ESCalate Developing Pedagogy and Practice 2010/11 Grant Project Interim Report

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Project Title	Supporting STEM: providing intervention strategies for borderline ITE students in STEM subjects to increase their success
Project Leader	Ruth Edwards
Institution	University of Southampton
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INTERIM REPORT

Supporting STEM: working with ITE trainees in STEM subjects to increase success

Edwards, R and Hyde, R
University of Southampton

Aims

The aims of this study were two-fold: firstly, to establish the reasons why some ITE students from STEM (specifically mathematics and science) subjects struggle to meet the standards for Qualified Teacher Status (QTS); and secondly, to design and implement intervention strategies to support them. The outcomes of this research will inform the teaching on ITE programmes for the HEI involved in the study and, subsequently, will be used to inform teaching in other HEIs involved in ITE through targeted dissemination of findings from the study. The importance of the study lies in the need for current, and future, high levels of retention of mathematics and science ITE students to alleviate the shortfall in qualified teachers in these subjects, and promote longer-term economic strength underpinned by strong STEM teaching and learning.

Impacts on the original project plan, content and/or time-scale

Some minor changes to the proposed project plan were necessary. A group of trainees who had experienced a difficulty of some significant kind early on in the course were identified and asked to participate. This allowed us to track some of those who might potentially be unsuccessful later in the course. Not all trainees initially invited agreed to take part; as a result whilst some of the trainees involved in the project could be described as 'borderline' in that their early progress at the end of their first professional placement was below that expected at that expected at that stage of the course, this classification did not fit all who contributed.

Three main methods were originally suggested for data collection: systematic analyses of documentary evidence in the form of 'tracking documents' on ITE students in the current and previous years; semi-structured interviews; and taught intervention sessions. Similar documentary analysis of the chosen subset of pre-service teachers' written assignments and school-based reports from mentors were to provide supplementary evidence of areas of concern. Once areas of concern had been established, a series of twilight intervention sessions were to be planned, and the selected participants invited to attend. The pre-service teachers were to be encouraged through these sessions to reflect on their practice and identify individual targets and areas for improvement. Whilst the intervention sessions were intended as group activities, recognition was given that there may be the need for a more individualised approach in some instances. The participants were to be 'tracked' during their second school-based placement and improvements in

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identified areas noted. Documentary analysis of successive school-based reports, throughout this second school-based placement, were to be undertaken to inform interventions in an on-going interactive way over the period of time of the school-based placement. A second (exit) interview was to be held with each participant to identify perceived benefits of the intervention.

The timescale between receiving approval for the project and the end of the course proved too short to implement the data collection, analysis and intervention originally proposed. It was decided to collect and analyse the data however any designed interventions would be implemented for the mathematics cohort starting their ITE course in September 2011. This is described below.

Methodology

Three main methods were employed for data collection: systematic analyses of documentary evidence in the form of 'tracking documents' on ITE students in the current and previous years, semi-structured interviews and focus groups. For the past five years, detailed 'tracking' has been undertaken of all PGCE students at the University of Southampton to highlight 'critical incidents' which may contribute to their lack of success on the course. Such data are now suitably longitudinal to provide key indicators of the factors specifically affecting mathematics and science pre-service teachers. A systematic analysis of these 'tracking' data was undertaken to provide information to answer some aspects of the main research question and inform the second. The sample for the study through semi-structured interviews and focus groups was the cohort of secondary PGCE mathematics and science pre-service teachers at the University of Southampton, with a subset of those pre-service teachers across both subject specialisations identified at the end of their first school-based placement. Guided by a student's professional placement report (written by the school-based mentor in their first professional placement) University-based tutors identified which trainees might benefit had a series of interventions been available. These trainees were subsequently interviewed on a one to one basis and then took part in a focus group to try to identify if common threads linking them. The in-depth individual semi-structured interviews were undertaken in the pre-service teacher's placement school. Evidence of such interviews in situ in schools (Edwards, 2007) indicates that the workplace provides teachers with stimuli to trigger their recall of situations and incidents, resulting in rich data. The individual interviews were conducted by a research assistant to ensure consistency of approach. The pre-service teachers were encouraged through these interviews to reflect on their practice and identify individual targets and areas for improvement. Ten trainees from mathematics and ten from science were invited to take part in the project. Whilst all the trainees from mathematics agreed only one science trainee was involved.

