

The Meta-Package

St John's International Academy, Marlborough

Problem: What challenges does your school have that need to be addressed?

Pupils of lower prior attaining groups at the school, particularly those eligible for free school meals have lower attainment than their peers. Our overall progress 8 (P8) was -0.05 but P8 for disadvantaged pupils was -1.24, which places us in the bottom 10% nationally in terms of progress for this group. Existing evidence highlights metacognition, self-regulation and mindset as areas which can allow disadvantaged pupils to make significant progress.

Innovation: How will the innovation help improve the problem you have identified and benefit teachers and learners?

The innovation is the delivery of a full package of interventions called The Meta-Package. It includes two distinct aspects. One is a series of seven lessons on neuroscience. The other is a language for learning based on these lessons which is present in all lessons where pupils are taught as a tutor group (approximately 50% of their timetable).

Neuroscience lessons

The seven one-hour fortnightly neuroscience lessons will be taught during the autumn term. The lessons have the following topics:

Lesson 1: Taking on personal learning struggles with poem memorisation, neurons and neuroplasticity.

Lesson 2: Performing and reflecting on poem memorisation by writing a letter to a future pupil about a learning struggle.

Lesson 3: Exploration of the five "Neuro-facts" (taken from Bjork's Self-regulated Learning research) using hands on activities.

- Neuro-fact 1: "We store information in terms of its meaning to us."
- Neuro-fact 2: "Retrieved information, rather than being left in the same state, becomes more recallable in the future."

- Neuro-fact 3: “Human memory is a fallible process.”
- Neuro-fact 4: “Retrieval is cue dependent.”
- Neuro-fact 5: “Storing information in human memory seems to create capacity.”

Lesson 4: Strategies for learning (desirable difficulties, retrieval practice, spaced and interleaved learning) taught via a simulation of an exam planning and preparation scenario.

Lesson 5: Three in-class strategies (question stems, ABC (Agree, Build-on, or Challenge) discussion, 1–5 self-assessment scales) all explored via interactive activities.

Lesson 6: Independent strategies (eg. self-regulation cycle, strategic resource use for learning). Pupils select from 15 strategies they are going to apply and reflect on their choice.

Lesson 7: Review and assessment.

Language for learning

Following their seven neuroscience lessons, staff teaching the intervention tutor groups will use a language for learning based on these lessons. Intervention group lessons throughout the spring and summer terms will incorporate question stems, ABC discussion, 1–5 self-assessment, and pupils and staff should also be aware of the self-regulation cycle. A series of posters designed to give a shared language across lessons will be placed in classrooms of the intervention groups (where possible).

Existing evidence: What evidence is there that this innovation will improve outcomes?

Literature review

The Education Endowment Foundation teaching and learning toolkit reports that meta-cognition and self-regulation approaches “have consistently high levels of impact, with pupils making an average of eight months’ additional progress”. It is reported that these approaches can be particularly effective for low achieving pupils. The longitudinal nature of the intervention to include the shared language for learning is to further promote metacognitive practice.

The neuroscience lessons can be attributed to specific studies:

- Lessons 1 & 2: E. Aronson (1999) and J. Aronson et al. (2002) used the idea of writing a letter of advice to another pupil to reinforce the message of neuroplasticity.
- Lessons 3 & 4: The 5 Neuro-facts and related strategies are directly from Bjork, Dunlosky and Kornell (2013).
- Lessons 5 & 6: According to Jones, Farquhar and Surry (1995), the further pupils’ awareness of metacognition is improved, the more pupils’ effectiveness is increased.

The Strategic Resource Selection comes from Chen et al (2017); pupils in this study selected a strategy from a list of 15 to help them prepare for an assessment. We have adapted this list and used their reflective questions within the lesson structure.

Blackwell, Trzesniewski, and Dweck (2007) found that middle school pupils who attended an eight-session workshop teaching them that the brain is like a muscle and grows with effort displayed a sharp increase in math achievement for the rest of the school year, an effect not shown by pupils who attended a control workshop that taught them study skills.

Pilot Study

Small scale research was carried out in the 2016/17 academic year into the lessons and the shared language materials separately. Both were measured using questionnaires to assess confidence in self-regulation and also measurements of mindset. The initial data shows a positive impact for both approaches, but more data is required to determine whether there is an impact on learning.

Research question or hypothesis: What effect will the intervention, implemented for how long, with which pupils, have on what outcomes?

Research Question

What impact does participating in The Meta-Package for two terms have on the progress of Year 7 pupils within the subjects in which it is used?

Hypothesis

Year 7 pupils participating in The Meta-Package for two terms will make more progress within the subjects in which it is used than pupils who do not participate in the intervention.

Method: Include sample, design, measures, intervention, process evaluation and analysis

Sample/participants

A total of 262 pupils in nine tutor groups in Year 7 at St John's International School will take part in the study. The tutor groups are mixed prior attainment with between three and ten pupil premium pupils in each class.

Parents of all pupils in Year 7 will be sent a letter explaining the evaluation. Parents will have the

opportunity to opt for their child's data not to be included in the analysis.

Assignment to condition

This is a class level randomised control trial. There are nine tutor groups in year 7: five tutor groups will be selected at random will receive the intervention; the remaining four tutor groups will form the control group.

Intervention

The Meta-Package includes two distinct aspects: a series of seven lessons on neuroscience, and a language for learning based on these lessons, which is present in all lessons where intervention group pupils are taught as a tutor group. These lessons are art, computer science, drama, geography, history, music, PE, philosophy and religion, science and wellbeing.

