A Holistic Support Package Affords Sustained Performance Enhancement in Applied Medical Knowledge Testing to Struggling Undergraduate Medical Students

Christian Gray, Tony Finnigan, Alice Osborne and Nick Toms
Medical Students in Difficulty

• Despite meeting the **high admission standards** required to study medicine, some medical students encounter difficulties
• Often **manifesting in weak assessment** performances
• Chronic strugglers often have **complex difficulties**
• Students can struggle to be **effective independent learners**

**School Learning:** Syllabus-driven rote learning to pass exams

**Medical School:** Independent life-long learner expectations via **Self-Directed Learning**

• Medical School learning expectations align to qualified doctors life-long learning practice
Early Struggler Detection and Support

• Our *frequent assessment, rapid remediation* strategy facilitates an early detection of struggling students

• Medical knowledge assessments (*Progress Testing*) performance analysis enables triage into tiered remediation packages

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**Progress Tests**: applied MCQs using clinical vignettes

**Four tests per year**: timely remediation for any test failure

**Negatively marked**: 1 mark for a correct answer, -0.25 for an incorrect answer and 0 for “don’t know”

**Promotes clinical reasoning**: increased probability of a higher grade when potential answers are eliminated
A 52-year-old man has had increasing dyspnoea and cough productive of purulent sputum for 2 days. He has smoked 20 cigarettes a day for 30 years. His temperature is 37.2 °C. Breath sounds are normal with a few rhonchi and wheezes. His leucocyte count is 9000/mm³ with a normal differential. Gram’s stain of sputum shows numerous neutrophils and gram-negative diplococci. X-ray films of the chest show hyperinflation.

Which of the following is the most likely diagnosis?

a) Asthma
b) Bronchiectasis
c) Bronchitis (symptoms of Chronic Obstructive Pulmonary Disease)
d) Pulmonary embolism
e) Streptococcal pneumonia
f) Don’t know

By the end of year five students would be expect to be confident in answering most Progress Questions
Progress Testing: Detecting Struggling Students

- Performance compared to cohort mean (Norm-referenced)

Remediation

L1: Student’s Academic Tutor (Borderline or Unsatisfactory)
L2: Clinical-Trained Remediation team
Tiered Student Remediation Packages

For Progress Testing Performance Issues:

• Termly Academic Review Group (ARG) meet to identify struggling students

• The ARG agrees appropriate remediation packages:
  – 1\textsuperscript{st} Test Fail: Academic Tutor meeting (Level 1)
    • Study skills questionnaire; exam technique
  – Chronic Failing: Remediation Team (Level 2)
Holistic top-level “Level 2 Remediation” package

- How much should I do?
- What’s the best way of doing it?
- I don’t think I will ever be able to remember everything
- Self-Directed Learning
- I don’t think I can ever learn all this
- How will I know I know something?
- Is there a way of reading efficiently?
- How will I know I know enough about something?
Holistic top-level “Level 2 Remediation” package

• Level 2 Remediation involves **in-depth student interviews** with a clinically-trained Remediation team member
  - Wellbeing/health issues - stress, mental health, self-care
  - Specific learning difficulties
  - Personal issues – family, finance
  - Self confidence/anxiety
  - Quantity and quality of SDL time
  - Learning skills, organisational skills, planning & goal setting
  - Approach to Progress Test

• A **recommended student action plan** is agreed and progress monitored subsequently by the student’s Academic Tutor

**Signposted to:** Occupational Health, Own GP, DisabilityAssist, Health and Conduct Review Group
Effectiveness of our holistic top-level “Level 2 Remediation” package

- **368 students** required Level 2 Remediation over the 6 year study period (6.32% per year)

- **Year Two** displayed a higher Level 2 Remediation incidence vs. other study years (n=130, **9.99 ± 1.73%**)

- **Year Five** displayed the lowest Level 2 Remediation vs. other study years (n= 16, **2.56 ± 1.17%**)

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Effectiveness of our holistic top-level “Level 2 Remediation” package

• Z-score is the number of standard deviations from the mean
• Negative Z-score indicates a student is below the cohort-mean
Effectiveness of our holistic top-level “Level 2 Remediation” package

Student who received Level 2 Remediation (average Year 1-4)
- A decline in performance prior to remediation
- Significant enhancement of medical knowledge performance after remediation (-1 vs post-Level 2 (p<0.0001, n=344))
Effectiveness of our holistic top-level “Level 2 Remediation” package

- Consistent Level 2 Remediation effectiveness (2008-2014)
- Level 2 Remediation in Year 1 afforded significant early enhancement of medical knowledge performance vs. other years (Paired-t Test -1; p<0.0026)
Self-Regulated Learners

• Self-regulated learners take control of their learning environment through **metacognition** and **motivation** to learn
  
  o **Forethought**: setting effective goals and strategic planning  
  o **Performance**: metacognitive monitoring of one’s learning  
  o **Self-Reflection phases**: self-judgement and adaptive self-assessment

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**Self-Regulated Learner in practice:**
Changes to student’s independent study to include goal setting, short study periods, interspersed with brief rest periods and spaced opportunities for information recall and self-testing

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Self-Regulated Learners – In practice

Establishing learning Environment

- Activate prior learning
- Ask SMART questions

SMART Questions:
- Specific
- Measurable
- Achievable
- Realistic and relevant
- Timed

- Dedicated area - no distractions e.g. phones, emails, friends
- Resourced - computer, books, white board, paper
- Well lit - ambient/LED light

- Active recall of learning e.g. mind map
- Active recall at end of learning
- Active recall at end of day
- Active recall at end of week
Conclusion

- Level 2 Remediation offers holistic **in-depth student interviews**

- Level 2 Remediation correlates with a **sustained and significant positive impact** on Progress Test performance

- Our assessment and timely remediation approach affords a **sustained benefit to struggling medical students**