

Subject Knowledge Enhancement courses in mathematics



Introduction

Subject Knowledge Enhancement (SKE) courses are a well-established part of provision for trainee secondary mathematics teachers where they provide programmes of study of mathematics prior to Initial Teacher

Education (ITE). They are targeted at those without sufficient mathematics for direct entry to a secondary mathematics ITE course and those for whom the need for additional study is identified at interview for an ITE place. These may include mature entrants to the profession, career changers or those whose own education was undertaken abroad.

A substantial proportion of those completing ITE programmes for secondary mathematics have previously completed SKEs. Continuing shortages and demand for mathematics teachers mean that SKE is an established part of the landscape and a key tool in mathematics teacher recruitment. Our experience as ITE tutors indicates that those completing good SKE provision feel well-prepared for their ITE programme and have relevant subject knowledge that they can draw on in their teaching.

AMET is concerned that changes in the funding, provision and organisation of SKEs in recent years have led to a greater variation in provision of SKE and we therefore offer the following advice to stakeholders in the interest of maintaining standards and promoting high quality ITE for specialist teachers of secondary mathematics.

“The course has helped me see maths in a different way, look for real understanding and resolved many of the questions of why some methods are the way they are. [It’s] important knowing the, “why” something works when you want to teach it”

“I definitely feel more prepared to commence the PGCE than I would have if I hadn’t been on this course”

Purpose

The primary purpose of SKE is to develop the mathematics subject knowledge of potential teachers of secondary mathematics. Courses aim to help students make sense of mathematics and to develop a deep and conceptual understanding of the subject. Prospective teachers need to understand the ‘whys’ of mathematics, the big ideas in mathematics such as variation, proportion, place value, proof, equivalence

and data distributions, and the connections between aspects of mathematics. They should also develop their understanding of the importance of fluency, reasoning and problem solving in learning mathematics.

“...I have a new-found confidence in my ability to deliver the very highest quality teaching – a confidence that simply would not exist had I not undertaken this course”

Content

Longer SKEs (four months at least) generally focus on AS and A level mathematics but also cover parts of the KS3 and 4 syllabus. Short SKEs (8 weeks) may only cover GCSE mathematics. Some SKEs offer the opportunity for short school placements for participants to observe and support pupils learning in mathematics lessons.

SKE students may have some higher level of mathematics in their qualifications but have not studied a breadth of mathematics. Hence, SKEs generally cover a range of mathematics topics which may include:

- Functions
- Number
- Geometry
- Modelling
- Statistics
- Decision and discrete mathematics
- Mechanics
- Problem solving
- Calculus
- Analysis

“The amount of time dedicated to in-depth subject knowledge, rather than just revision of the school syllabus, has meant that I am not only confident in teaching GCSE material, but excited about the prospect of being able to breathe life into it for the kids that I teach”

Teaching approaches

AMET believes that good mathematics teaching and learning on SKEs involves opportunities for learners to work in a variety of ways including through discussion and working together, practical activity, extended tasks, whole class teaching, individual work, participating in presentations, and enrichment opportunities.

“The course gives me...opportunities to see different styles of teaching....an appreciation of how different people learn...lots of ideas, resources and material that I will be able to use when I’m a teacher”

Courses should also personalise learning programmes through auditing students’ subject knowledge and providing additional support and enrichment as identified. Face to face elements of SKE provide opportunities for students to support one another, work collaboratively, receive tutorial support, and to work directly with specialist tutors.

Assessment

Good SKE courses assess students' progress using a range of assessment tools which may include examination, coursework, extended tasks, presentations, vivas, reflective logs and portfolios. We believe that a range of assessment tools should be used in order to give a clear picture of development in mathematical thinking. Some programmes offer formal accreditation, but this is not a feature of all SKE provision. Assessment is used as a diagnostic tool to help students set appropriate focused targets for their on-going subject knowledge development during their ITE course and beyond.

“gives you a head start in your PGCE” “vital to my development as a teacher” “provided me with the confidence and skills to be able to teach maths” “invaluable in your journey to become a maths teacher”

Transition to ITE

Successful completion of an SKE will be a condition of an offer of a place on a student's ITE programme. Transfer to ITE, particularly where the SKE provider is not the same as the ITE provider, is greatly enhanced when there is clear communication about the student's success on their SKE. Such communication may be by means of a letter, or a course transcript detailing progress and identifying areas for future development. Some SKE providers may also provide early indicative targets for the students' ITE programme.

“a good transition period before the PGCE” “given me confidence in my maths ability” “my maths is an awful lot stronger” “very worthwhile. My confidence has been boosted substantially” “a very beneficial course that provides a perfect feeder onto PGCE”

Advice to SKE providers

Providers are strongly recommended to ensure that their website and information for prospective students makes it clear as to the level and content of the material to be studied, the teaching methods employed, modes of study, expected level of commitment, additional opportunities offered as part of the programme and methods of assessment. Such information allows potential students to make informed choices between providers and to choose what is best for their own learning and circumstances.

SKE providers should also ensure that ITT providers are informed of successful completion of SKE courses in a timely manner and with a helpful profile of progress and attainment.

Advice to ITE providers

The ITE provider has responsibility for the assessment of trainees' subject knowledge for successful award of Qualified Teacher Status through the Teachers' Standards. You will therefore want to discuss with a prospective applicant what their subject knowledge needs are and whether they need an SKE course. You may also want to suggest or specify particular provision, or to ask for certain outcomes, such as portfolio of work.

Advice to schools

Good SKE provision delivers essential specialist subject knowledge for prospective mathematics teachers who are not considered to have sufficient mathematics for direct entry to an ITE programme. It also offers a range of other benefits and experiences to trainee teachers in terms of their breadth, understanding and depth of knowledge of mathematics and their readiness to undertake an ITE programme. If you are considering appointing an NQT who has followed an SKE prior to their ITE programme, they should be able to show you their work from the course and be able to discuss their experiences.

Advice to prospective students

As tutors, our advice to applicants is always about making sure you put yourself in the best position to be successful on your ITE course and to ensure that you have all the skills you need to make a good start to your career as a secondary mathematics teacher. You should therefore ask advice from tutors, ask others who have recently completed a SKE course, and carry out your research carefully in order to make the best decision for you as to your choice of SKE provision. You are encouraged to keep your work from your SKE course as it will provide evidence of your claim to be a specialist mathematics teacher and to the quality of your work on the SKE.