



Tim G Harrison*
Bristol ChemLabS
School Teacher Fellow
Dudley E Shallcross
Bristol ChemLabS
Outreach Director

School of Chemistry
Bristol University
BS8 1TS

*t.g.harrison@bristol.ac.uk

It is easy to discuss the content of a first year course with a resident STF and to be made aware of material that will be totally new and of course to know what students should already know

The impact of Teacher Fellows on teaching and assessment at tertiary level

Abstract

It is perceived that Outreach activities are primarily conducted to raise the profile of the department and the subject with a view to recruitment. However, we highlight a range of benefits to teaching practice and assessment of practical teaching at tertiary level that can arise from such activities. In particular, engaging with secondary school teachers can provide invaluable insight into successful teaching and learning strategies in particular for first year undergraduates.

Introduction

Bristol ChemLabS is a HEFCE CETL that has dedicated significant resources to its Outreach program to secondary schools and the general public. One of the main components of the program has been the appointment of a full time School Teacher Fellow (STF) Tim Harrison for the duration of the CETL project. The advantages such an appointment brings to Outreach activities are discussed by Shallcross and Harrison¹ highlighting the effectiveness of such activities, particularly to schools. The potential benefits of a good outreach program in terms of promoting the subject and in the long term recruitment to the subject are obvious. However, are there other direct benefits to a department from such endeavours in terms of teaching practice and assessment? After two years of our outreach program we reflect on some possible benefits.

Benefits to Teaching at tertiary level

Having a STF in the Department has had a significant impact on undergraduate teaching. The STF has discussed courses, sat in on lectures and most importantly had an input on the design and implementation of 1st year practicals. It is easy to discuss the content of a first year course with a resident STF and to be made aware of material that will be totally new and of course to know what students should already know². Two groups in particular have benefited from involvement with the Outreach program in terms of their tertiary teaching.

Benefits to Academics

For the academics involved in Outreach activities (about 30% of staff) it has been an opportunity for them to interact with secondary school students and the general public, something Barnes³ implores us to do. In particular working with a range of audiences (such as adults with visual impairment) and over a range of timescales (from the 10 minute presentation to the day long activity) has challenged them to rethink teaching strategies and to engage the full range of senses in lectures and workshops and in particular not to immediately construct a PowerPoint presentation. More lecturers have developed practical or computer generated demonstrations for outreach purposes and this has encouraged them to use demonstrations in lectures and break out from the 'safe' PowerPoint or chalk and talk presentation. Perfumers smell sticks have been used on occasion! Informal and formal feedback from undergraduates has shown their appreciation of this effort and there is evidence from interactions in workshops that well thought out demonstrations have aided student cognition.

Giving subject updates to secondary teachers has been a very valuable experience for the academics let alone the teachers. They have provided real insight for the academics highlighting those subject areas that are difficult to grasp and why. Through interaction with secondary school teachers academics have been exposed to different teaching styles themselves and strategies for teaching difficult topics. This has been a powerful way of refreshing the link between tertiary level and secondary level teaching.

Benefits to Postgraduates

Postgraduates make a vital contribution to the Outreach Program. In surveys they highlighted several benefits of involvement in Outreach. These included: giving

presentations of their research to a wide range of audiences, writing articles for journals targeted at schools and working in practicals with the complete range of young people of school age. They found that this forced them to understand the background to their research and they were often challenged by interesting questions that sometimes brought new perspectives to their research. Some postgraduates are involved in supporting the delivery of workshops to undergraduates; they found the outreach program a very useful launch pad into honing teaching skills. In addition, working with a secondary school teacher provided many useful insights into teaching strategies, something that is also true for academics. Being praised by school teachers and the general public for a job well done has excellent benefits for the individual and department in terms of teaching and demonstrating confidence and quality.

The Approach of the Outreach Program and its impact on practical assessment

Often evaluation of an undergraduate course involves a questionnaire completed either in a few minutes at the end of the course or perhaps some time after the course has ended. Some of the feedback can be useful but a lot is not. The use of focus groups is a very valuable way of obtaining feedback and improving evaluation and is used at Bristol. But are there other ways that we can capture useful information on teaching to inform practice?

