minimum of people necessary, in case of unexpected no-shows or last minute drop-outs.

When recruiting volunteers the level of supervision needed, particularly in regard to child protection issues, should be carefully considered. Especially for one-off events it is often not reasonable or feasible to ask all volunteers to have CRB checks or to join a scheme such as STEMNET Ambassadors beforehand. However, as long as a thorough risk assessment has been carried out, and child protection policies agreed with the event organiser and appropriate practices in place, this should not be an issue or preclude people from taking part.

It is absolutely vital to ensure volunteers are thanked at the time and afterwards and that they feel their contributions have been valued. It is also important to make sure others in the department are aware of the event, any opportunities for publicity taken advantage of, and that any contributing organisations are appropriately recognised.

Many universities now run schemes which recognise extra-curricular activities like volunteering, such as 'Bristol Plus' or the 'Bath Award' and volunteers can be encouraged to use their experience towards something like this, in addition to putting it on their CV etc. After events many students are keen to get more involved with STEM communication activities, so it is a good opportunity to highlight upcoming events or other schemes with which they could get involved.

Case Study : Caity

Caity was a postgraduate research student at the University of Bath, undertaking a PhD in Physics. Originally volunteering on the Institute of Physics stand at Bath Taps Into Science during her first year to boost her 'generic skills training' record, she has subsequently been involved every year since. She has found that as well as having a great time, there are other significant benefits:

'I participated in a number of physics outreach events while studying for my PhD, and really enjoyed everything I took part in. Helping out at the annual Bath Taps event also had many benefits for me; it was a chance to put my communication skills to the test with children of all ages, their parents, and the general public. Working with fellow volunteers at a large event like Bath Taps meant that I built essential teamwork skills, and learnt how to cope with busy times on our stall, so that the day was enjoyed by everyone.

I also learnt how to engage in discussions at the appropriate level, and how to deal with some of the more 'challenging' questions a volunteer gets asked. "Which planet is better: Mars or Jupiter?" being one of my favourite from a budding young scientist (we decided, after some serious scientific discussion, that Jupiter was possibly more exciting because it is bigger and made of gas).'

Working as a PhD student, with a focus on completing independent research in a short time frame can sometimes mean limited opportunities to develop such 'transferable' skills. Nonetheless, young researchers are often expected to take on additional duties such as demonstrating and tutoring. As well as gaining experience which will be valued by any potential future employer, Caity feels the skills she developed were immediately useful:

'I was able to use the skills I had gained from outreach events as I took on more responsibilities for teaching our undergraduates, and I believe I became more confident in this role due to my outreach experiences.'

In addition to building confidence, Caity also found that the events boosted her motivation towards her research. Getting out of the lab, even for just a short period, can help students remember why they chose their subject in the first place:

'Taking a small amount of time away from research to participate in outreach events helped keep the PhD challenge in perspective, and renew my enjoyment of physics when the going was getting tough!'

What started off as a 'one-off' volunteering experience has developed into a real enthusiasm and belief in engaging the public about physics and is something Caity certainly plans to continue doing as a post-doctoral researcher:

'The enjoyment and skills I got from participating in outreach events was one of the reasons I have chosen to remain in academia, and I look forward to getting involved more as I continue my career.'

5. Evaluation Findings

An extensive evaluation was conducted to compare the students' experiences of the three different models of STEM Communications outlined in *Sections 2 – 4*. This evaluation consisted of the following approaches:

(i) Electronic questionnaires were distributed to students both before and after being involved in the STEM communication activities. (n_1=40 and n_2=31 respectively)

(ii) Short audio-recorded interviews with the STEM communicators took place during key events (such as Bath Taps into Science) to ascertain students' direct experiences of being involved. (n_3=21)

(iii) An informal debrief discussion was held within the project team to identify broader successes and challenges within the programme.

(iv) Follow up audio-recorded interviews were conducted with a sub-set of students approximately one year after their initial involvement in the STEM communication activities. (n_4=9)

This section summarises the main findings from the above approaches. If you are interested in further detailed information please contact Karen Bultitude, karen.bultitude@ucl.ac.uk.

Demographics

A total of 60 students were involved in the evaluation processes. The gender balance was approximately even (29M, 31F), with the vast majority of participants under 25 years of age. The cohort was relatively inexperienced: two-thirds were new to STEM communication activities; only two had participated in more than three events previously.

Motivations

As demonstrated in *Figure 1*, participants were mainly inspired by altruistic motivations, such as wanting to reach out to others, either to encourage them directly to take a greater interest in STEM subjects or to share their own enthusiasm. 'Having fun' was also rated highly by the student communicators. Involvement appeared to be based on individual choice rather than linking to friendship ties – the lowest average priority was allocated to 'My friends are involved'. Professional factors (such as CV or skills development) were moderately popular, but direct overt incentives ('being paid' or 'gaining degree credit') were relatively low in priority.

When these data were further investigated, it was noticeable that students with prior experience in being involved in STEM communication activities were more likely to be motivated by altruistic motivations, and ranked 'Gaining degree credit' as their lowest priority. Males tended more towards external motivations (impacting on other people rather than themselves) than females, and in particular, females ranked 'gaining degree credit' much more highly than males, but were less inclined to be influenced by 'My friends are involved'.

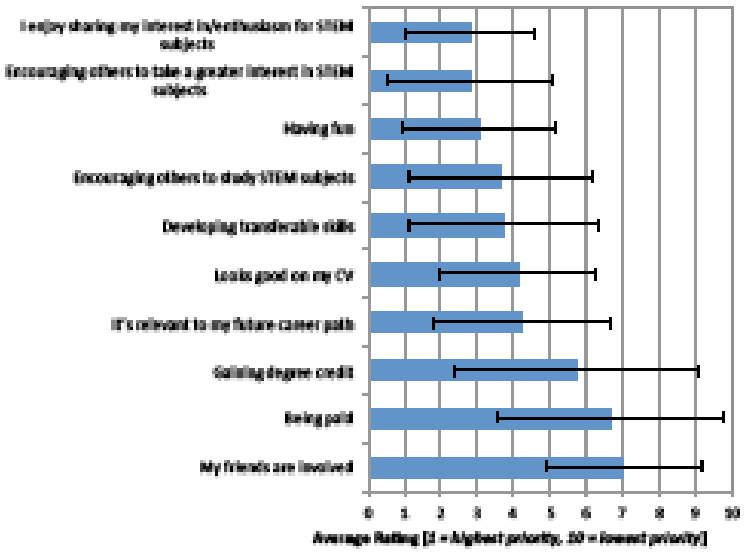


Figure 1 - Average ratings of potential motivations to be involved in the STEM communicator activities [data collected prior to involvement in any events, n_1=40)]. Error bars indicate the standard deviation in the rankings across the cohort. (Note that the sample sizes are too low to allow direct statistical analysis.)

