Experiences from a bespoke programme for year 1 foundation mathematics for students with vocational entry qualifications

Rationale for Programme

To support students from vocational backgrounds to make successful transition to HE

Surveys of BTEC students at University of Bath highlight:

- Mathematics as key barrier to successful transition
- Lack of confidence around peer group, perceived to be better prepared (qualified) for university programmes.

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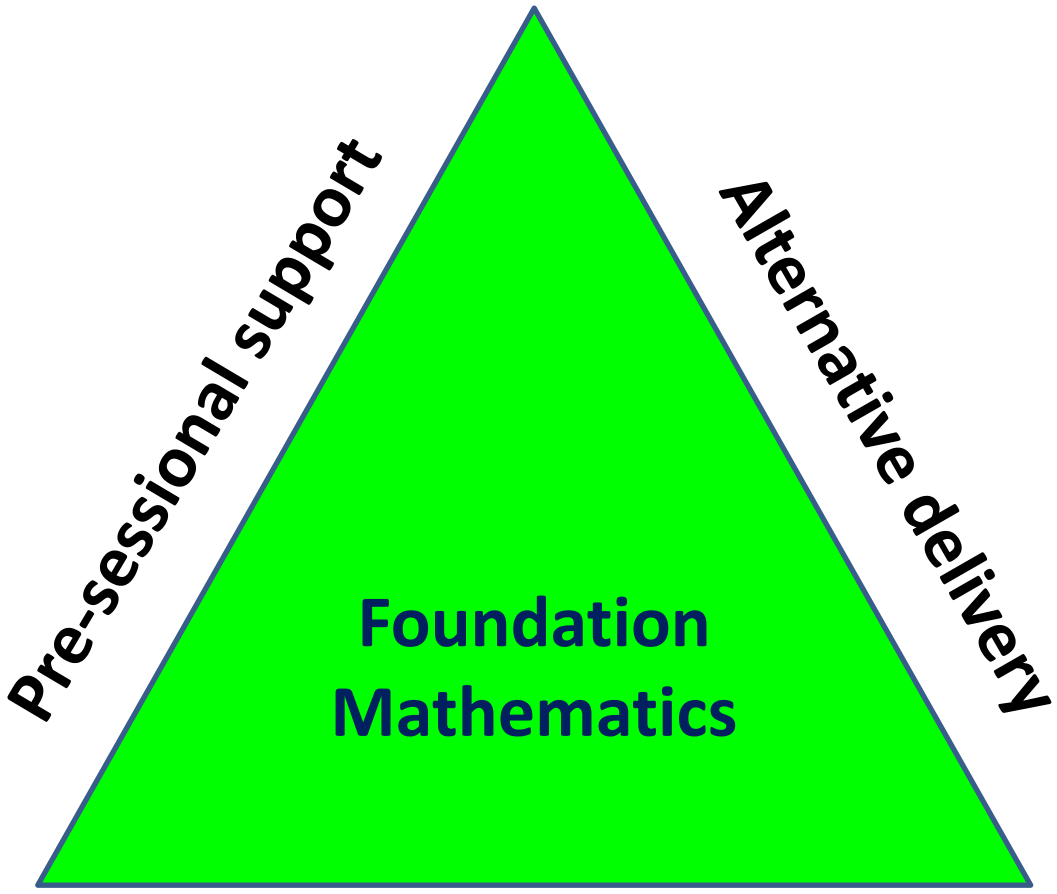
The programme



Student-led developments

Foundation Mathematics

GCSE revision (quadratics, graphs, numerical manipulation)
Key A level methods (exponentials, logs, differentiation)

Traditional structure to 2011
2 lectures
1 tutorial

Around 80 students
Sports & Exercise Science
Natural Science
Chemistry

Entry qualifications
A levels (not including maths)
BTEC Sports Science (20-35% cohort)

Student-led development
Phase 0: Student feedback 2011/12

"There is a wide range of abilities in the group so the pace is right for some students but a bit slow for others"

"It might be useful to have separate classes for those who studies maths to GCSE and those who studied it further"

"I learnt more with my one tutor session than I did with two sessions of lectures"

Some students "switched off in lectures once they didn't understand something, which could happen as soon as 10 minutes into the lecture"

Lectures "seemed to jump from GCSE style to A2 before we knew"

Experience at Nottingham 2010-11

Core maths on an accredited Engineering programme

Separate teaching on a lower-level module can lead to:

