RedhillTSA research

# Does the regular reviewing of specification content increase students recall ability and improve their problem solving ability in physics exams? Preliminary Findings

June 2016

**The Redhill Academy has invested a considerable amount of time and energy in ensuring that pupils develop a range of revision techniques that they are able to use in preparation for examinations.** Feedback from mentoring meetings suggests that students are indeed using a range of strategies to revise, but that they do not generally construct their own revision programme.

With the change to linear examinations and the reduced impact of coursework, students will have to retain more information and potentially solve more challenging problems in physics examinations. Feedback from mentoring suggests that students weight their revision towards the end of the course (massed practice) instead of reviewing information regularly throughout the course (distributed practice).

In order to investigate the effectiveness of distributed practice on examination performance, 50 Year 11 science students in two classes, with predicted grades ranging from A* to D, were given a structured revision programme, reinforced by regular class tests using online flashcards on the Quizlet site.

Students followed a structured review of material involving homework tasks and short tests carried out every week, whilst they studied the final parts of their Additional Science courses. The primary method of revision involved students using pre-prepared flash cards via the Quizlet website on a weekly basis and then being tested in class. The Physics component of Additional Science was structured so that students revisited ideas on a regular basis. Each student was provided with a revision programme, which indicated which topic would be tested and on what date. The revision for the test was given as homework. Students compiled a record of their performance as they carried out the reviews. Using AQA analysis software, students' performance in their 2015 GCSE exams will be compared with their performance in the 2016 examinations. The year 11 mock examinations allowed some preliminary results to be obtained and these are reported here. A four point Likert questionnaire was used to assess student's opinions about both the process itself and the effectiveness of the revision materials. The responses to the questions were assembled into a simple database so that their opinions could be analysed.

## Exam Performance

After students had completed their mock examinations in March 2016, each of their papers was analysed and their marks in three categories calculated and compared with their results from their external examination in June 2015. The categories were based on the analysis software provided by the AQA examination board. The results are shown below:

| | Recall | Application | Analysis and Evaluation |
|---|---|---|---|
| June 2015 | 56% | 67% | 36% |
| March 2016 | 62% | 50% | 42% |

The subject content being examined was clearly different on both papers, but the percentage of marks available on each paper in each category was very similar (within 3%). It is difficult to draw conclusions with a high degree of confidence at this stage, since students' June 2015 result would also have been the result of attempting many practice papers under examination conditions as well.

## Questionnaire

The purpose of the questionnaire was to determine how useful the design of the flashcards were, how often students actually used them, and how often students revise generally. There was a free response section, which allowed students to suggest what they would find useful to support their revision for physics in the future. The mean scores on the questionnaire are shown below:

| Question | Mean Score | |
|---|---|---|
| I didn't find that the Quizlet tests helped me to remember facts | 1.9 | Disagree |
| I used the Quizlet site regularly | 3.1 | Agree |
| I usually don't revise for physics exams | 2.0 | Disagree |
| I use a variety of methods to revise | 2.5 | Neutral |
| I am following a revision plan | 2.4 | Neutral |
| I find the Quizlet flashcards useful | 3.3 | Agree |

When questioned about the design and use of the Quizlet site, students commented that diagrams needed to be clearer, that they would prefer them to be based on the exam assessment objectives, and that it would be better if they were used more regularly in class and at home.

When asked about how their revision could be supported in the future, they suggested that they themselves should do more revision, use more revision techniques, use a revision timetable, and that they needed more revision classes.

**Dave Mangan** , Science SLE, The Redhill Academy **d.mangan@theredhillacademy.org.uk**

This research has been carried out as part of a professional development opportunity run by the Redhill Teaching School Alliance, enabling staff to engage in their own research to investigate what works best in schools like ours.

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