Influence of mode of involvement

As might be expected, there are some major differences in the students' motivations which are closely linked to the model under which they were recruited to participate in the activities. The students taking the accredited module on average ranked 'gaining degree credit' as their top average priority, and ranked the more altruistic factors (such as 'encouraging others to study STEM subjects', 'I enjoy sharing my interest in / enthusiasm for STEM subjects' and 'encouraging others to take a greater interest in STEM subjects') much lower than the other two groups. In a similar vein, the students who were paid to participate ranked 'being paid' more highly than the other groups. It is however notable that in the case of these paid students the financial incentive was still their second lowest average priority. The interview data further demonstrates that being paid was valued, but not the major incentive:

'I think if they were unpaid I probably still would have done them, I think, but it's a way of deciding you're definitely going to do it and you can definitely give up your time. It's just that extra little thing that goes "right I should do this because not only am I going to enjoy it and get a bit out of it, it also will help with pay and study", so it is that extra little tipping point to get you to really sign up and commit for it I think, especially when you're a student and a bit low on money.'

Within the questionnaires the volunteers ranked 'gaining degree credit' much lower than the other groups, possibly because some of the volunteers were postgraduate students (as opposed to the undergraduate cohorts in the other samples), and therefore degree credit now appeared less relevant to them. Other personal factors were also ranked lower on average by the volunteers, for example skills development, CV contributions or relevance to a career path. For all three models of involvement 'having fun' was a strong motivating factor, whilst having their friends involved proved to be a weak motivation for almost all participants.

What they hoped to gain

Within the questionnaires the students were asked to outline what they hoped to gain from the experience. 51 'internal' factors were identified, including:

- skills development (n1=16)
- experience (n_1=9)
- enjoyment (n_1=7)
- confidence (n_1=5)
- knowledge (n1=4)
- contacts (n1=3)

There were a further six factors relating to their career, e.g. 'To enrich my skills and give me a headstart in my teaching career' or 'Experience to put on my CV'. The respondents also identified 23 'external' motivating factors, e.g. 'getting children involved in and interested in science', whilst three comments recognised bi-directional learning between the demonstrator and the audience.

Recognised barriers

By far the most common barrier identified was time (n_1=27; n2=19). Other commitments, such as university courses or jobs were also a notable issue (n_1=16) e.g. 'Pressure of pretty much always feeling like I should be working on PhD stuff directly...'. Prior to their involvement in the first events, seven respondents reported a lack of confidence. However, it was interesting that no students reported this as an issue after the events themselves (see 'reactions' below). There were also logistical issues which proved to be significant barriers; transport problems and events being held at distant locations prevented some students from being involved as much as they would have liked. Finally, students anecdotally reported feeling overwhelmed at certain times of the year; in particular, the close proximity of multiple events in National Science and Engineering Week (NSEW) provided challenging.

Reported emotions

Within the online questionnaires the respondents were asked to select (from a pre-determined list) which emotions best described how they felt regarding being involved in the events. Figure 2 provides a visual representation of students' reported emotions:

Figure 2 – Word clouds representing the res[ondents' emotions both before and after being involved in the STEM communication activities. The larger the word the more respondents selected that option. Note that the word colours and orientations do not habe amy particulat menaing in these figures.

Six emotions were not selected by respondents in either questionnaire: 'frustrated', 'inadequate', 'passive', 'afraid', 'bored', and 'confused'. It is noticeable that these are all negative emotions, thereby indicating an overwhelmingly positive response to the experience by most respondents. The three most strongly reported emotions prior to the event were 'excited' (n_1=80.0%), 'responsible' (n_1=60.0%) and 'creative' (n_1=47.5%). 25.0% of respondents reported feeling 'anxious' in advance (and a further two indicated they were 'nervous' in the open-response part of this question), 15.0% 'rushed', and small numbers reported other negative emotions such as 'stressed' (n_1=10.0%), 'tense' (n_1=7.5%), 'overwhelmed' (n_1=5.0%) or 'uncomfortable' (n_1=2.5%).

The timing of the questionnaires before and after the events enabled a comparison of how the students' reported feelings changed due to their experiences of being involved, as demonstrated in Figure 3:

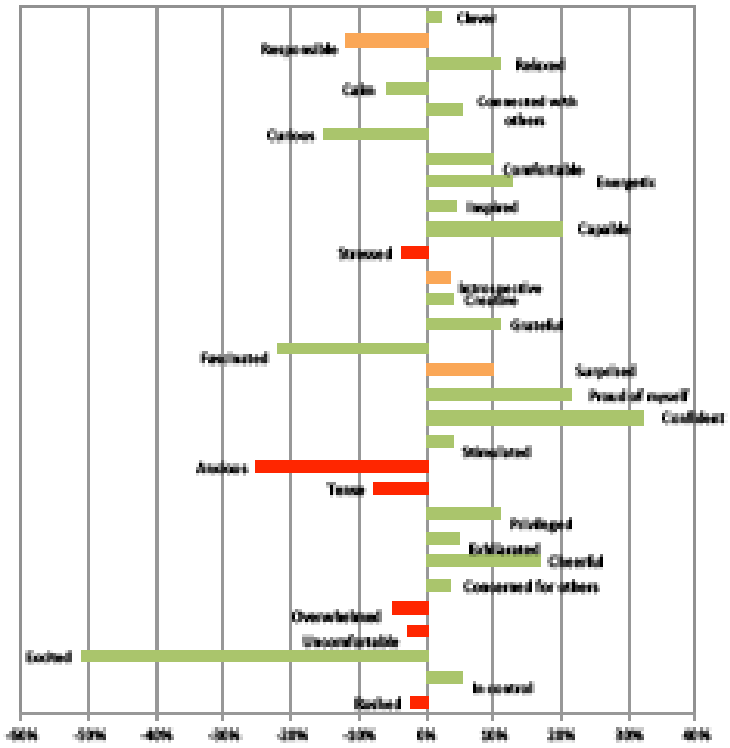


Figure 3 - Variation in participant emotions before and after the events. The values shown were calculated by subtracting the proportion of the cohort who expressed a particular emotion before the event from the corresponding proportion after the event. Negative values therefore represent a reduction in the proportion of the cohort who experienced that emotion, whilst positive values represent an increase.

It is noticeable that all of the 'negative' emotions were reported to reduce between the two surveys. The most positive changes related to self-value, for example being 'confident', 'proud of myself' and 'capable'. There were also some positive increases in aspects relating to acknowledgement of wider effort and support, for example 'grateful' and 'privileged'. Some 'positive' emotions did however decrease between the two surveys (in particular 'excited', 'curious' and 'fascinated'). However, these are to be expected as they are associated with anticipation and are therefore less likely to be perceived after the event.

