



## Disseminating student ambassador top-up training in engineering in Yorkshire and the Northeast region

Dr Kerry Jaime Baker and Dr Nazira Karodia  
University of Bradford

### Abstract

In Yorkshire, Humber and the Northeast, learning from the London Engineering Project (specifically with regard to good practice in the use of undergraduate students as ambassadors for STEM) has been shared and embedded into nine higher education institutions (HEIs) in this region. The training has been delivered by the project team to undergraduates and staff at each institution with the acknowledgement that the staff would be able to re-deliver this training to their students (and other staff) in future years. The overall aim of this project was to ensure that the information and skills delivered during this training remain within the participating HEI to be used for their own needs in the future.

**Keywords:** STEM ambassador, HEI, training, outreach, widening participation, students

### Background

The basis for the project came from successful practices developed by the London Engineering Project (LEP) (The Royal Academy of Engineering, 2010), specifically its use of undergraduate students as ambassadors of engineering and higher education in local schools, helping to raise enjoyment of STEM subjects (science, technology, engineering and maths) and awareness of engineering across a wide range of under-represented student groups. The evaluation of the LEP suggests that it was particularly effective in challenging students' negative and gendered preconceptions of engineering and science-related careers.

### Rationale

Widening participation (WP) in STEM subjects is critical to the recovery of the UK economy but apparently lacks appeal to society as a whole and to young people in particular (Sainsbury, 2007; Galton, 2009). To this end, lessons learned from the LEP are invaluable to other higher education institutions (HEIs) wishing to set up or increase the involvement of their undergraduate students in activities for schools. This project not only transfers the learning and good practice from the LEP to HEIs in Yorkshire, Humber and the Northeast, it also enables new or updated processes to be put in place at each participating HEI to continue this training using tried and tested methods. This has enabled a short project to have maximum impact, as trial training sessions and material redevelopment have not been required due to the use (and minor redevelopment) of existing materials used in the LEP student training.

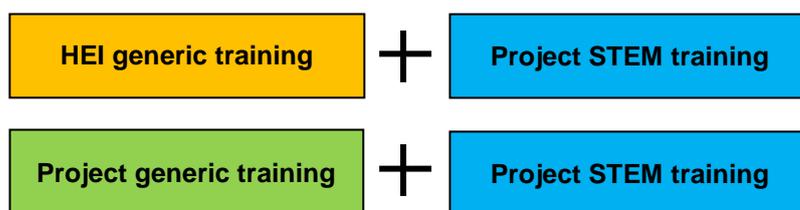
### The approach

The process of carrying out the training begins with communication between the project lead and an interested individual or department at the participating HEI. The department or individual may differ from one HEI to another due to where the responsibility for this type of activity lies and who has the time and/or inclination to put it into practice. Examples of staff worked with include widening participation officers for a particular STEM faculty, central university widening

participation units and lecturers, researchers and administration staff from STEM faculties (most commonly engineering faculties and departments). Although this method means that the project is not carried out in the same way in each HEI, it does enable a greater level of commitment from the participating HEI, as the contact is already motivated to carry out the good practice and training in their institution and will be more likely to follow it up and get students putting their training into practice in local schools as soon as possible.

After an introductory discussion about the project, including the planned delivery and the expected outcomes, the existing practice of undergraduate ambassador training at each HEI is established and the best way to fit the STEM-specific training into it is agreed. This method has not only enabled the students to receive distinct and new training, but has also ensured that the training is seen as part of the HEI ambassador training and not as a random addition. The project delivery took two main forms.

In some HEIs there may already be a general ambassador training programme, but a STEM department wants its students to be able to talk specifically about STEM during its own WP and outreach activities. These HEIs have requested an inclusive package of training that touches on general ambassador skills and expectations as well as the STEM aspects. However, where participating HEIs already have a strong and established ambassador training programme, this training has been carried out as a top-up or add-on for undergraduates who specifically want to work in STEM subject outreach and WP, see Figure 1.



**Figure 1. Training options**

Once the needs of the HEI have been established, the training session is co-ordinated, booked and advertised to the students. The training session has run on different days and times, depending on the needs of the HEI and the timetable of the expected student uptake. Although the training is delivered directly to the students, the participating HEI is required to have a minimum of two staff members present who will be responsible for carrying out the training in the coming years once the project has concluded.