- demotivation
- Lower-level learning outcomes, affects follow-on modules

Solution: extra tutorials for weaker students

Symonds et al, *msor Connections* **12**, 1, 2012

Phase I: Pre-entry

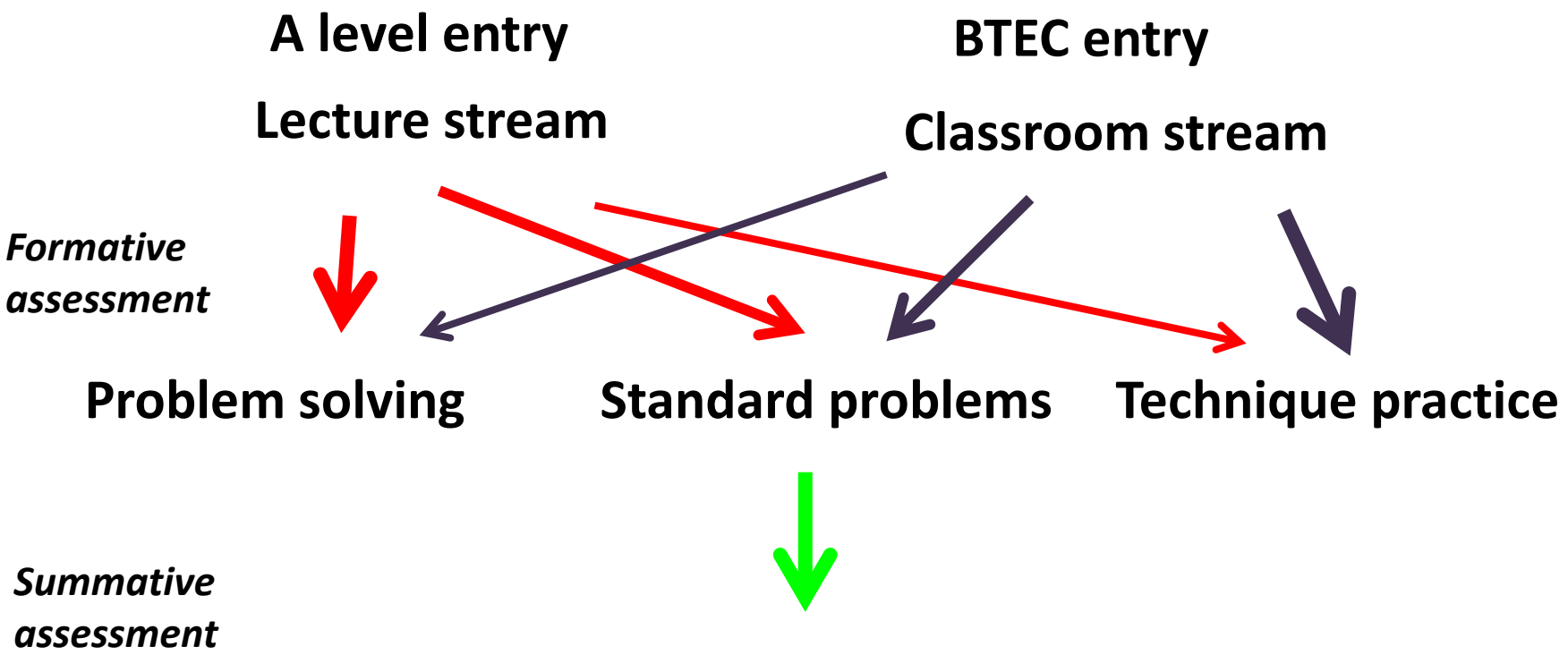
Pre-sessional moodle module
Developed with student interns (BTEC entry, year 1 sports students)

Content	Resources
Algebra	Videos
Trigonometry	HELM booklets
Graphs	Geogebra
Number	Motivational Examples
	Quizzes

Mathematics tutoring in local FE colleges

- Three local colleges
- Three BTEC programmes
- Mathematics summer school

Phase II: Alternative delivery
Dual teaching



Formative Assessment

Two-tier weekly tutorial sheets 1A, 1B, 2A, 2B, etc

A sheets: emphasis on practising techniques
B sheets: emphasis on applications, problem-solving
e.g. quadratic equations v Felix Baumgartner skydive
exponential decay v doping in athletes
simultaneous equations v nutrition, calorimetry

The A sheets were given as an optional handout to the main group
The B sheets only given to the main group

Summative Assessment

Common test, coursework and exam

Test in Week 6 was made simple, to instil confidence

The coursework involved problem-solving, but was discussed extensively in the tutorials of the BTEC group

Exam: short questions (Part A) and problem-solving ones (Part B)

Transfers in/out

- Two good students were able to move up to the main group
- Another good student stayed, led the group by asking relevant questions
- Three students asked to move down (for an easy ride?), which disrupted the group dynamic
- One student was moved down (had passed GCSE with extra tutoring, but didn't understand the principles)
- Three really weak students (also dyslexic) failed to benefit

Outcomes

Changes in Likert scores 2011-12 to 2012-13 (both groups):

- Understanding: 3.63 → 3.75
- Teaching methods: 3.07 → 3.29
- Advice & support: 3.70 → 3.96
- Overall satisfaction: 3.10 → 3.64

More homogeneous main group made lecturing easier. Additional topics and applications could be covered in main group.

Failure rate 6%; students who failed Maths also failed their Sports units

Next steps
Foundation Maths 2013-14

Aim to taper off separate provision: after the first few weeks, bring the BTEC group into one lecture per week.

BTEC student interns (Thriplow Trust) to support development of programme.

On track to Bath mathematics programme for BTEC students whilst at college.