Conclusions

Based on the students' feedback the following conclusions have been drawn from this evaluation:

- There is no 'one' incentive for student involvement in STEM communication activities; motivations vary quite widely.
- Both internal and external motivations should be emphasised when recruiting participants.
- Students report overwhelmingly positive outcomes and reduction of negative emotions from their involvement.
- Student involvement can be supported through:
    - Pre-organised events which reduce the amount of time required to plan and prepare for activities.
    - Embedding a training programme to develop skills and confidence.
    - Ensuring that travel expenses are covered, and where possible, that students are assisted in arranging transport to off-site locations.

6. Tips for Setting Up Your Own Scheme

We now consider some 'Frequently Asked Questions' generated from a wide range of participants that engaged with the 'Developing and Enhancing Student STEM Communicator Models' project.

What broad advice would you offer?

Manage your expectations (start small and build up), allocate lots of time, never turn down any offer of help (and there is a lot of possible help out there), don't be put off by any negative comments from your colleagues, go for it and have fun!

How do I convince my institution that I should run such a scheme?

High on the agenda of most institutions is: enhancing the student experience (especially given the National Student Survey); developing students' communication skills; enhancing widening participation opportunities and demonstrating that universities are engaging with their local communities. This means that you are often pushing on an open door when proposing to run a STEM communicators programme. However, you still need to convince senior management to allow time and provide resources to help to run a scheme.

You should certainly point to successful examples of such schemes running in many other institutions. Furthermore, carefully evaluate your own scheme as it develops so that you have hard evidence that it is achieving the results described above.

Other advantages to an institution are that it raises their profile, both within their community and nationally. This can be a powerful recruitment tool. Institutions themselves are also slowly becoming aware of the need for public engagement. See if your organisation has signed the manifesto for public engagement developed by the National Coordinating Centre for Public Engagement at: http://www.publicengagement.ac.uk/why-does-it-matter/manifesto

What are the main problems I am likely to encounter?

Problems could include: the sheer time commitment involved (especially in periods of high activity such as during National Science Week, or in marking lots of projects against a deadline); difficulties in raising funds; negative attitudes from colleagues who think that you should be doing more traditional courses or working harder towards the research required for the Research Excellence Framework (REF). These schemes are also often heavily reliant on the skills and commitment of a few individuals.

And how do I counter these objections?

Provided that your outreach is directly linked to your research then it can be counted as REF Impact. Furthermore, there is no contradiction between being good at research and good at promoting research and we firmly believe that anyone who says this is talking nonsense! If your colleagues don't want to be involved then they don't have to (but will be missing out on a lot of fun if they don't). Faraday, Feynmann & Zeeman are all excellent examples of great scientists and great populariser of science. It is important, however, to recruit as many of your colleagues as possible. This avoids over-reliance on a small number of individuals and helps to sustain the project over a longer time period.

How much time do these schemes take up?

We have to be realistic; any scheme of the nature of those reported in this report will take up a lot of time for the coordinators. One of the advantages of an accredited programme is that this time can be offset against the usual teaching load of the coordinators, and this helps with the sustainability of the scheme (although inevitably more time will be needed than is typically allocated!). However, the disadvantage of an accredited programme is that marking the students' work can be extremely time consuming depending on the nature of the assignments. A further time commitment is the administrative process of allocating students to projects, liaising with schools etc., sorting out travel and other costs.

How do I select and train the students?

Never underestimate what students can do or the enthusiasm and creativity that they bring to the activities. But also never overestimate their initial levels of confidence. STEM students in particular are often not initially natural communicators. Give lots of time to training (preferably hands-on) and to feedback and evaluation. Value your students, and show that you value them. We have included an example application form and training session plan in *Appendices 5 & 6*; you may also find the following article on best practice in public communications training in STEM of interest: http://jcom.sissa.it/archive/08/02Jcom0802%282009%29A03/Jcom0802%282009%29A03.pdf/

Are a CRB check and insurance necessary?

The guidelines on who requires CRB checks (or their equivalent) are currently being reviewed. However, we would definitely advise that anyone (staff or students) who is likely to have on-going contact with young people should undergo a CRB check. When delivering activities outside the university all personnel should be covered by the indemnity insurance of the institution – it's worth checking the terms of the policy to make sure that this is the case. Appropriate insurance is important in case any of the students are injured during the activities, or worse still injure someone else. If they do not have a CRB check then it is quite possible that they will not be insured and if the worse case happens and there is an incident involving a young person, then you as organiser will potentially be in serious trouble if you cannot prove that they had CRB clearance. Of course by far the best thing is for such incidents never to arise, and here training in child protection and avoiding potential problems by conducting a careful risk analysis is extremely important.

It is usually possible to engage STEMNET or a similar organisation to do the CRB training and to administer the paperwork, and many institutions have an existing process in place to arrange such matters – check with your HR department for advice.

What other safety issues are there?

Closely linked to CRB training is Health and Safety. This is important in any environment, and essential when involving practical science demonstrations. Many demonstrations (for example, those which use hot or corrosive materials) are much too dangerous to be used in a public arena. Such issues can be avoided by careful planning, requiring the students to submit a full Risk Assessment in advance of delivering any activities, and in conducting a dry run of any demonstrations well before any of the public are involved. See *Appendix 5* for an example of an over-arching risk assessment. Again, without an appropriate Risk Assessment in place, your activities may not be covered by your institution's insurance policy.

How much does it cost?

The base costs for the scheme really depend upon how much ambition you have and vary widely depending on the scheme and funding model. Typical costs which should be considered include: staff time, travel expenses, administration, buying resources, publicity, venue hire and training.

If you want to run a scheme which only places students in schools, then the main costs are travel expenses and administrative time. Costs rise if you include other activities such as delivering and managing larger events such as Science Fairs. However, here things can work both ways, since through raising money to run a science fair you can also be raising money to support your students. Staff time is the largest cost, and this really depends upon what cost model your institution wishes to use.

Where do I get funding for a STEM communicators scheme?

One advantage of the schemes that we have outlined is that they are all relatively cheap to run, and in the short term can be funded from a variety of sources such as industrial sponsorship or one-off grants from organisations such as the Royal Society, the London Mathematical Society, the Institute of Physics or the British Science Association. More sustainable funding is possible if you get institutional buy-in, especially if the scheme is considered part of the Widening Participation Programme for your university. (See *Section 7* on sustainability).

Are STEM communicator schemes only available for undergraduates?

Not at all. In fact, postgraduates are important members of many STEM Communicator projects. This is often in the 'voluntary role' but in certain Doctoral Training Centres some involvement in public engagement training and delivery is both expected and required. Postgraduates can also participate in various schemes where they go into schools to present the research that they are doing, or engage directly with young people e.g. online through the I'm a Scientist project.

How do I publicise such schemes?

If a scheme is part of an accredited degree programme, then it should be included in the unit catalogue of the university and also appear on the university website. This gives an automatic publicity route. However, a very effective publicity route is via word-of-mouth from students who have previously taken part in the scheme. If you manage the scheme well, then the students will enjoy it and will be your best possible advertisements. Paid or voluntary models usually recruit students via posters, mailouts and other standard student communication forums. Be careful to think about your recruitment messages along the lines suggested in *Section 5*.

