Promoting IBSE with teacher mentors

Summary:
Integrating IBSE practices into work with school based subject mentors as part of an Initial Teacher Training course.

Aims:
To develop and common understanding of IBSE practices amongst a group of mentors who work with the faculty of education as part of their teacher education program and work with them to integrate this into their mentoring work with those in teacher training.

Main activities:
Development of an understanding of IBSE with experienced science teachers who are mentors through faculty based sessions. Where possible support them in their work with trainee teachers on the faculty of education PGCE teacher training and then collate and share their experience of this work and their own understanding of IBSE in secondary schools in England.

Narrative:
The work with mentors as part of this program is most likely to involve three stages, two based at the faculty in organized sessions and one where they look to implement and develop the ideas raised in their own practice and/or within the context of their work supporting trainee teachers as part of the PGCE course
- Orientation and reflection
- Implementation and individual development
- Sharing of practice, refection and further development

Orientation and reflection: As part of the faculty based work, the mentors will be introduced to the IBSE model and examples of it in formal training sessions. This will have overlapping themes and content with the session that will be run for trainee teachers. There will be opportunities for the mentors to share their own practice, building upon the work done in the visionary workshop as part of the PATHWAY project which most were present at

Implementation and individual development: In the period between the first and third stages, the mentors will work in their own schools looking at and reflecting upon their own IBSE practice and/or supporting the trainee teachers working with them to do so. There will be opportunities for feedback both formally and informally with staff at the faculty of education which will run the formalized training as well as monitor, collate and share the feedback from all mentors.

Sharing of practice, refection and further development: A final meeting of mentors towards the end of the academic year will provide an opportunity for reflection upon the implementation of IBSE ideas. There will be dual focus here, looking at their own teaching as well as their work with the trainee teachers. These outcomes can feed into revision and development of the materials that are available for mentors as well as trainees. It may also help to

inform subsequent training sessions for mentors and trainee teachers. These materials developed and available will be part of a wider package that includes that which has been developed for work with the trainee teachers, this will provide a consistent message and resource bank that will hopefully support all those involved. Throughout the year there will be opportunities both

Methods of learning/training: Mentors draw on the content and outcomes of faculty training sessions to inform their own practice and the ways in which they can support training teachers in their school.

End user: Experienced teachers working as mentors as part of the PGCE course at the Faculty of Education. They all work in 11-16 or 11-18 comprehensive schools in Eastern England. This will also hopefully impact upon their own classes.

Involved actors: Teacher trainers

Location: At schools in the faculty.

Languages available: English

Where to find the application: University of Cambridge, mediated through the VLE

Evaluation parameters: Mentors will provide feedback on the sessions and reflect on their own experiences with respect to their own use of IBSE as well as work with trainee teachers either through and formal/semi-formal questionnaires, group discussions (which will be recorded) as well as contributions to the course VLE.

Duration: The mentor meetings where this training and group feedback happen up to twice a year. As the PGCE course

runs over a year then this intervention is likely to run over the course of an academic year

Optimum number of participants: Potentially up to 50 (approx current number of mentors) although it is expected that a smaller group of mentors (approx 10) will engage with this on a more detailed level.

Additional information or resources: All current mentors are aware of the project and most participated in the visionary workshops

Teachers' Competencies

1	subject matter/content knowledge	
2	nature of science	x
3	Multidisciplinary	x
4	knowledge of contemporary science	
5	variety of (especially student-centred) instructional strategies	x
6	lifelong learning	x
7	self-reflection	x
8	teaching/ learning processes within the domain	x
9	using laboratories, experiments, projects	x
10	common sense knowledge and learning difficulties	x
11	use of ICTs	
12	knowledge, planning and use of curricular materials	x
13	Information and Communication Technologies with Technological Pedagogical Content Knowledge	

Mapping best practices with main principles

3. Develop multiple goals:
- understanding big ideas in science including ideas of science, and ideas about science
- scientific capabilities concerned with gathering and using evidence
- scientific attitudes

By engaging with ideas of IBSE, and setting them in context in their work in school with trainee teachers and pupils, all three groups will gain a good appreciation of some big ideas of science, and develop capabilities concerned with gathering and using evidence.

5. Relevance of the content to daily life of students:

Because teachers' lessons are planned in response to a perceived deficit in the teaching and learning that takes place in their lessons, teachers invariably plan an intervention part of whose purpose is to contextualize science against students' daily life, developing relevance for them in learning about science. Since 2006, the curriculum has made more explicit reference to this and so contextualized lessons relating to the everyday life of students are considered to be common, ad often best, practice which they would aim to emulate. This means that the work done by mentors and trainees will almost certainly take account of this to some extent

6. Understanding science as a process not as stable facts. Using up to date information of science and education:

By engaging with ideas about IBSE in Faculty, and exploiting those ideas in school, both mentors, trainees and teachers will develop an understanding that science is not just about accumulation of facts.

7. Activities for gaining knowledge, not for entertainment, nor for simple imitating of results:

As part of the training, all teachers are supported to develop an understanding of practical work and its value within science education. It is most likely that many of both their and trainee teachers lessons and IBSE styled activities will involve practical work for students in some fashion. It would be hoped that their aspiration in lesson planning to develop activities which enable pupils to gain knowledge in the ways described above. Equally the process of supporting the development of the professional competence of trainee teachers in this regard will be a beneficial learning process for the both the mentor and the trainee teacher.

8. Doing science: experimenting, analyzing, interpreting, redefining explanations:

Principal 8 forms the basis for many of the kinds of activities which both the mentors and the trainee teachers they are working with include as part of their teaching. As sich this will regularly be a focus in lessons. It will also form the basis of the context and examples that will be provided in the faculty session(s).

9. Assessment: formative ~ of students' learning and the summative ~ of their progress:

From the perspective of the support for trainee teachers, within the course, lessons are evaluated both in advance of teaching as well as through the feedback and professional development cycle that exists as an integral part of the course. Mentors will provide and evaluate the feedback on the successes and further challenges with respect to their lessons and so the development of embedded IBSE practice will become relevant where appropriate and allow a focus for a professional discussion that will hopefully benefit both the mentor and the trainee teacher. In respect of the sharing of good practice, this will hopefully promote reflection on the trainee teachers own professional development.

10. Cooperation among teachers and with experts:

The mentors will have opportunities to work with other mentors involved in the course (the first and third stages mentioned in the earlier section) as well as with the trainee teachers over a prolonged period. This will help support a professional community of practice that involves experienced teachers and trainee teachers together with other school based staff and university teaching staff. All of these relationships are focused on the trainee teacher's professional development as well as that of the mentor (which whom mentoring is a CPD activity in its own right), looking for opportunities to develop and improve.