Fund undergraduate students to undertake focused summer intern projects within universities.

With evidence of the potential for undergraduate students to work as research assistants in mathematics and statistics support centres and with a keen desire to develop explicit collaborations between member institutions within the hub, sigma-sw piloted a summer intern programme for students across the region which aimed:

1. To provide undergraduates with an opportunity to engage in research activity linked to principles of mathematics and statistics support in HE;

2. To develop effective, working collaborations between colleagues in sigma-sw initiated by the work carried out by students during the summer internship and leading to a research portfolio within sigma-sw.

Each institution took charge of its own project design and student recruitment during Spring 2011 resulting in the following 4 projects.

**Measuring the effectiveness of mathematics support services;** Matthew Taylor, Cardiff University with supervisors Jonathan Gillard & Rob Wilson

Providing concrete evidence of the effectiveness of mathematics support continues to be very difficult. We used the internship programme to offer the student a research project which would allow them to develop their statistical skills whilst carrying out exploratory analyses on our support usage data. What emerged from the project was a simulation model, parameterised using data predominantly from Cardiff, that we hope to develop into a functional and informative tool for evaluating the effectiveness of mathematics support services.

**Creating a community of practice for maths and stats support staff and an online resource for students;** Oliver Bond, University of Exeter with supervisor Barrie Cooper

This project built an online resource for students, not to replicate existing online resources for maths and stats, but to validate them through student review and build

1. More information on sigma-sw is available from http://www.bath.ac.uk/study/sigma-sw
a framework for a sustainable student support community. The new site (http://labspace.open.ac.uk/course/view.php?id=7405) will become the online hub for maths and stats support at Exeter and through regular student and staff use, should evolve into a valuable and effective site that is freely accessible to all. Regular contact and feedback with interns from other HEIs has ensured the value of the final output to the wider student community.

What do drop-in usage statistics tell us? Callum Anderson, Plymouth University with supervisor Dave Graham

An analysis of usage statistics and feedback, including identification of the main areas of demand and patterns of behaviour in students, has been immensely valuable for the SUM:UP (Support for Undergraduate Mathematics at the University of Plymouth) service. This project also compared such statistics for different institutions to identify common or distinctive features, which highlighted several issues in performing such comparisons across different models of provision and using varied means of recording participation.

Helping students learn how to learn mathematics at university Andrew Kennedy, University of Bath with supervisors Jane White & Emma Cliffe

It is fairly uncommon for students entering a mathematics degree programme to consider, in any great depth, how they learn effectively. By contrast, experience suggests that developing a range of approaches to tackle unfamiliar problems can help students maintain interest and enthusiasm for mathematics at a higher level. We are increasingly keen to get students thinking about their learning, to find ways for them to develop independent study skills which are effective in the long-term, not just at examination time. The online resource developed during the internship will form one component of study skills sessions that will be offered in the mathematics support centre in Bath in 2011/12.

For the project as a whole Aim 1 was achieved to a good degree. Each student spent time researching the background to, and contextualising, their project. Projects were based in, and relevant to, each HEI but students were expected to liaise with students in the other HEIs to test materials, provide data etc. The hub structure enhanced this process by allowing students to receive and respond to constructive criticism from academics and the intern peers. We arranged an initial meeting at Bath and following this the students communicated using a Facebook group and arranged two further meetings, one at Exeter and one at Plymouth. A plenary lecture, planned at these meetings, was delivered by the students at the CETL-MSOR Conference 2011.

The long term Aim 2 has certainly been facilitated by the summer intern programme. Each project involved the development of a resource and/or analysis of mathematics support data. It is now our responsibility to move forward first by trialling materials developed by the interns across the region; then by using this as a platform to create further collaborative research projects.

Selected reflective comments from the student interns are presented below:

Matthew Taylor, Cardiff University: “I thoroughly enjoyed my work on the project, as it allowed me to experience mathematical research, explore a practical application of my mathematical knowledge and network with other students across the United Kingdom. I feel my confidence in my ability to work independently and trust my own instincts and judgements has also benefited greatly. As an added bonus, I found the CETL-MSOR conference a great insight into how the teaching of Mathematics at undergraduate level can move forward.”

Ollie Bond, University of Exeter: “I benefited a lot from this project and I’m very glad I participated. I gained some more ideas about what working from home involves and academic research, whilst my teamwork and organisational skills were enhanced. As a group we were able to set up meetings to collaboratively get work done, and we actively shared a lot of ideas.”

Callum Anderson, Plymouth University: “This project has been an introduction into academic research and into working within a network of institutes. It has also increased my abilities to work independently and as part of a team, provide feedback on others work, write reports and meet self-set deadlines. Overall it has been a very valuable experience and I would strongly advise students to take a similar opportunity if possible.”

Andrew Kennedy, University of Bath: “Not only have I found out more about how I learn, but I have had a chance to develop my skills in a way which will hopefully aid other students in their learning. Throughout the project the staff and students from the four universities have provided valuable input which has helped shape the structure of the final site. Special thanks are due to Dr Jane White and Dr Emma Cliffe of the University of Bath, whose support and advice made the project possible.”

Reflective comments from our student interns provide us with useful ideas to enhance the programme. Most notably, we acknowledge that a preliminary meeting, prior to the start of all projects, would be hugely beneficial to initiate and subsequently facilitate research support by the student community. The other issue that we should consider is placing more than one student in any participating HEI whilst maintaining a minimum of 4 participating HEI.

The success of our pilot strengthens the resolve to continue to develop the intern programme beyond the life of the National HE STEM Programme to create a community of students involved in the development of mathematics and statistics support nationally, to provide opportunities for students to engage in research into mathematics and statistics support in HEI and to develop and strengthen research collaborations in mathematics and statistics support within and between regional hubs.