2020 cohort

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Can a Targeted Revision Intervention Improve the Exam Performance of High Ability Year 11 Physics Pupils?

Able GCSE pupils from disadvantaged backgrounds often struggle to achieve their target grades in science (Banerjee, 2016). Studies suggest that this potential for underachievement amongst disadvantaged pupils is due to lack of resources to help their learning at home, and also lack of motivation or opportunity to learn independently (Bedford, 2017). Whilst existing in-class intervention techniques for these pupils do take place in the school, such as questioning and challenging these pupils more often than their peers, the rationale behind this project was to investigate whether more targeted, individualised intervention techniques can improve outcomes for these pupils.

The project hence focussed on pupils who are identified as requiring intervention and also flagged as Pupil Premium. It aimed to examine the efficacy of techniques such as one-to-one interviews, targeted small-group revision sessions and guidance on completing higher-level GCSE exam questions effectively, in relation to the performance of pupils in physics assessments. Such techniques have been demonstrated to show efficacy before in small-group settings in different contexts (Soong, 2010; Higgins et al, 2016) and revision interventions of this time have helped to identify misconceptions amongst maths pupils before (Leech, 2019).

The project explored whether such techniques can improve motivational factors such as pupil self-efficacy, pupil perception of the value of learning and pupils' ability to successfully handle revision and exams. The focus was on physics, a subject which relatively few pupils go on to study physics post-GCSE (Soong, 2010), which may be related to a general notion that it is too difficult, or an inability to succeed in physics. The findings from this project could help to begin to address this.

Thirteen Year 11 pupils from the two top science sets, who study separate sciences, took part in the study. Pupils were invited on the basis of the need for intervention: primarily, those flagged up by the department as having scored two grades below their target or more in previous assessments were invited to participate.

Fifty per cent of pupils invited to take part were Pupil Premium (PP), but only four of the participants were PP (31%), which implies that PP pupils were in this instance less likely to agree to participate in a lunchtime revision intervention in science. This may be because they are especially lacking in motivational factors such as parents who have attended university or an emphasis on academic success at home, but the reasons for non-participation are beyond the scope of this study.

The study consisted of four main stages:

1. All participants were invited to fill in a questionnaire which asked about their experience of physics revision, their perceived strengths and weaknesses and what they feel would help them to revise more effectively.
2. A series of four revision sessions was carried out at lunchtimes, targeted to meet the needs of the different pupils taking part. The sessions focussed on examination technique, how to revise content required for exams, and how to solve more difficult, lengthier exam questions that pupils often struggle with. These were carried out by the researcher in a science classroom.
3. Participants filled in a follow-up questionnaire to evaluate their confidence at answering physics exam questions, their enjoyment of the programme and their enjoyment of physics in general, including whether they planned to pursue the subject at a higher level in future.
4. Participants sat end-of-term assessments alongside their peers, and results of both participants and non-participants were compared with their results before the intervention took place.

For this last part, the progress of the participating pupils during the intervention period was calculated from the difference between their results in physics past papers before and after the intervention. This was compared against the performance of a control group, which consisted of top-set pupils who did not take part in the intervention. This comparison, alongside anonymised comments from the questionnaire, was used to evaluate the success of the intervention.

The main findings of the research were these:

1. Pupil Premium pupils were less likely than others to agree to participate. This may imply a lack of motivation, and could be due to fewer academic family members, other commitments, lack of resources
2. Attendance decreased over time. Sessions were not mandatory, and feedback from the follow-up questionnaire suggested that pupils who stayed to the end would have preferred it to have been mandatory. Non-attendance could be due to the problem of establishing a consistent time and communicating sessions to pupils. Or, pupils may simply have not enjoyed the sessions or not found them useful.
3. Mean percentage marks on exam-style questions increased by 17 for participants, but only 13 for their classes as a whole. This could imply that the intervention was successful. Alternatively, those who agreed to the intervention may have already been more motivated and more likely to do revision than their peers.
4. Pupils who stayed to the end tended to enjoy taking part and felt that it increased their confidence in physics, according to the follow-up questionnaire. This shows that at least some pupils enjoy having a revision intervention of this sort in place, and that they think it has increased their confidence. However, it is not surprising that the pupils who remained part of the intervention until the end said that they enjoyed taking part!
5. The project did not increase pupils' desire to study physics at a higher level overall. Some pupils said in the follow-up questionnaire that they would be more likely to study physics at a higher level, others did not. This study did not measure whether this was specifically because of the intervention, or whether the pupils would go on to study physics in reality.
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Overall, this project has shown the potential for a Year 11 revision intervention to improve physics performance for high-ability pupils. It has not proven that the strategies used here are effective, but it has shown tentative evidence that they may be a means of improving both exam technique and confidence, and indeed that such interventions are welcomed by some pupils.

Future studies into Year-11 revision interventions could improve on this one by:

1. Making the sessions mandatory
2. Establishing a fixed time from the outset
3. Following up pupils after the intervention regarding exam results and future subject choices
4. Using more than one group of participants, preferably from more than one context

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