

Issues around transition in mathematics and transfer at 16

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Background

Members of the Evaluating Mathematics Pathways (EMP) project team are considering the mathematical experience of learners in many types of school and college. It is apparent that progression to post-16 mathematics is experienced differently in different settings. This paper focuses on a structural fault line, i.e. when students transfer at the end of Key Stage 4 to a new institution.

11-18 schools interested in retaining students start preparing these students for GCE Mathematics and Further Mathematics during Key Stage 4. There remains a problem for effective transition for students who are in 11-16 schools and who go on to study post-16 in a school or college. There is no reason why an 11-16 school should consider the next phase for their students, and EMP has evidence that such schools frequently do not engage fully with issues of transition.

Pilot 11-16 schools are reluctant to embark on AS Mathematics, because of concerns about duplication, and because often teachers lack confidence in teaching mathematics at AS/A2. Relations with post-16 providers are variable but generally teachers either side of the transition do not know about students until they appear in official data sets.

Students who transfer at 16 are reliant on the information, advice and guidance available from individual schools and colleges, the quality of which is very variable. Some colleges let students start AS Mathematics with grade B, others C, and some discourage students without at least grade A in GCSE Mathematics. Some centres offer a one-to-one interview with applicants to explore specific questions and advice on which course would be most suitable, AS Use of Mathematics or traditional AS Mathematics; others encourage students to come to taster lessons before deciding. Colleges are mindful of their near neighbours and sometimes share provision between them. However, more options post-16 in college raise timetabling and tracking issues of individual students' course choices.

The pilot shows that many post-16 students appear in college with the need to a) resit GCSE Mathematics, or b) do mathematics as part of vocational course or Diploma. In some centres, these students are being offered Free Standing Mathematics Qualifications (FSMQs) as an alternative, and sometimes GCSE Use of Mathematics, quite often following a mandatory diagnostic test on entry. Others are less certain about the viability of this approach because of the perceived need for GCSE Mathematics certification.

The absence of clear pathways across this transition is very serious, as many students move institutions at this point.

Research Questions

The focus of the enquiry reported here is on a cluster comprising a sixth form college and feeder 11-16 secondary schools. The cluster is fully aware of the difficulties arising from transfer at 16 and has set in motion some steps to try to address the problems. We address the following questions:

- 1. How does the college work with students in Key Stage 4 thinking of doing mathematics post-16?
- 2. How do the schools work with the college in preparing for transition?
- 3. What are the most significant issues arising for schools, college and students?

Methods

Evidence of disruption to mathematics learning pathways during transfer at 16 comes from three main sources: a survey of heads of department in participating pilot centres in 2009 that investigated the effects of removing Key Stage 3 tests; case study data from over 50 participating pilot centres collected over 2007-09; meetings with heads of mathematics in Manchester and in London in July 2009.

The method used here is progressive illumination (Stake, 1978). By exploring the questions above in the light of existing evidence we develop a detailed case study of how the issues are recognised and might be addressed.

Frame

By integrating the data from the case studies with existing data we will construct a composite case that explores the issue of transition in 14-19 mathematics. The technique of constructing typical, fictionalised accounts is established in education research and allows in-depth exploration of the issue that goes beyond a simple 'exemplary case' or 'best practice' in a surface and uncritical way.

Research findings

Structural changes, particularly the two-tier GCSE, the removal of Key Stage 3 Tests and the inclusion of mathematics in the count of 5 A* - C GCSEs in attainment and achievement tables, have resulted in schools adopting strategies to maximise their performance figures. This is a particularly problematic in the large number of 11-16 schools who tend to have less direct interest in transition issues.

Thus there is a significant structural constraint on the development of 14-19 mathematics pathways: the mix of 11-16, 11-18, sixth form colleges and FE colleges. There is an outstanding need for professional discussion and action to mitigate the effects of the education fault line at age 16. This paper will facilitate overt discussion and further consideration of this.