You also need to advertise the availability of your students to the broader community and to set up activities for them to assist in delivering; an example booking form is included in *Appendix 6*. You will find that as you run the scheme over several years, demand for your students will increase and many new opportunities will arise. STEMNET and other coordinating organisations are also very effective in identifying possibilities.

7. Sustainability

Whether you choose to implement an accredited, paid or voluntary model of student involvement in delivering STEM communication activities, there are various actions that you can take to enhance the sustainability of your chosen model:

Embedding & Mainstreaming within Institutional Activity

Of course, accredited models of STEM communications are embedded in institutions as part of curricula but, even without accreditation, there are other means to embed and support their sustainability, as outlined below:

Access Agreements
As of 2012, universities looking to charge more than £6,000 per annum in tuition fees have to produce an access agreement setting out their fee limits and the access measures they intend to put in place (e.g. outreach work or financial support) to safeguard and promote fair access to higher education. Access agreements are submitted to, and monitored by, the Office for Fair Access (OFFA) on an annual basis. N.B. Access agreements do not cover postgraduate courses and do not apply to overseas students.

It may be that your STEM communications activity enhances your institution's outreach activity and / or has a positive impact on the retention of students. If this is the case, monies could be made available through your institution's access agreement to support your work. In the first instance, it would be worth reading your institution's access agreement to find out targets and milestones and how much money is to be committed to fair access. Access agreements are available publically through OFFA's website at www.offa.org.uk. If your institution has an access agreement, it will likely be owned by your Widening Participation office or equivalent.

Intra-institutional Collaborations
As indicated under 'Access Agreements', your work in STEM communications is likely to be of wider use and import to cross-cutting institutional themes such as: widening participation, outreach, student retention, employability, student experience and so on. Rather than working in silo, you could take some time to consider how others in your institution might contribute to, and support, your work. Widening participation units, careers services, students' unions and the like may be interested to hear of your work and might be able to provide training, advice and even financial support. If your institution runs co-curricular award schemes, then a quick win is to persuade your students to apply for these, thus raising awareness of your work whilst encouraging the students to reflect on their learning.

STEMNET
STEMNET (www.stemnet.org.uk) is a national charity that creates opportunities to inspire young people in STEM, allowing them to develop their creativity, problem-solving and employability skills and ensuring that they are well-informed about STEM. The charity runs three programmes delivered by 45 sub-regional contract holders around the country:

- STEM ambassadors – There are currently 25,000 volunteer ambassadors nationally who offer their time and support to promote STEM subjects to young people in schools
- STEM clubs' network – STEM clubs allow children to explore, investigate and discover STEM subjects in a stimulating learning environment, outside of the constraints of the school timetable or a prescribed curriculum
- Schools' STEM advisory network – Through strong links with business organisations, this network aims to ensure that all schools and colleges can offer their students programmes which support the curriculum and increase the quality and quantity of students moving into further STEM education, training and development

Your STEM communications activity may complement one of STEMNET's programmes. If this is the case, it would be worth contacting your sub-regional contract holder (relevant contact details can be found at: www.stemnet.org.uk/contact) to see whether there is any support (e.g. training / advice) they could provide to enhance the sustainability of your work.

Continuance – Advice

There exist a plethora of key organisations providing advice on public engagement activities and, very occasionally, funding. We have already highlighted how institutional access agreements and other departments might provide sources of funding and advice. In addition, you could consider:

National Coordinating Centre for Public Engagement (NCCPE)
The NCCPE supports universities to promote best practice in public engagement, supporting, recognising, rewarding and building capacity for public engagement work. The NCCPE can offer advice on any aspect of public engagement and have a huge range of publications and resources available for free at www.publicengagement.ac.uk. To keep in the loop with relevant funding opportunities, you may like to register as a public engagement ambassador with the NCCPE (see: www.publicengagement.ac.uk/how-we-help/ambassadors-scheme) and / or join their public engagement JISCMail network by heading to www.jiscmail.ac.uk and searching for 'NCCPE-PEN.'

Research Councils UK (RCUK)
The RCUK is the strategic partnership of the UK's seven research councils. It believes that engaging the public with research helps empower people, broadens attitudes and ensures that the work of universities and research institutes is relevant to society and wider social concerns.
The RCUK has an active public engagement team overseeing policy, research and funding calls. The Catalyst funding call in 2012 saw eight universities granted £300,000 each to embed public engagement with research in their institution. A range of best practice guidelines, publication and public engagement resources can be accessed via www.rcuk.ac.uk.

RCUK consider the demonstrating and maximising of impact of research to be of great significance. As such, the Research Council application and assessment process involves completion of a 'Pathways to Impact' section, prompting researchers to think about how they will achieve excellence with impact and how to explore the pathways for realising the impact (see: www.rcuk.ac.uk/kei/impacts/Pages/home.aspx). STEM communication models focusing on disseminating current research findings may well facilitate pathways to potential economic and social impacts and so could be included in funding applications to the RCUK.

The National HE STEM Programme
Running from 2009 – 2012, this programme funded over 500 STEM-related projects nationally with a focus on widening participation, curriculum enhancement and workforce development issues. The programme focused on the disciplines of Engineering, Mathematics, Physics and Chemistry, and all programme outputs are freely available via www.hestem.ac.uk, with a subset of South West regional outputs available at www.hestem-sw.org.uk.

Professional Bodies
Professional bodies for specific disciplines occasionally release funding calls to support public engagement activities, and some have specific grant schemes. Many have outreach / public engagement departments who provide advice and free resources and usually possess strong links with schools and colleges. Links are given in Section 8.

British Science Association's Collective Memory
The Collective Memory is a database of evaluations of a diverse range of science communication initiatives. It aims to bring together a wealth of expertise from across the public engagement community so that people can learn from their peers. Head to collectivememory.britishscienceassociation.org/ to see if there are any activities similar to the ones you are planning / run and see whether there is any useful learning to be had. You may even like to share your own examples!

The STEM Directories
The aim of STEM Directories is to connect teachers with the wide range of activities in the UK that can help enhance their teaching in science, engineering and mathematics. As such, the directories provide a huge range of ideas for activities, and providers that may well be worth collaborating with.
See: www.stemdirectories.org.uk/?p=home

8. Useful Resources

Useful links, contacts and resources

Advice & Guidance

IMA National HE STEM Programme project, on-line
http://www.ima.org.uk/activities/he_stem.cfm

A comprehensive guide to working with Student Volunteers from the NCCPE
www.publicengagement.ac.uk/how/guides/working-student-volunteers

Article summarising the findings of research into best practice in public communications training in STEM:
http://jcom.sissa.it/archive/08/02/Jcom0802%282009%29A03/Jcom0802%282009%29A03.pdf/

Ambassador Schemes

UAS http://www.uas.ac.uk/

STEMNET www.stemnet.org.uk

Engineers Without Borders http://www.ewb-uk.org/

Café Scientifique http://www.cafescientifique.org/

IMA Maths ambassadors
http://www.mathscareers.org.uk/ambassadors.cfm

Activity Ideas

Institute of Physics Activity Ideas
www.iop.org/activity/outreach/resources/activity/page_47894.html

Maths Busking
www.mathsbusking.com

The Naked Scientists Kitchen Science Experiments
http://www.thenakedscientists.com/HTML/content/kitchenscience/

British Interactive Group www.big.uk.com – advice and ideas for anything interactive; also has an associated mailing list (BIG-chat) which is very informal and where members are only too happy to share their experiences and ideas.