In the outreach program we take the view that we do not want to hand out questionnaires to students before they start an activity and then on completion of the activity to find out whether it has done what it set out to do. There seems no poorer way to begin an enthusing activity and it is hardly the way to conclude an event. The questionnaires are often completed hastily because the accompanying teachers wish to leave quickly. Are the answers to the questionnaires what the participants really think or are they what they think you want to read? Is there sufficient time for reflection set aside for filling in the evaluation forms? Think back to your own attendance at a recent workshop or conference and your own attitude to the inevitable course survey. Some surveying using questionnaires is valuable, but what else can be done?

It is useful as a starting point to consider why Outreach providers should obtain feedback on their events. We suggest that there are several reasons. First there is a need to find out where an improvement could be made in an event that will be run again. Secondly, it may be a requirement from a funding body to assess the impact of the event. Thirdly feedback may provide numerous quotes that can be used in articles, web pages, presentations and possibly in future grant applications. Lastly, and hopefully, there is the 'feel good' factor of a job well done by all those concerned. Are questionnaires to students the way to elicit this information?

In the case of laboratory work we invite demonstrators to comment on unclear instructions, as they are the ones likely to be asked for an explanation repeatedly. They will be able to judge the level of engagement with the task(s) in hand. They will also be able to offer constructive suggestions for improvement of text, practical layout and timing. Such feedback from demonstrators during undergraduate practical teaching has been a powerful evaluation mechanism.

Questionnaires given to accompanying teachers are also invaluable. In most cases questionnaires given to teachers early on in the activity, so that they are aware of the areas to look at, will yield more useful information than ones given at the end of the session, when its return can not be guaranteed. Teachers can also be asked to comment on the level of the activity in relation to the ability of the participating group and to its appropriateness to links within the subject specification. Since there is often considerable cross-over between Post 16 and 1st year undergraduate practical work, we have had much useful advice from secondary school teachers which together with their evaluation of practical procedures and practical scripts, has benefited undergraduate work.

The expertise of technicians is also sought to inform future practical outreach events. Whilst good events will already have involved the technical staff in the planning stages, their thoughts on possible improvements should be captured fairly quickly afterwards whether this is adjustments to numbers, sizes or types of glassware, positioning of stock bottles or in the issuing of laboratory coats. Indeed, technical staff form a very valuable part of the evaluation of undergraduate laboratory sessions.

Summary and looking forward

Working closely with a range of secondary school teachers can have significant benefits in terms of informing Teaching and Learning practice, and evaluation of practical teaching, in HEIs. For many years at Bristol we have had a Teaching Advisory Board, composed of secondary school teachers, that meets once a year to review topics in Chemistry and aspects of teaching and this has been of great help. However, having a regular flow of teachers through the department throughout the year has been very beneficial to academics, postgraduates and technical staff, in particular in the area of practical Chemistry.

The concept of a School Teacher Fellow has been taken up by the *Chemistry for our Future* Pilot scheme and seven STFs will be working with Chemistry Departments in Bath, Nottingham, Leeds, Warwick, Birmingham, Sheffield and Reading, together with TGH at Bristol and David Read at Southampton funded under separate schemes. Some of these STFs will also review first year undergraduate courses in their respective departments in 2007-2008.

Acknowledgments

DES thanks the HEA for a National Teaching Fellowship and we thank Bristol ChemLabS and CHeMneT (our school teacher network) for their support.

References

1. Shallcross D. E. and Harrison T. G. (2007) A Secondary School Teacher Fellow within a University Chemistry Department: The answer to problems of recruitment and transition from secondary school to University and subsequent retention? *Chemistry Education Research and Practice*, **8**, 101-104.
2. Ausubel D. P. (1968) *Educational psychology: A cognitive view*. New York, Rinehart and Winston.
3. Barnes, N. (1999) Switching places: Why college teachers should teach high school students. *Curriculum Inquiry*, **29**, 293-313.