



Research & Development Impact Report No. 2

How effective is the Numbers Count intervention for learners who are of secondary age but still working within Year 1 National Curriculum expectations?

'Numbers Count is taught in a fun way. There are some people who think there is only this way or that way to do it but there are hundreds of ways of learning the same thing'

Dee Dee, Year 7, Stormont House School

'It's good and I would like to carry on doing it everyday'

Justin, Year 7 (one term after the intervention)

Who might find this research useful?

- Secondary mainstream schools, special schools, FE or alternative provision settings with learners who are of secondary age but still working within Year 1 National Curriculum expectations



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Research & Development Impact Report

The effectiveness of 'Numbers Count' as an intervention for secondary students working well below age-related expectations

Project Participants	Sue Keavy (Numbers Count Teacher) Garry Minto (Every Child Counts Trainer) Kevin McDonnell (Headteacher)	Phase(s)	EY/ Pri/ Sec/ Spec/ FE/ All
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School context relevant to this research:

- Stormont House School is a secondary day special school (11-17)
- Students have complex and inter-related special educational needs to the extent that their ability to learn, thrive and develop in a secondary mainstream setting would be significantly affected.
- The vast majority of students arrive on secondary transfer from mainstream primary schools and are working within Year 1 or 2 National Curriculum descriptors/ expectations.
- Statutory teacher assessment for such learners at the end of Key Stage 2 lacks the detail necessary to plan either class teaching or accurate interventions
- The school is using the Pupil Premium Grant to pay for training, salary costs and materials

Starting point(s):

- Numbers Count is an intensive intervention for learners in Years 1 to 3 who have the greatest difficulties with mathematics. It is delivered by a specially trained teacher who also supports other staff in school. (Numbers Count 2 is aimed at learners in Years 4 to 9)
- The evidence base for the effectiveness of Numbers Count is therefore based on its effectiveness with much younger learners

Key R&D question(s)

How effective is the Numbers Count intervention for learners who are of secondary age but still working within Year 1 National Curriculum expectations?

Is this developing the findings of existing research evidence?

- The Every Child Counts (ECC) team at Edge Hill University, Ormskirk, Lancashire, has established a significant evidence base for Numbers Count and Numbers Count 2: over 50,000 learners making an average Number Age gain of 16.5 months in only 4 months – over 4 times the expected progress.
- The Education Endowment Foundation (EEF) reports that 'Numbers Count ... has been independently evaluated using a randomised controlled trial (RCT). This study found that Numbers Count had an impact of 0.33 standard deviations on attainment'.
- The EEF is currently evaluating another ECC programme, 1stClass@Number, which is a small-group intervention delivered by teaching assistants (TAs) intended to support pupils struggling with numeracy in Year 2. The evaluation report will be published in autumn 2017.

Intended successful outcomes

- Students undertaking the Numbers Count programme make significantly greater progress in Number Age than the increase in their chronological age (3-4 months). (This progress would be even more significant for learners of this age than those in Years 1-3 as they will have had 6 more years of education already).
- Impact is also significantly positive when calculated using the John Hattie 'Effect Size' methodology

Success criteria/ Impact measures

- Numbers Count teacher identified and trained
- The increase in Number Age during the intervention period is significantly higher than the increase in chronological age for the vast majority of participants
- The 'Effect Size' of the intervention calculated using John Hattie's Visible Learning methodology is significantly greater than the 'hinge point' expectation of 0.4
- There is evidence that gains are sustained

Summary plan of action

- Identify and train a part-time Numbers Count (NC) Teacher
- Identify and resource a dedicated Numbers Count room/space
- Establish good lines of communication between NC teacher, NC advisor, maths subject lead and headteacher
- Identify initial and subsequent student cohorts
- Implement
- Evaluate impact

Initial timescale

Spanning 2 academic years: 2014-15 and 2015-16

Initial resource allocation (human, material and financial)

This is an expensive intervention. In addition to training costs, cover costs for training and resources, it is a teacher-led intervention largely or wholly working intensively with individual students. The opportunity to use the Pupil Premium Grant was invaluable in this respect, as was guidance and support from the Every Child Counts Trainer

'I liked it when Gary (link teacher) came in and we worked together'

Nora, Year 8

'I did counting in 5's and 10's using numicon, little people and number mats' (Jodie)

'I liked using the pegs, teddy bears and socks' (Lizzie)

(Jodie and Lizzie, Year 10, describing practical equipment they remember using)

Other points to note

Locally-sourced training: The school benefited from the Numbers Count and other ECC programmes being available locally from Kingsmead School, one of the 2 Teaching Schools within the HTSA

The Numbers Count programme is highly structured and provides the following

Training and Professional Development

- 7 days of local training by an accredited ECC Trainer
- Mathematical subject and pedagogical knowledge
- Supporting parents and colleagues across the school
- 2 school visits by the Trainer
- ECC accreditation for teacher and school
- Ongoing CPD and school visits every year
- Opportunities for further accredited academic study

Resources and Support

- Detailed handbook guidance
- Online guidance and downloadable resources
- Access to the ECC data system, providing detailed analyses of impact and children's progress
- Phone and e-mail support from ECC and the Trainer

Progress and Impact Review May 2016

Visible Actions completed

- A part-time Numbers Count (NC) Teacher was identified and trained during the 2014-15 school year
- A Numbers Count room within the school was identified, furnished and resourced. It is not used for other purposes and work, displays and resources can remain readily accessible and visible
- Good lines of communication between the NC teacher, NC advisor, maths subject lead and headteacher were established
- Initial and subsequent student cohorts were identified.
- The programme has been implemented and evaluated for all 24 student participants to date.

