Increasing Student Success, Engagement and Retention Through a Novel Approach to Mathematics Support

Michael Gallimore
Contents

• Background
• Traditional Approaches to Support
• Support is Two-Fold
  - Immediate (Diagnostic Testing)
  - Sustained (AFL)
  - Individual Learning Plans (ILP’s)
• Impact
• Future Work
• References
• Questions
Background

• Ever-increasing gap between secondary and university level mathematics.
• More diverse cohorts.
• Students are less prepared for shift in levels meaning transition is more difficult.
• Ultimately leads to poor retention, low success rates and lack of engagement.
• Means required to aid this transition through a mathematics support programme particularly in STEM subjects.
Traditional Approaches to Support

1) DIAGNOSTIC TESTING ON ENTRY
- Content often not thought through and has no real purpose
- Not used to inform future learning

2) ONGOING SUPPORT
- Often very informal and relies on students understanding their weaknesses
- Not tailored to individual needs
Support is Two-Fold

What mathematical knowledge do students require?

How do we target shortfalls in knowledge?

IMMEDIATE

How do we assess current knowledge?

Are there shortfalls in knowledge?

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Support is Two-Fold

Initially Course Driven Cross-Curricular

**IMMEDIATE**

- How do we target shortfalls in knowledge?
- Are there shortfalls in knowledge?
- How do we assess current knowledge?
Support is Two-Fold

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Diagnostic Testing on Entry
Support is Two-Fold

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IMMEDIATE

Match current knowledge with required knowledge
Support is Two-Fold

**IMMEDIATE**

- What mathematical knowledge do students require?
- Are there shortfalls in knowledge?
- How do we assess current knowledge?

Individual Learning Plans (ILP’s) and tailored support
## Individual Learning Plans (ILP’s)

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<th>TOPIC</th>
<th>Rounding DP's</th>
<th>Rounding SF's</th>
<th>Standard form</th>
<th>Laws of indices</th>
<th>Rearranging equations</th>
<th>Solving equations</th>
<th>Expanding &amp; simplifying</th>
<th>Algebraic fractions</th>
<th>Expanding double brackets</th>
<th>Factorising</th>
<th>Quadratics</th>
<th>Simultaneous equations</th>
<th>Linear graphs</th>
<th>Pythagoras</th>
<th>Trigonometry</th>
<th>Conversions</th>
<th>PREVIOUS MATHS STUDY</th>
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Support is Two-Fold

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SUSTAINED

How do we assess current knowledge?

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Support is Two-Fold

Assessment Driven
Cross-Curricular Driven

How do we target shortfalls in knowledge?
How do we assess current knowledge?
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SUSTAINED
Support is Two-Fold

- What mathematical knowledge do students require?
- How do we target shortfalls in knowledge?
- Are there shortfalls in knowledge?
- Assessment For Learning (AFL)

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Assessment for Learning (AFL)

- Random Questioning
- Explicit LO’s
- True/False
- Levelled Exam Questions
- Misconceptions/Find the Mistake
- Student Created Questions
- Think/Pair/Share
- RAG
- Peer Assessment

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Support is Two-Fold

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SUSTAINED

Are there shortfalls in knowledge?

Assessment For Learning (AFL)
Support is Two-Fold

- How do we target shortfalls in knowledge?
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Support is Two-Fold

What mathematical knowledge do students require?

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How do we assess current knowledge?

Individual Learning Plans (ILP’s) and Tailored Support

SUSTAINED
Impact on Retention

• The percentage of young entrants to full-time degree courses in 2008-09 who were not retained was 8.8% for engineering courses compared to 6.5% for all subjects.

WE RETAINED ALL STUDENTS IN THIS CATEGORY
Impact on Retention

• The percentage of mature entrants to full-time degree courses in 2008-09 who were not retained was 15.8% in engineering compared to 12.9% for all subjects.

WE ACHIEVED 5% IN THIS CATEGORY
Impact on Success & Engagement

• **Success** backed up by retention figures as no students left through under-achievement

• **Engagement** measured through regular feedback forms administered 3 times per year for each module studied. Support allowed students to focus on key areas of study.
Future Work

• Development of a Mathematics Support Website to facilitate on-line testing and improve student tracking.

• Introduction of ‘student expert’ system to encourage cross-institutional support and student mentoring.
References


ANY QUESTIONS?

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