The content of the training takes on elements of the provision and good practice achieved by the LEP, specifically the references to gender, ethnic minority and disability inclusion in speech, images and general ambassador practice. The training also includes:

- overarching STEM aspects, such as the need for STEM and STEM-skilled people in the UK economy
- the benefits of STEM skills and knowledge to the individual
- video footage of ambassadors in action to allow participating students to see what they are signing up to
- signposting of web resources for general STEM and STEM careers information
- highlighting the need for undergraduates of any specific STEM discipline to be able to point young people in the right direction for information about other STEM subjects if they are unable to answer the questions themselves.

The training was supported by the contents of the *STEM Careers Workbook* (National STEM Centre, 2009). The *STEM Careers Workbook* was designed by the Women in SET team (WiSET) at Sheffield Hallam University as part of the DfE-funded STEM Subject Choice and Careers

Project, and the training sessions were delivered in partnership with a WiSET Project Manager. Particular use was made of the activities suggested on pages 11 and 12 of the workbook and were used during the training to get participants to think about what they would say, and how they would say it, when describing what they do and what they enjoy in terms of STEM. The training also utilised resources from *Teachers TV* (National STEM Centre, n.d.) and videos of STEM careers on the *Futuremorph* website (Science Council, 2012a and 2012b).

In terms of how this training fits within participating universities, it has been run as a top-up 'option' alongside other specific training elements such as working with looked-after children and working with primary schools. The STEM training has also been used as a gateway for access to certain outreach activities, for example, if an individual has not completed the STEM training they are excluded from being able to take part in certain outreach events and activities. This has enabled HEIs to build up groups of "speciality" ambassadors with enhanced skills and knowledge in specific areas. A good example of this can be seen at the University of Sunderland, which already had a strong and well established generic student ambassador training scheme. The activities of this project have supported Sunderland in setting up a variety of specialist training modules for their student ambassadors, one of these being STEM-specific training, and students are able to pick one, many or zero additional training modules. However, for certain STEM projects and activities, only students who have undertaken the STEM training module are able to apply to assist.

Another model of embedding can be seen at Durham University, which has now integrated this training into the *Science Communication* module offered to all level 6 students studying for science degrees. The module requires forty hours of direct contact with a local school and is supported by a two-hour lecture once a week throughout the academic year, plus additional seminar time. This training has now been incorporated into the learning outcomes for the module.

A third example is the University of Bradford, in which the training is being used to train a range of students, researchers and staff who have an interest in supporting the STEM Centre at Bradford (currently under construction, to be completed and opened in March 2013). The centre is for use by schools only (not university students), to enhance knowledge in school STEM subjects and encourage participation in extra-curricular STEM activities using a state-of-the-art science laboratory, lecture theatre and resource centre. Members of the university taking part in the training offered by this project will be able to gain valuable experience of supporting schools and young people using this centre.

The variety of information, skills and sources allows staff in participating HEIs to tailor future training to their own needs and embed these activities within current practice, carrying out the training at a time that suits the ambassador programme rather than following a dictated process.

The staff that have taken part in the training come from a variety of backgrounds and roles within the HEIs, but all of them share one characteristic: they have responsibility of some kind for student ambassadors in STEM subjects and, as such, will be the appropriate people to continue the training in the years to come. The staff are left with the training materials and contact details for the main deliverer should there be any questions in the future.

## Evaluation

Due to a number of unforeseen issues (change of contact at partner HEIs, changing requirements for outreach and the restructuring of the majority of HEIs and how they carry out student training and outreach), the original project plan had to undergo some alterations to enable the objectives to be met. These changes have not been significant but have resulted in a more streamlined training process that enables the good practice being shared to fit neatly and seamlessly into existing or desired student ambassador practice.

In terms of the project and activity carried out within it, the evaluation has been conducted with participating undergraduates and staff members during and after the training, respectively.

At the end of the session, the undergraduates are asked to complete a simple evaluation by writing positive and/or negative comments on post-it notes and leaving them on a wall or board as they

leave. Although informal, this method is anonymous and allows students to provide any written feedback - this tends to be the aspects that they either found most interesting or were least inspired by. The feedback is not only particularly useful for refining the project in terms of minor changes and development, but also for enabling the HEI to see the specific needs of their undergraduates, which may affect the following year's training.

