The Scottish Universities Science School (SUSS)

Many of you reading this brief article may have started your association with SSERC through attendance at a SUSS event. Without doubt, SUSS is, for the SSERC team, the most complex and challenging event in our calendar. We thought it might be interesting to look back at what has been achieved over the years.

Figure 1 - Lunch at SUSS 2019.

Following discussions with colleagues in the Teacher Education Institutes (TEIs), it was agreed to extend SSERC's involvement with Professional Graduate Diploma in Education (PGDE) students to include subject coverage across the sciences and offer support for practical work in areas outside a student's specialism; thus in 2005 the Scottish Universities Science School (SUSS) was developed. Here, we explore how SUSS has become established as an important feature in the educational calendar.

SUSS programme

SUSS is a two-day, residential event bringing together Biology, Chemistry and Physics PGDE students and graduating science/education students from across Scotland and aims to provide participants with:

- experience in a range of activities not usually available during initial teacher education programmes;
- opportunities to develop expertise in teaching topics outside of their subject specialisms;
- networking opportunities with other teachers of science from across Scotland;
- an introduction to high quality professional development and information on where and how to access further development opportunities;
- information on sources of practical support.

SUSS is timetabled into the PGDE year and takes place in January. For most student teachers this falls between first and second blocks of teaching experience. Attendance at SUSS is voluntary but typically >95% of the eligible cohort attend from across all 10 Scottish TEIs.

The programme includes both subject-specialist and cross-curricular sessions and consists of a mix of hands-on practical sessions, lectures, demonstrations and discussion sessions. Students work through activities much as their pupils might with workshop tutors providing guidance on pedagogy and classroom management.

On Day 1, students are split into groups with colleagues from across the universities depending on their subject specialism (Biology, Chemistry or Physics). Regardless of their specialism, each student attends a biology, chemistry and physics session. On Day 2, students work in mixed subject groups with colleagues from across the universities. Each mixed group attends the same sessions throughout the course of the day including practical hands-on activities, discussion activities and input from the Teacher Support Organisations.

For most delegates, attendance at SUSS is their first experience of external professional development and we hope that this will be the start of a career-long association with SSERC and the other professional bodies and associations. Such an approach accords well with previous observations [1] that:

> *'Beginning teachers are at the start of their professional journey, no matter how well prepared they might be by their experiences during initial teacher education.'*

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Evaluation

Student feedback

We report here on cumulative evaluations of SUSS for the period 2013-2018. From 2013-2018 there were 1048 attendees at SUSS representing >95% of the eligible cohort. Students are asked to complete evaluations prior to their departure from SUSS; typically, the response rate is 80+%.

Students are asked to rate their overall experience of SUSS from 'very good', 'good', 'average' or 'poor'. Results are overwhelmingly positive with 99.1% reporting their experience to be either 'good' (12.4%) or very good' (86.7%). Across the years only 7 individuals have reported that their experience was 'average' (0.8%) and 1 individual reported their experience as 'poor' (0.1%). The majority of these 'less positive' comments refer to aspects related to the accommodation.

Students are asked to rate the individual sessions in providing them with information to use in their teaching and professional development from 'very useful', 'useful', 'of some use', 'of little/no use' or 'N/A' if a student had not attended the session. The most popular sessions were the subject focussed sessions with a minimum of 94% of students finding these to be 'useful' or 'very useful'. For all subject specific sessions, students particularly enjoyed the practical activities and the ideas they gained from them:

- *The experiments were great, perfect for the classroom, great resources.*
- *Great ideas for teaching science and making science exciting in class!*
- *Lots of good activities that are cheap and accessible.*
- *Very interesting to do the practical and see what challenges pupils might face.*

Figure 2 - A subject workshop.

Students report that sessions have improved their subject knowledge, helped to address misconceptions and improved their confidence, particularly in teaching topics that are outside their subject specialisms:

- *Learnt a lot! Didn't realise how little I knew about photosynthesis.*
- *This session was useful and cleared up a few of my own misconceptions.*
- *Fantastic, very useful and helped build my confidence in an area I'm weakest.*

Students also felt that sessions were well delivered and that the enthusiasm and knowledge of all the presenters resulted in lots of tips and guidance for improving learning and teaching in the classroom:

- *Good practical and reflective advice of classroom teaching.*
- *Informative, well presented, excellent resources and ideas.*
- *Really interesting to hear from a teacher's point of view.*

What students enjoyed most about the evening lectures and keynote sessions was that they were inspiring, motivational and entertaining. Students felt that invited speakers were good role models and found their perspectives to be interesting and engaging. Many remarked that the keynote was an enjoyable and appropriate way to start the event and the evening lectures were a good way to end Day 1.