At the end of their second placement in the final week of the course two focus groups were held; one of mathematics and one of science trainees. The same trainees were invited to be part of the focus groups and they were asked the same questions as those in their individual interviews and to discuss some of

the common themes that had arisen from these interviews. Six trainees from mathematics and seven from science took part.

Findings

Analysis of the tracking information held on trainees who suspended or withdrew from the course over the last five years revealed that these trainees fell into two broad categories; those who felt that teaching was “not for them” and trainees who other difficulties, such as poor organisational skills, were reluctant to respond to advice from staff or had not formed a successful relationship with their school mentor.

The records indicate that the trainees in the first group tended to have had little experience of schools prior to starting the course, were mature students following a change in career or had encountered problems with classroom management. Tutor comments indicate personal characteristics such as “lack of assertiveness” and “lack of suitable personality for teaching” were common in those who struggled in the classroom. Roughly half of the trainees in this group had left the course prior to their second school placement, those that did continue longer with the course tended to be mature trainees who were following a change in career.

Trainees described as having poor organisational skills also demonstrated a poor self-awareness of themselves as teachers, a lack of understanding of the need for a range of classroom management strategies, an inability to form positive relationships with pupils, unable to reflect on their progress and weak subject knowledge. Trainees in this group had predominantly been a cause for concern since their first placement however, despite support from school mentors and University tutors, they did not progress sufficiently to be able to complete the course.

Four common themes were identified through the individual interviews as having a major impact on the progress made by trainees; isolation on teaching practice, difficulties with lesson planning and access to resources, presence in the classroom and consistency of support from mentors in school.

Trainees felt ‘alone’ when they were the only PGCE student in a school; in particular when the mentor was perceived to be inexperienced. When comparing their two placement schools trainees felt they had been more successful in a school where there were trainees from the same or another higher education institution than when they had been alone. Trainees reported that having someone in the same position as themselves, or someone who had recently completed a PGCE was helpful, providing support in organisation, completion of paperwork and monitoring of their own progress. Trainees did not need to be from the same subject area to provide this support and opportunities to spend time with other trainees in the school were welcomed. Knowing trainees who had been in the school previously was also identified as being useful.

Isolation on teaching practice is, in part, linked to the structure of the PGCE course. Whilst some trainees have previously completed the mathematics subject knowledge enhancement course run by the University and have established friendship groups the same is not true for students who have direct entry to the PGCE. Trainees spend only a few weeks in University sessions before going into school and have had insufficient time to form a common support group. Social network groups being used by some trainees were not all inclusive and Blackboard, the University's virtual learning platform which features a discussion board was seen to be restrictive in developing a support structure as were organised social activities. It was however noted that the group work activities organised as part of the taught University sessions did encourage trainees to set up limited support networks.

Whilst it is not possible to change the course structure of the whole of the secondary PGCE at this stage, it is possible to implement some interventions to try to reduce the impact of isolation on teaching practice and increase the support available:

- Promote and develop the use of group work activities in University taught sessions to encourage the development of support networks
- Develop a social network 'virtual staffroom' using Facebook which all trainees on the course are invited to join
- Invite experienced ex-trainees to join the Facebook 'virtual staffroom' to offer additional support and guidance

Difficulties involved with lesson planning and access to resources were common to all trainees interviewed. Trainees reported not fully understanding how to reference the National Curriculum and whilst the need for this was emphasised during University sessions this was not always seen as a high priority in school. Some trainees identified particular difficulties with setting individual learning objectives. They felt they more support in early lesson planning was needed, in particular with choosing appropriate resources for pupils at a given level. Trainees acknowledged the need for detailed lesson planning, despite observing experienced teachers not explicitly doing this, and recognised that for themselves, the time spent looking for resources formed a lengthy part of the process.