Science Fairs and Festivals

These are an excellent resource for both training students and for giving them a chance to give exhibitions. The following is a very incomplete list

Big Bang Fair http://www.thebigbangfair.co.uk/home.cfm

Cheltenham Science Festival
http://www.cheltenhamfestivals.com/science

Royal Society Summer Exhibition
http://royalsociety.org/Summer-Science/

British Science Festival
http://www.britishscienceassociation.org/web/britishsciencefestival/

Bath Taps Into Science
http://www.bath.ac.uk/math-sci/extracurricular/bathtaps/

A guide to running an exhibition in a science fair is given in the National HE-STEM Programme report
http://www.hestem.ac.uk/resources/guides-and-publications/national-he-stem-programme-user-guide-how-design-finance-and-run-r

Mathematics Masterclasses

These are Saturday morning workshops all around the country for KS3 students in mathematics which are coordinated by the Royal Institution.
http://www.rigb.org/contentControl?action=displayContent&id=00000001857

Professional Bodies & Grant Schemes

Institute of Physics' Public Engagement team and Public Engagement Grant Scheme
www.iop.org/activity/outreach/index.html

Royal Academy of Engineering's Public Engagement team (including information on Ingenious, a public engagement grants scheme) -
www.raeng.org.uk/societygov/public_engagement/default.htm

Royal Society of Chemistry's Education team –
www.rsc.org/Education/

The Royal Institution www.rigb.org

Institute of Mathematics & its Applications (IMA)' Education team - www.ima.org.uk/activities/education.cfm & The London Mathematical Society (LMS) www.lms.ac.uk . Both the IMA and the LMS have educational grant schemes which will give one off grants in the region of £600

The Biotechnology and Biological Sciences Research Council (BBSRC) spends around £1m per year on public engagement activities -
www.bbsrc.ac.uk/society/pe-strategy-and-funding.aspx

Other

Bath Award
www.bathstudent.com/bathaward/

Bristol Plus Scheme
www.bris.ac.uk/careers/plusaward/

All appendices can be downloaded for free from the project's web-pages. Head to www.hestem-sw.org.uk and click on 'All Projects' to find the STEM Communicator Models project.

Appendix One:

The unit description for the University of Bath Communicating Maths Unit as it appears in the university directory of courses:

Communicating Maths MA30241

Credits: 6
Period: Semester two
Level: 3

Available to all third/fourth years in any of the mathematics courses. Numbers taking the course will be restricted to about 20 each year. Selection for the unit will be made on the basis of a short written statement by potential candidates.

Assessment: 100% CW. The work will be written up as a portfolio together with the permanent piece of work (see below for a detailed description)

(Pre-)Requisites: None, other than that ALL students on the course will be required to have an up to date CRB check.

Aims: To teach communication skills in mathematics and to practice these in a hands on environment involving science fairs, masterclasses etc.

Learning Outcomes: At the end of the unit the students will

(i) Have learned methods for communicating mathematics through running exhibitions, delivering masterclasses and other hands on activities.
(ii) Have learned how to critically evaluate their work using a variety of techniques
(iii) Have learned how to carefully communicate mathematical idea to a group of young people
(iv) Have produced a permanent piece of work describing a mathematical topic in a medium that they specify.
(v) Have learned basic ideas of child protection and health and safety when communicating in a hands on environment
(vi) Have had the experience of working with professional communicators and teachers.

Skills:

Written, graphic and spoken communication	T/F	A
Problem solving	T/F	A
Team work	T/F	
Project management	T/F	A
Critical evaluation (project and self)	T/F	A

Work involved: 100 Hours. A mixture of lectures, hands on practice and project work

Content:

Background:
Communicating Maths has been run as a successful project unit available for about 20 students for the past ten years. It has attracted a number of National education awards and is currently supported by a grant from the HE-STEM programme. It has led directly to similar courses being run at other universities based on the Bath model.

Detailed Course Description:
The students will receive training on

1. Child Protection/Health and Safety: One extended lecture
2. Preparing an exhibit for a science fair: One lecture and two practice sessions
3. Critical evaluation skills: One lecture
4. Preparing a schools level masterclass: One extended lecture (followed by an observation of a masterclass).

The training will not count directly towards the assessment, but the students will be expected to use the training in the production and evaluation of their activities.

(A) The students will work (typically in teams) to deliver and evaluate

A. An exhibition during the Bath Taps Into Science Festival which will demonstrate a key STEM idea to a family audience
B. A mathematics masterclass for KS3 students (preceded by an observation of a masterclass which they should also evaluate)
C. A hands-on STEM activity taken from a list of options such as: delivering a lesson at a school (primary or secondary), taking part in the Big Bang Fair, working as a maths journalist, taking part in a maths theatre event, maths busking etc.

Each of these activities will count for 25% of the overall mark.

The mark for each activity will be a combination of an assessed 10 side piece of work presented individually by each student in a portfolio (counting for 80% of the activity mark) together with a mark from an assessor of the activity as it happened in context (counting 20%). The 80% assessment of the portfolio will be guided by a careful written explanation of what is expected (made available to the students at the start of the course) and will be based on (i) the design and planning of the activity (ii) the presentation of the activity, (iii) the educational merit of the activity including the successful accomplishment of the planned learning outcomes for the STEM material and (iv) the care of the self-assessment of the activity. The 20% context mark will be based primarily on an evaluation by an external reviewer (this could be the unit leader, but it could also be a teacher) on the success of the activity in achieving its stated objectives.

(B) Each student will also create a permanent piece of work on a mathematical theme, in the medium of their choice, to an audience of their choice. (For example this could be a newspaper article, a web-site or a poster) This will count for 25% of the final mark. This mark will be given on (i) the presentation of the material (ii) the effectiveness of the work in conveying the mathematical idea to its intended audience.

Appendix Two:

Template for the allocation of marks to the students for the University of Bath Communicating Maths Course.