The 'Teacher Support Organisations' and 'What can SSERC do for you?' sessions were particularly useful for building students' professional networks and for providing information about support and further development opportunities:

- *Didn't realise there was so much support for teachers.*
- *Great to put names to faces for organisations and to build professional network*

Tutor feedback

Several TEI tutors were interviewed at SUSS 2018 and their feedback was also very positive. SUSS is held in very high regard by tutors and is seen as a great opportunity to expose their students to high quality professional development at an early stage in their careers and this is confirmed by Findlay [2] who, in her article about science teacher education in Scotland, highlighted that SUSS is *'An important and enjoyable part of PGDE science courses across Scotland'*.

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Figure 3 - Song and dance routines from members of the SSERC team 'help the experiments go down...'.

In SSERC we believe that our close partnership with TEI tutors is responsible for SUSS routinely attracting such a large proportion of the available student cohort. Tutors feel that SUSS represents an invaluable opportunity for their students to network with others from around Scotland and to begin to build their professional networks.

Success factors

We believe the following have been key to the success of the SUSS model:

- Our partnership with TEIs is robust ensuring that we attract the vast majority of the available cohort each year.
- There is a real opportunity for delegates to network with virtually all their fellow student cohort from across Scotland.
- All presenters are experienced practitioners with relevant practical advice and guidance.
- We focus on experiential activities which are not normally part of the initial teacher education experience.
- The programme is designed to allow participants to develop expertise outside of their subject specialism in areas which they will be required to teach.
- The timing of SUSS in the academic year means that students can try out the ideas/activities covered at SUSS during subsequent teaching experience placements.
- Our chosen venue (an out-of-city, quality hotel) changes the tutor-student dynamic and ensures that everyone is treated equally as professionals. It also provides an immersive residential experience.
- Student teachers gain a deeper understanding of the level and variety of professional support which is available to them and are given information on how to access further support and development opportunities throughout their future careers.

The future?

There is no reason, in principle, why the model of SUSS could not be extended to other parts of the UK. In England, because of the absolute number of student teachers, it would probably make sense to bring groups of PGCE providers together on a regional basis.

In our view the model and structure of SUSS could also be extended beyond the secondary sciences.

Other secondary curriculum areas might benefit from an early 'large-scale' intervention at a national level. In this regard we can report that the Scottish Government has provided SSERC with funding to run a pilot event (the Scottish Universities Technology School [SUTS]) for PGDE students who are following either Design & Technology or Technological Education routes into teaching and our first such event was held in December 2018. Feedback from SUTS 2018 was very positive and we plan to run more such activities going forwards.

We feel that the primary education sector could also benefit from the SUSS model. We recognise that those following routes into primary teaching often lack confidence, and in some cases competence, in the teaching of experimental science. Events like SUSS with a focus on the primary curriculum would offer rich opportunities to address some of these issues. A particular challenge in this regard would be the number of PGDE Primary entrants (the target for 2018/19 entry in Scotland was 1200 [Scottish Funding Council, 2018] although with sufficient resource in place we believe that the quality of learning and teaching in the classrooms of probationer teachers would be much enhanced at a time when the Government's STEM Strategy [3] calls for such change.

A fuller version of this article appeared in Science Teacher Education - see [4]. <<

References

[1] Patrick, F., Elliot, D., Hulme, M. and McPhee, A. (2010), 'The importance of collegiality and reciprocal learning in the professional development of beginning teachers', *J. Education for Teaching: International Research and Pedagogy*, **36**, (3), 277-289.

[2] Findlay, M. (2017), 'Science teacher education in Scotland', *Science Teacher Education*, **80**, 33-45.

[3] Scottish Government (2017), 'Science, Technology, Engineering and Mathematics - Education and Training Strategy for Scotland'. Available at http://www.gov.scot/Resource/0052/00526536.pdf (accessed 28th January 2019).

[4] Andrews, K., Beaumont, P., Bissett, E. and Crawford, K. (2018), The Scottish Universities Science School, *Science Teacher Education*, **83**, 7-15.