The trainees interviewed recognised that planning with their school mentor was invaluable. They were aware of a range of strategies to support lesson planning that they had either experienced directly or had knowledge of second hand. These included being given the resources and the topic and then left to work out how they all fitted together, sharing the planning and teaching of a lesson (or series of lessons) with the school mentor, planning a lesson which the mentor then teaches or planning a lesson with another trainee or group of trainees, and then teaching and evaluating the lesson in a way similar to the lesson study model. Trainees acknowledged that lesson planning became easier with practice and suggested ways that future PGCE students might be supported. These included taking learning objectives directly from the National strategies, using 'level ladders' available on the Internet or using examples from text books and past papers to ensure the level was correct.

They felt a resource sharing session at the University would be helpful, as would a lesson plan checklist, which they could use to support planning and subsequent evaluation.

During the first weeks of the mathematics PGCE course all trainees have a session dedicated to lesson planning. Interventions to support trainees with lesson planning can be initiated within this session as follows:

- The trainees will work in groups to plan a lesson on a particular topic at a given level. Each trainee will then take the 'joint' lesson plan into their placement school and talk through it with their mentor. Shared ownership of the lesson plan will make any negative observations made by the mentor less threatening. The trainees will return to the University and share with the others in their group any comments made by the mentors.
- Ask trainees to share resources by uploading them onto Blackboard or directing others to them via the Facebook 'virtual staffroom'.

Tutor comments relating to trainees who struggled in the classroom and had failed to complete the PGCE course included "lack of assertiveness" and "lack of suitable personality for teaching". Classroom presence was also discussed by the trainees interviewed who noted that they had either had conversations on this topic with their mentor in school or something had been written on one or more of their lesson observation forms. Trainees commented that they had not considered how use of voice or body language would be important in the classroom prior to starting the course. Professional themes sessions run by schools on classroom presence were not consistent across those interviewed.

The secondary mathematics trainees are videoed presenting a starter activity during the first few weeks of the course. This was seen to be a useful way of looking at how they present themselves. An additional intervention will be to:

- Run a session on voice coaching/body language/classroom presence for all the PGCE cohort. Running this early in the course will support the development of networks

Consistency of support given by mentors was mentioned by each of the trainees interviewed. In some instances trainees did not form a good relationship with their mentor, whilst another on the same paired placement did. This was accounted for due to differences in personality. Trainees were concerned that some mentors were unable to dedicate themselves sufficiently to the role as they were not full time members of the department or were already stretched as they had the dual role of head of department or Leading Mathematics Teacher. Other problems had arisen when the mentor had taken leave from school due to paternity leave or family problems. It was recognised that, whilst the University does not have a direct role in the appointment of mentors, schools should be reminded as to the advice given by the unviersity on the requirements of the role and greater monitoring of schools in this respect should take place.

Future stages/developments toward completion of the project

- Interventions, informed by findings from the 2010-11 cohort of students, will be implemented from September 2011 with the 2011-12 cohort in mathematics and science subjects;

- Impact of interventions will be evaluated in November 2011;

- Course design, informed by identifying how positive impacts, can be achieved in a sustainable way within the course structure in future school-based placements (September to October);

- Dissemination of findings to PGCE steering group (including school-based staff) at the University of Southampton

- Dissemination of findings to school-based mentors through the PGCE professional mentor meetings and at subject-based mentor meetings intended to offer mentors an opportunity to provide evaluative feedback.

- Implications for whole cohort implementation discussed and agreed, as a course team (October to December); The roll-out of positive outcomes through a re-designed course structure will positively impact on achievement of those PGCE students in other subjects who, in lesser numbers, experience the same difficulties in achieving QTS standards.

- Final report will be submitted to ESCalate by 31st January 2012.

- Presentation of findings at a Teaching and Learning staff development forum at University of Southampton

- Dissemination of findings at relevant conferences, initially at the Association of Mathematics Education Tutors (AMET) and the counterpart in the Association of Science Educators (ASE)

- Journal articles (to be decided). It is anticipated that the findings will lead to changes in current pedagogy and course structure/design.

Summary of expenditure to date

We are still awaiting this information

References

Edwards, J (2007) Primary Trainees' Reflection-in-action. British Society for Research into Learning Mathematics, 27(1), 30-35.

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