The effect of practice testing on attainment in KS4 Science: background

• Evidence for the ‘testing effect’ (Adesope et al., 2017): completing a low-stakes practice test improves future performance in high-stakes test (*quick and easy intervention!*)

• Practice testing may aid retrieval processes leading to better recall of information compared to simply restudying the material

• Problem: currently very little research has examined this effect at school level and outside the laboratory
Application to the classroom: science

- Changes in the science curriculum
- Increased breadth and depth of the course at KS4
- More emphasis on application of science in exams
- No more coursework!
Four year 10 classes matched on ability and randomised
Practice-test

• 35 minute practice-test followed by self-assessment (teacher explains answers)

• Composed of questions from the same exam board as the end of unit test with a mixture of multiple choice and short answer questions

• Administered one lesson before the real end of unit test (1-2 days)
Analysis and results

• N= 110

• Wilcoxon signed-rank test showed that no statistically significant difference in end of unit test results following a practice test versus a standard revision lesson (z=0.00, p=0.499, one-tailed).

• Median test score following a practice test – 33

• Median test score following standard practice– 31.5

• Effect size very small (r = 0.007)
Sub-group analyses

- No significant differences in performance for SEN, pupil premium, HPA/MPA/LPA pupils

However…

- Pupils who performed poorly in the control condition (end of unit test following no practice test), N=37 did significantly **better** in the intervention condition (end of unit test following practice test), (W= 3.75, p=0.001). Moderate effect size r=0.419

- And vice versa…Pupils who performed well in the control group, N=38 did significantly **worse** in the intervention condition, (W=2.79, p=0.003). Moderate effect size r=-0.306

- Differential effects on confidence/revision?
Barriers to classroom-based research

- **Staff turnover** – constant changes in staffing meant trial became very difficult to coordinate (timetable changed three times during this trial!) - led to attrition of groups

- **Time pressures** – data deadlines within school meant staff were unable to complete the practice-test

  ➔ **Difficulties in controlling extraneous variables** (e.g. delivery of content by teachers (involvement of student teachers in some groups)/ method of providing feedback by teachers/ revision sessions as standard practice/ revision time spent by pupils on each test)
The benefits of classroom-based/ teacher-led research

• Teachers at the forefront of research; unique understanding of the:
  1) needs of the pupils & staff
  2) needs of the school
  3) needs of the curriculum
  4) practicalities of conducting the research

• Leads to careful consideration of interventions in schools

• Sub-group analyses allow for targeted interventions for particular groups of students
Next steps

• Consider alternative methods of practice-testing to aid recall e.g. interleaving practice/daily testing and recapping

• Was the end of unit test high-stakes enough?

• Plan & control for possible extraneous variables such as lesson content & delivery

• Consider specific groups which pre-testing could benefit most: e.g. high-attaining students v low-attaining students?