For the participating staff, comments, suggestions and issues are requested via email during the week after the training. This gives them time to process the information delivered, share the results and outcomes with colleagues and begin to assess when and how they will deliver the training in the coming years.

Below are some comments from students about the training that was delivered in their HEI and from the staff members who also undertook the training and will have responsibility for delivering it in future years:

*What the undergraduates liked:*

- 'Seeing all the resources available to help promote STEM'
- 'The videos were very useful'
- 'Knowing how varied careers are that people can get into through STEM subjects'
- 'Learning how STEM affects just about every subject'.

*What students thought could be improved:*

- 'More ideas on how to inform student on STEM courses'
- 'Perhaps more practical group involvement'.

*Comments from staff:*

- Megan Lunn, Sunderland University: 'The session was well thought-out with a good mix of activity, information and discussion and it bridged the gap for those currently on science-intensive courses and those that weren't. We found it raised STEM awareness for all of our ambassadors enabling [them] to acquire the confidence to answer questions to prospective STEM students. We will definitely use elements of the session in our future training for all ambassadors. The facts are a good way of highlighting the importance [of STEM subjects], whilst getting everyone to consider how STEM relates to their course, no matter what their subject of study, was a useful [activity]'
- Marta Pyrek, Northumbria University: 'The STEM initiative was a major driver for us to create a group of committed and passionate STEM reps who we use now on regular basis'
- Joanne Crowther, University of Bradford: 'It was useful for the students to consider how they talk about STEM to students younger than themselves and what kind of language to use to best to describe what they do. The session was both well attended and very much appreciated by our undergraduates'.

In total, nine universities participated in the project, and in some cases more than once as people from different departments and backgrounds found out about it. Table 1 shows the institutions that participated in the project plus the number of staff and students that were trained.

**Table 1. Project statistics**

| <b>Institution</b>          | <b>Subject area</b>                         | <b>Students</b> | <b>Staff</b> |
|-----------------------------|---|-----------------|--------------|
| Durham University           | Sciences                                    | 34              | 3            |
| Northumbria University      | Engineering                                 | 27              | 2            |
| Sheffield Hallam University | STEM  | 10              | 2            |
| University of Bradford      | Volunteers for the British Science Festival | 72              | 2            |
| University of Bradford      | Engineering                                 | 48              | 3            |
| University of Bradford      | STEM Centre volunteers                      | 91              | 4            |
| University of Hull          | Sciences                                    | 17              | 3            |
| University of Leeds         | STEM  | 26              | 2            |
| University of Sheffield     | STEM/WP                                     | 56              | 3            |
| University of Sheffield     | Chemistry                                   | 12              | 1            |
| University of Sunderland    | STEM/WP                                     | 45              | 4            |
| University of York          | Physics                                     | 22              | 2            |
|                             |   | <b>460</b>      | <b>31</b>    |

## Discussion, summary

The flexible model developed by this approach means that there is no conflict between the training delivered through this project and the HEIs' own ambassador training. The feedback from the staff that were trained suggests that this programme will be integrated into all new training for STEM undergraduate ambassadors and that, in some cases, this training has been the inaugural event for the establishment of specific STEM ambassadors.

By meeting the needs of the individual HEI, this project has been able to achieve a strong commitment from the participating staff and a high level of interest from the students in doing outreach and WP work in the future. The training has also highlighted to undergraduates and staff the need for sharing this passion and knowledge and its relevance not only to young people, but also to school staff, parents and the general public, a concept that encouraged participants who were nervous about working with young people to think about other groups they can work with.

## Further development

All participating HEIs have noted their intention to deliver the training in future years, although it will be carried out in different ways in different HEIs. In one HEI, the session will be kept as an add-on to other sessions to allow access to specific STEM events and other elements of the training will be used during all ambassador training (for any subject) to ensure that everyone working with the local schools and young people is fully aware of how STEM affects every subject and is relevant to the whole of society. In another HEI, where the training was delivered as part of a *Science Communication* module for undergraduates carrying out 40 hours of work with a local school during the course of the academic year, the training will be embedded within the module and become part of the curriculum.

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