PROJECT ASSESSMENT

1. Design and Commentary on Two Projects (50%)

   (a) Masterclass (25%)
   - Background (3%)
   - Design of Masterclass (7%)
   - Evaluation of Masterclass (10%)
   - Presentation of Report (5%)

   (b) Activity of Choice (25%)
   - Rationale for Choice (3%)
   - Preparation for/Background of Activity (7%)
   - Critical evaluation of Activity (10%)
   - Presentation of Report (5%)

2. Design and Commentary on Project for National Science Week (25%)

   - Background to Bath Taps Into Science (3%)
   - Design of Exhibit (7%)
   - Evaluation of Exhibit (10%)
   - Presentation of Report (5%)

   3. Written Activity e.g. webpage, newspaper article, poster (25%)
   - Mathematical/Scientific Content (10%)
   - Presentation of Material (15%)

ASSESSMENT CRITERIA

Guidelines are provided below which indicate the type of activity which is expected for the following classifications:

1. Mark between 40-50
2. Mark between 50-60
3. Mark between 60-70
4. Mark Over 70

Background Material

1. Present some basic information
2. Provide basic information in a coherent structure
3. Provide well-structured information on the activity with some more general information on general issues
4. Integrate background information into the current national context

Design of (Preparation for) Activity

1. Basic description of activity
2. Description of activity including rationale for choice of activity
3. Description of activity integrated with rationale for activity, limitations of activity
4. Integrated description of activity -practicalities, rationale, limitations, anticipated outcomes, etc…

Evaluation of Activity

1. Some general comments on the activity: use of anecdotal evidence
2. Critical discussion of the activity, making use of any evidence collected during the activity
3. Evaluation of one aspect of the activity making use of any evidence collected during the activity. Critical discussion of the remaining elements of the activity
4. Good evaluation of one aspect of the activity using evidence collected systematically during the activity. Critical discussion of the remaining elements of the activity.

Presentation of Report

1. Report split into relevant sections. Some sections well presented
2. Report constructed in a methodical manner. Mostly well written with some use of photos, diagrams, etc…
3. Clear report structure, mostly well constructed with some good use of colour, photos, diagrams, etc…
4. Well constructed report -clear structure, well written, key points highlighted, appropriate use of colour, photos, figures, diagrams, etc…

Written Activity-Content

1. Suitable choice of content. Some material well motivated. Some accurate science
2. Suitable choice of content. Generally accurate science, mostly well motivated. Attempt to identify audience level
3. Good choice of content. Correct identification of audience level. Generally accurate science
4. Good choice of content, well motivated. Correct identification of audience level. Accurate science.

Written Activity-Presentation

1. Basic presentation: statement of problem/concept, generally good use of English language, some attempt to use appropriate scientific language, basic use of graphs and/or diagrams
2. Standard presentation: clear and well-motivated statement of problem/concept, good use of English language, several attempts to explain scientific concepts, basic use of graphs and/or diagrams
3. Good presentation: clear and well-motivated statement of problem/concept, good use of English language, several attempts to explain scientific concepts, basic use of graphs and/or diagrams
4. Excellent presentation: clear overview of problem/concept, well written English, appropriate use of scientific language, good use of diagrams and/or graphs.

Appendix Three:

Confidential

Student Science Communicator Application Form 2011

Faculty of Health and Life Sciences

Personal Details

First name(s)		Date of birth	D D / M M / Y Y	Male	
Family name				Female	
Preferred name		*(if different to above)*			

Term-time address:		Home address:	
Postcode		Postcode	
Tel		Tel	
Mobile		Mobile	
E-mail		E-mail	

Student Number | | | | | | | | | *(We cannot process your application without this)*

Transport and availability

Do you have your own transport? Yes ☐ No ☐

If yes, what type (e.g. bicycle, car, motorcycle)

Would you be prepared to work at external venues away from UWE? Yes ☐ No ☐
(e.g. schools or Festivals)

Are you available to work outside normal term times? Yes ☐ No ☐
(e.g. during the evening, at weekends or during the summer)

Are you available for interview on Monday 28th February? Yes ☐ No ☐
Please indicate any time(s) you are NOT available that day:

Are you available for training on Wednesday 9th March 13.00 – 16.00? Yes ☐ No ☐

Please indicate which of the following dates/times you are currently available to act as an SSC:

March 16 (PM) ☐ March 17 (10-1) ☐ March 18 (AM/PM) ☐ March 19 (AM/PM) ☐ March 23 (10-1) ☐

Academic details

Programme of study		Year (e.g. 1st, 2nd)	
School - Faculty		Campus	
Undergraduate		Postgraduate		Full-time		Part-time	

University of the West of England, BRISTOL

better together

Motivation

Please indicate why you wish to be a Student Science Communicator (*maximum ½ a page*)

Skills and Interests

Please provide a description of any relevant previous experience or skills you can bring to the role (*maximum ½ a page*).

Experience with young people					
Have you ever worked with children or young people before (either paid or voluntary?)	Yes		No		
If yes, please give details:					

University of the West of England BRISTOL

betterTogether

Confidential

Protection of Children: Employment as a Student Science Communicator is likely to involve you working with children and young people or other vulnerable individuals therefore you will be required to undergo a Criminal Records Bureau (CRB) check. This will detail any criminal convictions and cautions that you may have and will be used to help us make an informed decision about your suitability for the post. This disclosure will entail completing an additional form. Full guidance will be given. (A conviction will not automatically exclude you from joining the Student Ambassador Scheme.)

Have you ever been cautioned or convicted of a criminal offence?	Yes		No		

If yes, please give details:

Are you willing to undergo a CRB check?	Yes		No		

Data Protection

This information will be held and processed for purpose(s) of monitoring suitability for becoming a student science ambassador and matching ambassadors with specific activities.

I agree to the University of West of England recording and processing this information about me. I understand that this information will be used only for the purpose(s) set out in the statement above, and my consent is conditional upon the University complying with its duties and obligations under the Data Protection Act.

Signature _____ Date DD / MM / YY

It may on occasion be deemed necessary to pass your contact details and information regarding your participation in these schemes on to third parties. These third parties may be internal to the University of the West of England (e.g. a faculty/service) or external to the University of the West of England (e.g. the Higher Education Funding Council for England, the Teacher Training Agency or other educational institutes with whom we work in partnership).

Please tick the box to indicate your consent for us to pass your information to third parties ☐

Declaration by applicant

I declare that, to the best of my knowledge, the information given is true and correct at the time of signing.

