

# Embodied Learning in the Primary School Classroom – Improving reading and academic performance by training visual, motor and auditory attention with physical activities.

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## Introduction

Less than 15% of UK children with special educational needs (SEN), including dyslexia, receive diagnosis of their condition, so 1.5 million SEN children do not receive support tailored to their specific needs.

Large-group interventions which improve performance and ability for SEN pupils, and which can be delivered by the class teacher, would be a very cost-effective addition to current provision. We have trialled a new whole-class school intervention for pupils aged 7 – 12, designed to improve attention and self-control.

## The intervention

A 12-week physical, visual and auditory classroom intervention programme, Move4words (M4W), has been developed in collaboration with 35 UK Primary and Secondary schools since 2006. The 10-15 minute intervention is delivered to the whole class by the class teacher, at the start of each day, to pupils aged 7-12.

To make delivery easy for participating teachers, the intervention is highly prescriptive, with each element of each of the 60 days' activity sessions laid out in step-by-step form on a DVD. Teachers who participated in recent trials only needed one 2.5 hour training session.

More than 200 individual activities are modelled by videos of engaging child actors or animations. Pupils copy the video demonstrations of each activity, to train their visual, motor and auditory attention.

The activities aim to improve the following areas which have been linked to academic success:-

- Attention, concentration and self-control <sup>1</sup>
- Executive Function through physical training in many incremental steps, with repeated practice <sup>2</sup>
- Visual Attention <sup>3</sup> and eye tracking skills <sup>4</sup>
- Rhythm and timing <sup>5</sup>
- Aerobic exercise <sup>6</sup>
- Thoughtful limb-movement patterns <sup>7</sup>
- Rhythmic, dynamic music <sup>8</sup>
- Mindful body movement and breath awareness <sup>9</sup>



## Methods

20 schools participated in trials of the current version of the intervention (M4W) in 2011 or 2012, with more than 1,000 children aged 7 – 12, during normal lessons.

All data were collected by the participating schools, using some or all of the following tests:

- their regular reading age test;
  - their termly assessments of performance in reading, writing and maths (Key Stage Levels);
  - the national end-of-Primary-School SATs tests;
  - a reading speed test devised by E McClelland.
- Statistical analyses were carried out by E McClelland.

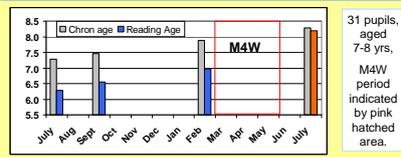
## Results

These pilot trials were very successful. The greatest impact was seen for children performing below the 5<sup>th</sup> percentile (with large effect size), although all ability ranges benefited: the higher the ability, the smaller the impact.

### Reading age (RA) of pupils aged 7 – 12 years

*Longitudinal trials of reading age (total N = 151)*  
Some schools tracked reading age before and during the intervention. These data showed large increases in reading age during the intervention (Fig 1). For pupils below the 5<sup>th</sup> percentile,  $p < 0.001$ , effect size  $d = 1.27$ ,  $N = 27$ ; between 5<sup>th</sup> and 15<sup>th</sup> percentile,  $p = 0.048$ ;  $d = 1.02$ ,  $N = 15$ .

**Figure 1: Example of median reading age vs chronological age tracked for 7 months before and 5 months including M4W.**



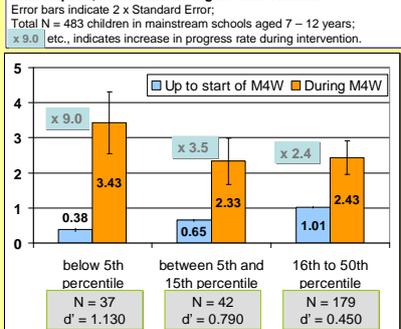
### Combining RA data from 483 pupils in 13 schools.

In this study, 37 children initially performing below the 5<sup>th</sup> percentile had made almost no progress in reading at school despite 3 or more years of targeted support (median initial RA = 4.8 yrs; Chron age = 8.5 yrs; reading delay = 3.5 yrs).

After the intervention, this group's median reading age increased by 14 months in only 4 months ( $p < 0.001$ ; effect size = 1.1, Fig 2). This is an 9-fold increase, shown in Fig 2 in months of reading age progress per month of time.

42 children initially performing between the 5<sup>th</sup> and 15<sup>th</sup> percentile also improved significantly, with a 3.5-fold increase in progress rate ( $p < 0.001$ , effect size = 0.8; Fig 2).

**Figure 2: Reading age progress in months, per month of time elapsed, before and during the intervention.**



Higher-achieving children achieved smaller but still significant improvements ( $p < 0.001$ ) in reading age (Fig 2), justifying the inclusive use of the intervention.

### Exam results and performance tracking

Eight underperforming primary schools used M4W with 235 11-yr old final year pupils in 2011 or 2012. Compared to previous years, significantly more pupils reached their target (Level 4+ in English and Maths) in final year exams ( $p = 0.001$ ).

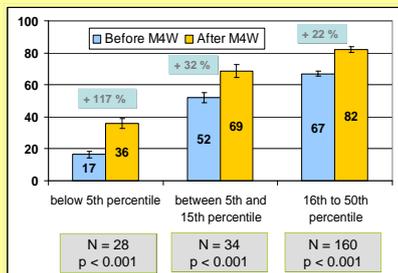
Compared to 8 comparison schools, matched to trial schools on final year performance over the previous three years, the intervention had a large effect on exam results ( $p = 0.034$ ; effect size 0.86, see abstract for figure).

### Reading speed of pupils aged 7 – 11 years

Significant and large increases of reading speed were measured after the intervention, particularly for very slow readers whose reading speed typically more than doubled (Fig 3).

**Figure 3: Reading speed in words per minute before and after the intervention, and percentage improvement.**

Total N = 477 children in mainstream schools aged 7 – 11 years.



## Feedback

### Feedback examples from teachers

- "We have noticed great results in the reading ages of most lower ability children" - SEN Coordinator, Kings Hedges Primary School, Cambridge.
- "The reading age tests I ran showed that the lower ability children's reading age improved at more than 5 times the national rate" - Year 6 teacher, Gilded Hollins Primary School, Leigh, Lancashire.
- "...there is definitely a marked change in their ability to concentrate." - Year 5 teacher, Rose Hill Primary School, Oxford.

### Examples from children

- "When I read before Move4words, my eyes went all over the place and I often skipped a line. Now I can control my eyes and read much better" - Year 5 girl.
- "I can read much better because the lines aren't moving about all the time" - Year 6 boy.
- "I don't get so distracted by the pictures so I read a lot better" - Year 5 boy.

## Conclusions

Move4words' embodied learning programme is simple, time-effective and achieves significant and large improvements in reading ability and exam performance comparable to many, more time-intensive reading intervention techniques.

The use of physical intervention programmes has caused considerable controversy <sup>10</sup>. However, this study suggests that well-targeted choices of physical, visual and auditory intervention elements which have a firm grounding in science (e.g. the key role of rhythm in the development of phonological awareness <sup>11</sup>) have led to a viable educational intervention approach.

Larger-scale and independent trials are required to determine whether this may be a new paradigm for education.

## Further Information and contact details

Move4words is a not-for-profit Community Interest Company; the Government-appointed CIC Regulator ensures any profit is used for further development or distributed back to schools.

The presenting author can be contacted by email at [office@move4words.org.uk](mailto:office@move4words.org.uk)

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