Outcomes to date (*refer to intended outcomes and success criteria*)

The following is based on 24 participants over 2 school years, ranked in order of Start Number Age (months)

Student Number	Start (Number Age in Months)	Finish (Number Age in Months)	Increase in Number Age	Percentage increase/decrease
1	53	60	7	12%
2	55	59	4	7%
3	55	57	2	4%
4	56	60	4	7%
5	56	64	8	13%
6	56	61	5	8%
7	56	69	13	19%
8	57	73	16	22%
9	58	69	11	16%
10	59	70	11	16%
11	59	77	18	23%
12	63	76	13	17%
13	63	67	4	6%
14	66	73	7	10%
15	67	81	14	17%
16	68	82	14	17%
17	69	79	10	13%
18	69	84	15	18%
19	70	82	12	15%
20	70	74	4	5%
21	74	83	9	11%
22	78	84	6	7%
23	78	89	11	12%
24	80	97	17	18%
Average	64	74	10	13%

Analysis

- The average Number Age at the start of the intervention was 5 years 4 months rising to 6 years 2 months at the end. This was approximately 7 years less than the learners' chronological ages
- All but one student made a greater gain in Number Age than their rise in Chronological Age (approx. 3 months)
- There was a wide variation in the gains recorded, and no correlation could be established with gender or deprivation (ethnicity was too varied in this small sample size)
- There was no clear correlation between the learner's start Number Age and the gains made
- The average gain in Number Age was 10 months, very approximately a 13% increase compared to a 4% increase in chronological age
- The average gain in Number Age was about 3 times the expected progress for a typically developing young person over the same period

Evaluation

- Based on the limited data available, Numbers Count is an effective intervention for secondary students working well below age-related expectations
- Although the average gain in Number Age was less than that reported in the summary ECC data, this is not surprising given that the learners in our school cohort are still working within Year 1 expectations after up to 6 years of additional statutory schooling compared to the typical target group for this intervention.

Effect Size Calculation

Student Number	Start (Number Age in Months)	Finish (Number Age in Months)	Effect Size Calculation
1	53	60	0.75
2	55	59	0.43
3	55	57	0.21
4	56	60	0.43
5	56	64	0.85
6	56	61	0.53
7	56	69	1.38
8	57	73	1.70
9	58	69	1.17
10	59	70	1.17
11	59	77	1.92
12	63	76	1.38
13	63	67	0.43
14	66	73	0.75
15	67	81	1.49
16	68	82	1.49
17	69	79	1.06
18	69	84	1.60
19	70	82	1.28
20	70	74	0.43
21	74	83	0.96
22	78	84	0.64
23	78	89	1.17
24	80	97	1.81
Average	64	74	1.04

Analysis

- The average Effect Size calculated using John Hattie's Visible Learning methodology was 1.04; approximately 2 ½ times the 'hinge point' expectation of 0.4¹. An effect size of 1.00 is reportedly broadly equivalent to a leap of 2 grades at GCSE
- For all students except one the effect size was greater than 0.4
- There was a wide variation in the gains recorded, and no correlation could be established with gender or deprivation (ethnicity was too varied in this small sample size)
- There was no clear correlation between the learner's start Number Age and the Effect Size of the intervention

¹ http://www.teacherstoolbox.co.uk/T_effect_sizes.html

Evaluation

- Based on the limited data available, Numbers Count appears to be an effective intervention for secondary students working well below age-related expectations (even though it was developed for primary age children)
- The researchers have been unable to establish to what extent Effect Size remains a robust comparative measure when participants do not form a 'typical' cross-section of the overall population. However, the impact of approximately 2½ -3 times the expected progress measured using actual increase in Number Age, percentage increase in Number Age or Effect Size appears significant and supports investment in further implementation of the programme for this target group of students.

Other outcomes and impact

“The pupils always enjoy the sessions which boost their confidence and allow them to learn, practise and secure skills. The impact of the programme is evident in the pupils’ growing ability to transfer skills between their classroom practise and the Numbers Count sessions. Even when it is taking longer to develop and acquire skills and language or to learn to apply them, the efficacy of the Numbers Count intervention programme is apparent in the pupils’ improved motivation towards working with mathematics in the classroom”.

Miss Raz Motin, Year 7 teacher, form tutor and Transition Lead

What next? / Wider learning

- To what extent are the additional gains made are retained as students progress through the school?
- How could we modify our 'core' maths teaching so that they incorporate appropriate elements of the Numbers Count approach?
- Implement and evaluate the 'sister' Teaching Assistant-led ECC interventions, commencing with 1stClass@Number
- Consider whether there are further links between home and school that could be developed to even better support this programme in particular and maths learning in general

Review of resource allocation (human, material and financial)

1. Numbers Count is an expensive intervention as it is teacher-led and implemented either 1:1 or 1:2 (1:1 in our context so far)
2. The impact of the intervention is very significant for the recipients
3. High quality training and support were essential to success, as was the provision of a dedicated space and additional physical maths resources
4. The school judges Numbers Count to be a very effective use of the Pupil Premium Grant

References

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