Signature _____ Date DD / MM / YY

Please complete this form by Friday 25th February and return to:

Justin Inijen
Marketing and Events Assistant
Faculty of Health & Life Sciences
E: Justin2.Inijen@uwe.ac.uk
T: 0117 32 83285

University of the West of England, BRISTOL

betterTogether

Appendix Four:

Student Science Communicator Training 2011

Karen Bultitude

Resources required:

- Printed descriptions of March events + sign-up sheet to identify SSC preferences
- Flipchart / whiteboard + pens

Schedule:

- Visit Justin, collect kit
- Ice breakers / introductions
  - Speed networking in pairs
- Paperwork:
  - Distribute CRB forms
  - Mention that they all need to prove their eligibility to work in the UK e.g. by taking their passport to Justin to be photocopied
  - Mention risk assessments & signing them off next week
- Brainstorm list of SSC's main concerns & identify which of those will be covered during the training etc.
- Arranging the space – discussion + practical of setting up at a venue. To include aspects such as fire exits, trip hazards, where equipment is stored etc.
- Demonstrations
  - SSCs to pair up and identify one demonstration from the list that they want to try out. They then get the equipment and practice performing + explaining it to each other. It's important to highlight that the SSC's should work together to provide critical feedback as well as help out when someone needs further assistance.
  - Above process repeated for 3-4 demos each (depending on time)
- Overview of working with audiences:
  - How to attract attention
  - Using volunteers
  - Working as a team (building on each other's demonstrations, giving feedback, planning & preparation before each event etc.)
  - What to do when something goes wrong
- Mini-performance (time permitting): SSC's split into two groups to put together a mini-show to perform to the other group. Again, emphasise the importance of giving feedback to each other.
- Discussion of any outstanding concerns (check whiteboard list)
- Discussion of March events
- Clean up & pack up!

Appendix Five:

Faculty of Health and Life Sciences ***School of Life Sciences***

RISK ASSESSMENT FORM RAGS
(Research: non COSHH & Off-site)

Please ensure that the project details front sheet is attached.
Please complete all the boxes in the table below, put n/a as appropriate.

Project Title: Student Science Communicator (SSC) Activities	Project Number: n/a	Name of Chief Investigator /Assessor Karen Bultitude
Activity(ies) being assessed: Outreach activities performed by UWE students involving hands-on demonstrations	Location(s) of activity(ies): Various locations incl. UWE, local schools and public venues such as shopping centres	Technical support: n/a
Level of study/staff group: Science Communication Unit	Date of Assessment: 16 February 2010	Date of Assessment Review:
Mode of transport to off-site(fieldwork) activity: Driving + public transport	Will the researcher be lone working? No	Give details of over-night accommodation: n/a
Please confirm that the researcher will ensure that someone responsible knows their off-site location, how to contact them (mobile phone number?), what they will be doing, when they will be expected back, and will raise the alarm if they do not return as expected. Identify person (if already known):	Justin Iriajen / Mandy James will coordinate the events from UWE's perspective. All SSCs to have access to each other's mobile numbers as well as contact details for the SoLS marketing and events team.	

For support in completing this form please read the "Guidance for Completion of Risk Assessments that can be found on the safety website.
http://fas.uwe.ac.uk/safety/

General Risk Assessment

Hazard	Risk description	S	Risk factors	Control measures	L	Risk Level
Slip, trip, fall	Working at an unfamiliar location	2	Tripping over obstacles, slippery surfaces.	SSCs to get familiar with location when first arrive, arrange equipment and room to avoid trip hazards etc., be careful when moving around venue.	2	4
Fire at venue	Serious injury / death if trapped by fire at an unfamiliar location	5	Suffocation / burning	SSCs to check location of appropriate equipment such as fire extinguishers and get familiar with venue evacuation procedures and location of suitable exits prior to delivering activities. No equipment to be left blocking exit routes.	1	5
Electrical	Use of electrical equipment	5	Electrocution	All electrical equipment to be regularly inspected; no bare circuitry to be used. Any suspicious equipment is to be appropriately disposed of.	1	5
First aid	Harm through accidental misuse of sharp objects etc.	2	Cuts, abrasions	Basic first aid kit to be available for use by SSCs. SSC team to get familiar with local first aid and H&S requirements in an external venue prior to delivering activities.	2	4
Liquid spills	Falling and/or slipping	2	Slippery surfaces	Paper towel carried by project team and spills immediately mopped up by operators. Demonstrations to be performed inside / over appropriate catchment containers where possible.	2	4
Methylated spirits	Very flammable. Harmful by ingestion, inhalation and skin absorption. Eye and Skin irritant.	2	Participants accidentally swallowing dangerous liquids	Anyone involved in a demonstration involving methylated spirits must wear lab coat, gloves and safety glasses. Only SSCs to handle the methylated spirits and small quantities only (<200mL) to be transported at any time. To be kept out of reach (and where possible out of sight) of audience participants. Very clear instructions to be given to any participants and at least two SSCs to be involved in delivering this demonstration / handling the audience throughout.	2	6
Glassware	Broken glass in the environment	2	Cuts	Safety style / robust glassware used where possible. All glass items only used under supervised conditions. Any broken glassware removed immediately and disposed of.	2	2
Small objects	Choke hazard	2	Participants (esp. young children at the public event) choke on small objects	Only used under supervised conditions. When small children are present all small objects are to be kept out of reach, and only operators are to perform the relevant demonstrations.	2	4
Flying objects	Some demonstrations	1	Breakage of equipment	SSCs trained in correct method of use prior to	3	3

	involve moving objects		and damage to both participants & operators from flying objects	performances; correct usage and reasoning explained to audience during performance. Relevant demonstrations only performed under supervised conditions, and away from other equipment.		
Sharp objects	Some demonstrations involve sharp objects e.g. kebab sticks, scissors	2	Danger of cuts, damage to soft body parts (e.g. eyes) if mishandled.	SSCs trained in correct method of use prior to performances; correct usage and reasoning explained to audience during performance. Relevant demonstrations only performed under supervised conditions. Location of sharp objects monitored by SSCs at all times. When small children are present all sharp objects are to be kept out of reach, and only SSCs are to perform the relevant demonstrations.	2	4
Matches and flames	Some demonstrations involve matches and small flames	2	Fire hazard	Matches only used under supervised conditions and in locations where the venue has approved their use. In the case of small children only the SSCs will light the matches. Venue fire equipment to be checked by project team prior to demonstrations (see 'fire at venue' above).	2	4
Liquids etc. unsuitable for consumption	Serious injury	5	Participants accidentally swallowing dangerous liquids	Containers stored out of reach of small children and clearly labelled as unsuitable for consumption. Containers to be clearly labelled with first aid instructions in the case of swallowing.	1	5
Verbal and/or physical threats	Interactions with unknown participants in a public place	2	Physical threat/abuse, reputational risk (accusation of improper behaviour).	Clearly explain purpose of activities if questioned, watch out for social tensions, always work in groups of at least two SSCs present at a time, do not give any personal details. Have clear university identification. Be prepared to end demonstrations at any time.	2	4
Heavy loads	Staff injury	3	Moving equipment to/from the venue and setting up	The equipment containers used are to be lifted by two people at a time. SSCs will be given advice on lifting and moving these containers in a safe manner.	1	3
Transport	Involvement in traffic accident or similar	5	Travelling to/from external venues	SSCs will travel by approved public transport (public buses and/or taxi cabs when necessary) or by car. Plenty of time will be left to travel to the venue to avoid rushing and directions and routes planned ahead of time.	1	5