Neuroscience lessons

A series of seven lessons with materials have been designed to be delivered by in-house trained non-specialist teachers. These will be delivered during the autumn term of Year 7. Information about the course can be seen in the 'innovation' section above. Non-specialists will be assigned to tutor groups prior to the selection of intervention or control groups. The teachers of the neuroscience class will receive in-house training in September 2017 about teaching neuroplasticity, the five Neuro-facts, desirable difficulties and the key features required for pupils to self-regulate.

Language for learning

Following the delivery of the neuroscience lessons, the language for learning materials and strategies will begin to be used with the intervention group in art, computer science, geography, history, drama, music, philosophy and religion, science and wellbeing lessons. From the beginning of the spring term the classrooms of the intervention groups' teachers will contain subject specific display materials referring to the five Neuro-facts and self-regulation cycle. The materials will be referred to where-ever applicable. The 1–5 self-assessment and the ABC discussion will be used as part of lesson routines.

Staff teaching the intervention tutor groups across these subjects will be trained in October 2017 on the application of question stems, ABC discussion, 1-5 self-assessment and of the self-regulation cycle. During the second half of the autumn term, a training session on language for learning will be provided for teaching assistants who work with the intervention group.

Ongoing support will be provided through two additional one-hour training and review sessions for teachers and TAs using the language for learning in their lessons during spring term of the 2017-18 academic year.

Control Group

Pupils in the four control tutor groups will not receive the seven neuroscience lessons. Instead they will receive wellbeing lessons on a separate topic. Their teachers will not use the language for learning and their lessons will be business as usual without the metacognitive language or strategies. Efforts will be made to ensure displays about the five Neuro-facts and self-regulation cycle are not visible during control group lessons where wherever possible.

Outcome measures

Three main sources of data will be collected for all control and intervention group pupils.

The first will be progress from their mean CAT-4 scaled score (taken at the beginning of the autumn term) compared to their scaled scores attained during their summative assessments in the summer term in art, computer science, geography, history, drama, music, philosophy and religion, science and wellbeing (the subjects in which the language for learning will be used). The summer term summative tests are GCSE style examinations given numerical scores which are taken in controlled conditions and teacher assessed. The raw scores are reported, which are then converted centrally into scaled scores with an average of 100.

The second will be a pre and post intervention questionnaire completed by staff, parents and pupils regarding mindset measurement scales as provided by PERTs (Project for Education Research that Scales). The scale has been used in numerous studies. It is a short, valid, and reliable diagnostic of pupils' mindsets. These will be administered in September 2017 and June 2018.

The third measurement for pupils in both control and intervention groups will be a second set of pre and post tests using Schraw and Dennison's (1994) [Metacognitive Awareness Inventory \(MAI\)](#). This tool will also diagnose the progress across the dimensions in both knowledge and process aspects. These will be administered in September 2017 and June 2018.

Process Evaluation

The process will be evaluated in three ways.

1. Focused interviews, carried out by an independent member of staff, with the teachers

who delivered the Neuro-lessons and the teachers who delivered language for learning within their own lessons. A short series of planned reflective questions will be asked with the responses recorded and reflected upon.

2. No-notice learning walks will be carried out by the evaluation lead and will form part of the quality control. Intervention fidelity of the Neuro-lessons and control group wellbeing lessons will be observed during the autumn term. An observation checklist will be used to identify whether key features of the neuroscience curriculum are present in the intervention or control group lessons. Intervention and control classes will both be observed throughout the spring and summer terms in relation to language for learning lessons. An observation checklist will be developed to record the use of the language, resources, and subsequent pupil engagement.
3. Finally a short survey of pupils within the intervention group will be carried out with questions regarding their perception of the intervention and the extent to which they saw the materials being used in their lessons.

Data analysis

The data analysis will investigate differences between the outcome measures for the intervention and control groups after controlling for pre-test scores and a number of other variables (eg., eligibility for free school meals, ethnicity and special educational needs status).

Generalised linear models will be used to analyse the progress data as measured using the CAT-4 mean scaled scores compared to their end of year scaled scores in the relevant subjects. Estimates of effect sizes for the intervention and control groups will be presented using effect plots derived from the appropriate statistical models possible due to CAT data.

Conclusion: What will happen if your innovation improves outcomes, or not? What are the limitations of your evaluation?

Three secondary schools from across the School Alliance and Multi-Academy Trust have directly expressed interest in our approach to mindset and self-regulation. They are involved in the design of the project evaluation and will observe the materials in use. If proven positive we will evaluate and refine our materials and processes ready to guide and train teachers from across the alliance to deliver the materials in 2018-19. We also have a primary research hub within the teaching school alliance which are also interested in the results of our research and the primary research hub lead has been actively engaged in the design of the intervention. These schools may be interested in carrying out further evaluation of the impact of The Meta-Package in their

settings if the findings from this evaluation are positive.

Shireland Research School's extensive network and communication framework will be utilised to share practice via written reports and presentation at their conference. We also share expertise across the County Federation of 13 secondary schools who are also engaged in our research through our shared good practice network.

The following are limitations of the evaluation:

- The intervention and control groups are from within the same school and the same school year and therefore we cannot generalise beyond this setting.
- There is a potential risk that the control group are incidentally and/or inadvertently exposed to the intervention materials which raises a potential validity risk.
- Equalisation is another potential validity risk as teachers of the control group will be aware they aren't receiving the intervention and may treat these groups differently to equalise the situation. The importance of the trial and explicitly this risk will be raised with all teaching staff at the beginning and throughout the trial.
- The pupils within the control group may begin to feel rivalry with the intervention group and put in efforts to raise their game which would invalidate our results. As such staff will be asked not discuss the innovation with the pupils from either group.

References

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