### Outputs: What has been produced thus far?

Since receiving the Teaching Award, staff in the Department of Geography have been further developing the ideas outlined in the bid for implementation as part of the undergraduate teaching programme. This activity has involved more detailed design of classes for delivery to students in a practical setting (field and laboratory), procurement of equipment and materials that were required to support these new activities, and initial set up and staff instruction on use of these new technologies. Staff and supporting personnel (Research Assistants, postgraduate students) spent time in the late summer of 2012 developing the first implementation of new practical teaching activities conducted in the 2012/13 academic year. A second implementation of these activities will occur in the 2013/14 academic year, along with further new developments to be delivered this coming year.

The cornerstone activity during the first year of this project was a new one-day field experience for all (100+) undergraduate geography students at a field site in Hertfordshire, which was successfully delivered in October 2012. The field experience, in which all 1st year undergraduates visited a field site managed by the Woodland Trust, took place on 31 October. Students were introduced to the site by Woodland Trust staff and then participated in three experiences based on geographical field techniques (ecology, instrumentation, mapping). The mapping and instrumentation exercises utilised equipment purchased with the Teaching Fund Award and the mapping exercises included ground based mapping using handheld GPS and imaging using infrared cameras, followed by aerial mapping of vegetation cover using balloon mounted mini-cameras. The instrumentation exercises included the investigation of the vertical profile of wind and how this changes with roughness of the terrain.

Further developments have been made in identifying techniques that could be demonstrated in our online ‘video manuals’ series. These are planned to cover a wide range of techniques used in the field and laboratory for physical geography research, using both existing equipment and also items purchased with the CTF award. An example video tutorial we have produced can be viewed at: [http://youtu.be/i7WQocsPVEQ](http://youtu.be/i7WQocsPVEQ)
Outcomes/Impact: To what extent are you achieving the original aims of the project? Please include examples where possible.

The project is on target to meet its original aims, within a revised timeframe. A number of new technologies are being used to deliver significant improvements in our practically based teaching for undergraduate students. These have allowed us to develop a completely new Physical Geography fieldwork component into the 1st year UG Geography degree, allowing every one of the 100+ 1st yr students to explore the practical application of "Geographical Science" and to apply the types of methods staff use in their own research, beyond their A-Level experience. Based in the largest new forest development in England for more than a century, each student undertook six kinds of environmental measurement (aerial imaging, ecological surveying etc). This "Field Day" became part of the Dept's new very successful 1st yr 'Activity Week', and the following are a representative sample of comments from the UG Feedback forms collected at week's end:

- "Going to Heartwood Forest, participating in group activities and getting familiar with the devices and equipment made me feel like a real geographer!"
- "Physical Geography Field work is awesome"
- "Being able to learn practically. The Physical geography day was brilliant."
- "Using 'Research-grade' instruments on the field; especially balloon imaging"
- "Using the near infrared cameras was a lot of fun and a brand new experience."
- Heartwood Forest – The Best!"

On-going activities include the development of a suite of lab-based practical sessions complementing the field trip, to further enhance the skills of undergraduate physical geographers in using practical tools for environmental research.

Supportive factors: What are the main factors that are contributing to the successful progress of the project?

The funds provided by the College Teaching Fund have allowed the purchase of technologies that would be beyond the levels of routine funding investment made by the Department in practical teaching. Furthermore, the Teaching Fund award has acted as a catalyst for the discussion of ideas that can be developed into interesting, inspirational and enjoyable teaching activities - and we have been able to access "educational discounts" for some of the technologies purchased.

Success of the project is currently being measured by anecdotal evidence of student enjoyment, engagement and personal development as a result of participation in these practical taught activities. Students seem to show a greater depth of engagement when teaching involves more 'hands-on' experience in making measurements and generating their own data (see comments from students included above, collected from "feedback sheets" given out after the 1st year "Activity Week"). We feel that this is likely to result in greater student satisfaction, in terms of both the greater learning efficiency and more enjoyment of the taught programme. A more structured survey of student attitudes and experiences of the project implementations is planned after the final wave of activities have been implemented and taught during 2013/14.

Challenges: Have you experienced any barriers or challenges in developing your project? What could be done to support innovation in the curriculum?

The progress of the project may take longer than initially anticipated, owing to the time it takes to identify, test, refine and develop these scientific techniques so that they are suitable for use in student activities. Hasty deployment into the taught programme could be counter-productive as any difficulties in using the devices in practical sessions could dissuade students from pursuing their use in the future (e.g. as part of their dissertation research). As such, we are keen that methods are only included if they can be utilised in context and as part of a carefully planned programme of learning. Furthermore, hasty purchasing of equipment can result in inappropriate acquisitions - and so far we have been able to avoid this by taking our time and getting demonstrations and "try outs" of most of the items acquired before we agreed to purchase.
In order to fully implement the aims and objectives of this project, we request that the project is extended for a further 12 months. This will allow for the most careful implementation of increased practical teaching into the undergraduate programme.

**Recommendations:** Based on your projects, what recommendations would you make for improving the curriculum and student experience generally? Are there any wider implications of your project for the College/University undergraduate and/or postgraduate curriculum? In particular what would be the implications of introducing your innovation on a large scale across a range of disciplines?

We have found that providing an increased level of practical and field based learning activities for Geography students encourages an increased engagement with the taught material, and a much greater enthusiasm for the topics covered. It is also envisaged that the increase in practical teaching will provide students with enhanced skills for greater employability upon graduation from their degree.

The wider implication of this project are likely to be that a diversity of teaching methods leads to more effective teaching of science-based topics, in addition to enhanced student engagement and satisfaction. Our intention is to further build on these ideas and developments within our large taught postgraduate programme, with a greater degree of technical challenge for the more advanced students.

**Dissemination:** Has the project been shared with colleagues within and beyond the institution yet? What are you plans to do so?

Dissemination is likely to take place after 2013, as this will allow plenty of time to test the techniques and effectively deploy them in the taught programme. Furthermore, it will also allow us to audit their popularity with the students (2x cohorts for the ‘1st year field trip’; 1x cohort for the ‘Methods from the Research Frontier’ 2nd year activity being introduced this year).

Current plans for dissemination are a paper for presentation at the annual KLE Annual Excellence in Teaching Conference, with the potential for a subsequent paper for publication in the journal ‘Geography Education: Research and Practice’.