Insert Additional Rows as Required

Some examples of possible hazards, for more examples see "Guidance for Completion of Risk Assessments" – Appendix 1 (hazards)

Activity/task hazards	Fire	Machinery	Posture	Stress
Behavioural	Hand tools	Manual handling	Psychological	Transport
Environment	Hot/cold	Noise/vibration	Psychological testing	Weather
Equipment	Lone working	Organisational	Slip, trip, fall	Working with vulnerable groups

RISK LEVEL	ACTION LEVEL			
SEVERITY	LIKELIHOOD	POINTS	RISK	ACTION
1 – Minor harm 2 – Minor harm needing treatment and/or recovery off the job 3 – Harm requiring short-term absence for full recovery 4 – Major harm with long-term absence and possible disability 5 – Fatality	1 – Extremely unlikely 2 – Unlikely 3 – Possible 4 – Likely 5 – Very likely	1 – 2 3 – 5 6 – 12 15 – 16 20 – 25	NEGLIGIBLE ACCEPTABLE MODERATE HIGH INTOLERABLE	No action necessary Although tolerable, apply "so far as is reasonably practicable" Some further measures required Immediate action necessary to reduce the risk Immediate action – cease the activity or do not start

Supplementary Information

Lone Working

All staff and students must adhere to the Faculty Policy on Lone Working as outlined in the Code of Practice 'Lone Working for Faculty Staff and Students'.

Ensure that lone working has been addressed in the General Hazard section if required.

Please note that lone working by U/G students is not permitted in the Science labs.

Specific Supervision and Training: (enter none, if none)

Supervision arrangements (specify)	Multiple SSCs will attend each venue and the SoLS Marketing / Events team will be aware of their location for each activity.
Training required (specify)	The SSCs will be trained in how to perform the demonstrations as well as how best to interact with the young people and members of the public during the activities.

First Aid & Emergency procedures:

Please identify any special first aid/emergency procedures required or provide title of relevant SOP, (enter none, if none).

Hazard	First Aid/Emergency Procedure

Declaration

Project Supervisor

I confirm that I have discussed this risk assessment with my student and I have ensured a full understanding of the risks and relevant control measures.

Signed……Karen Buttibude…… Date …16…./…02../ 2010…..

Project Student

I confirm that I have discussed this risk assessment with my supervisor and I fully understand the risks and will comply with all the control measures detailed.

Signed…n/a…… Date …n/a

Appendix Six:

Wow Science

Alka-Seltzer rockets, straw oboes, clucking cups and homemade tornados - you would be amazed what you can do with everyday ingredients and just a little pinch of science.

'Wow Science' is a fast-paced, highly interactive hot-pot of entertaining and educational science-related demonstrations. The workshop takes on an interactive format, with participants encouraged to try out the demonstrations for themselves and explore the science behind how they work. With so much to learn and a whole lot of fun, one thing is for sure: the audience will be wowed by science as a result.

'Wow Science' is best suited for KS2 and lower KS3 audiences, although it is also applicable to family groups. Up to 30 participants can be accommodated at one time, with each workshop lasting between 30 minutes and one hour.

The Presenters

Current UWE students have been trained to run the 'Wow Science' workshops. They will assist the participants to perform the demonstrations and will also facilitate discussions about the science involved.

The 'Student Science Communicators' (or SSCs as the presenters are called within UWE) are recruited from a range of scientific disciplines including forensic, environmental and biomedical sciences as well as psychology. The SSCs are also happy to talk about the experience of going to University as well as the courses they study. If you are interested in hearing from SSCs with particular subject specialities please make this clear within the booking checklist overleaf.

All the SSCs have been CRB checked and are fully trained in the health and safety aspects relating to each of the demonstrations being used. They will bring all necessary equipment apart from that noted overleaf in the booking checklist.

UWE BRISTOL University of the West of England

bettertogether

Wow Science

Venue Checklist

Please return this checklist at least two weeks prior to our visit to your venue. It should be emailed directly to the Faculty of Health and Life Sciences Marketing and Events Assistant, Justin Inajen (details below). If you have any queries about any of the requests please contact Justin well in advance of the workshop(s). Failure to do so could result in delays or possible cancellation of the visit.

Email: Justin2.Inajen@uwe.ac.uk Telephone: 0117 32 83285

Venue Details

Please confirm your venue details to ensure that we have the most up-to-date information.

Venue Location

Full Venue Address

Contact Person

Full Contact Details (please include a mobile or 24-hour number for emergencies)

Email
Phone
Fax
Mobile/24-hour

Performance date

Workshop time(s)

1st workshop
2nd workshop
3rd workshop
4th workshop

Instructions upon arrival

(e.g. where to sign in, where to park, what times the venue will be accessible, plus any other information about the venue that may be helpful).

Please note that up to an hour may be required either side of the workshop to setup and pack up.

University of the West of England
BRISTOL

bettertogether

Audience Details

Please complete as fully as possible for each workshop so that we can plan the workshops to best suit the expected audiences. Note that 'Wow Science' is best suited to KS2 and lower KS3, with up to 30 participants able to be accommodated in each workshop.

	Workshop 1	Workshop 2	Workshop 3	Workshop 4	Workshop 5	Workshop 6
Duration of workshop						
Total audience #						
# Teachers present						
# Year 3 students						
# Year 4 students						
# Year 5 students						
# Year 6 students						
# Year 7 students						
# Year 8 students						
# Year 9 students						
# other attendees (please specify)						

Please indicate if students / learners from any of the following backgrounds will be present:

- Low HE participation neighbourhood ☐
- Lower socio-economic group ☐
- Deprived geographical area ☐
- Little or no HE in family ☐
- Minority ethnic groups ☐
- Disabled ☐

If there are any other external organisations involved in this visit (e.g. feeder primary schools) please list such organisations here, including the number of participants from each organisation:

List all organisations involved in this event	Number of Participants

Item Checklist

Please indicate (by selecting the relevant boxes) which items you will be able to supply at the venue. Please have these items ready well in advance of the first workshop.

Requirements:

Item Required	Number	Supplied?
Large table(s)	4	☐
Large bin (for disposal of rubbish after the workshops)	1	☐
Nearby access to water e.g. a tap before the workshop	1	☐
Facility to turn off smoke detectors in the venue*	N/A	☐

** There are some demonstrations performed by the SSCs which produce small amounts of smoke. If your venue has particularly sensitive smoke detectors we advise that they are turned off for the duration of the workshop. If this is not possible then please let us know in advance so that those demonstrations can be avoided.*

Additional Information

Is there any further information that the SSCs should be aware of, for example topic areas recently covered in class or subjects you would particularly like the SSC's to focus on? Please use the space below to provide any additional information you think would assist our visit.

Full details of the demonstrations performed by the SSC's, including a full risk assessment, are available for download from: http://www.scu.uwe.ac.uk/index.php?q=node/80.

We look forward to visiting you!

UWE SSC team