

An Investigation of the Effectiveness of Reading Interventions for a Local Population of Primary School Children

The skill of being able to read fluently and effectively is essential to success in school. There are many reading interventions available but research on their effectiveness is relatively new. This project was initiated by the National Educational Psychological Service (NEPS) in January 2007 and was aimed at exploring the effectiveness of reading interventions available to learning support and resource teachers. The authors wanted to find out which of the reading interventions found in previous research to be effective, were most effective with the local population of primary aged children. In addition, this project was set up to encourage and support those teachers involved with teaching this cohort of children in their delivery of structured programmes.

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INTRODUCTION

The importance of being able to read fluently and effectively is something that is well documented and essential to success in school. Without this, children are significantly disadvantaged in the school system and may experience secondary difficulties including low self-esteem, low self-confidence and difficulties relating socially. Children with reading difficulties are supported in school through learning support and resource teaching and may be taught in small group or individual sessions. The materials and programmes used vary and outcomes show different levels of success. So, what contributes to success when providing this additional support?

LITERATURE ON READING INTERVENTIONS

There are many reading interventions available. Research in the area of effective interventions is relatively new. Swanson and Hoskyn (1998) conducted an analysis of research available and found the following:

- Not all 'treatments' are equally effective
- A combined model of direct instruction and strategy instruction is relatively more effective than other methods (that is, teaching certain aspects, such as phonics very explicitly, as well as teaching students strategies, such as predicting what might happen next as an aid to comprehension)
- Small group settings and individual tuition are more effective than larger groups
- Structured specialised tuition is more effective than eclectic approaches.

Other researchers, such as Vaughan, Gersten and Chard (2000) also reviewed research into literacy intervention and their findings reiterated those of Swanson and Hoskyn (1998). In addition:

- It was suggested that small interactive groups (a maximum of 3 pupils) and pairs with highly qualified teachers may be as effective as a one to one model

- Using a student with a disability as a cross age tutor is the most effective form of peer reading.

The National Institute of Child Health and Human Development (2000), an initiative of the federal government of the USA, reported the importance of the following when considering best practice in reading instruction:

- The explicit and systematic development of phonemic awareness (knowledge of the sounds of spoken language)
- Phonics instruction
- Developing fluency in reading
- Comprehension skills development
- The importance of teacher education
- The positive and effective use of computer instruction.

The research strongly points towards the effectiveness of systematic, structured teaching of phonics (National Institute of Child Health and Human Development, 2000). It has also been found that synthetic (small unit) approaches to phonics are preferable to analytic (large unit) approaches (Macmillan, 1998; McGuinness, 1997). Synthetic phonics refers to the teaching of individual letter sounds and the skills of blending of letter sounds (c-a-t-) while analytic phonics focuses on teaching sound chunks, such as 'at', c-at, m-at etc. Another important finding is that the more frequent the teaching, the more effective the intervention. Practice of new skills should be distributed over time rather than massed into a particular time (Solity, Deavers, Kerfoot, Crane and Cannon, 2000). Therefore, daily practice of 10 minutes (practice distributed throughout the week) is more effective the one hour of practice delivered in a block (massed).

There is also increasing evidence about which particular interventions are most effective. Brooks (2002) summaries extensive research and evaluates some 25 different intervention approaches. Information from this publication can be a useful guide in the selection of evidence based intervention programmes.

PROJECT METHODOLOGY

Initial In-service

An initial in-service session was delivered to a group of teachers in January 2007. During this session, background research, as discussed above, was presented to the participants. This was followed by an introduction to a sample of reading interventions for which there was evidence of effectiveness. The programmes presented were Toe by Toe, Peer Reading, Accelerated/Accelerate, Precision Teaching/Direct Instruction and The Orton-Gillingham Method.

At the end of this introductory session, the participants were invited to participate in an action research project. They were asked to complete a form, (also signed by their school principal) indicating which programme they were interested in. Of the 35 teachers who attended the initial session, 15 proceeded to participate in the action research elements. Documentation given out at that stage included part one of an Intervention Questionnaire. This questionnaire was used to collect qualitative information and consisted of three parts:

- Part 1: Pre-intervention
- Part 2: Review of Intervention to date
- Part 3: Post-intervention.

Participants were also asked to acquire a pre-agreed reading test to be used to pre and post-test pupils taking part in the project. Identification of possible candidates for the interventions was also carried out at this time.

The Project

Following the initial in-service session, the first of three follow up meetings took place early in February when briefing on pre testing was conducted. A Time and Qualitative Log was also distributed on which teachers could record the amount of time spent on each session of their chosen programme, the frequency of the delivery, the number of children in the teaching group and any other comments or information relevant. A time scale for completing the pre testing and implementing the chosen programme was decided.

The second follow up meeting, a progress review meeting was held towards the end of March. At this meeting, part 2 of the Intervention Questionnaire – Review of Intervention to date, was distributed. This meeting gave the participants the opportunity to raise any issues of concern and discuss and share possible solutions. Post testing was also discussed.

Post-intervention reading testing was conducted by the teachers in early June. A final meeting took place mid June when part 3 of the Intervention Questionnaire – Post-intervention was distributed and completed. At this meeting, the results of the pre and post-intervention testing was collected along with the Time and Qualitative Log.

Data Collection

Quantitative data collected included pre and post-intervention reading scores, number of teaching sessions, number of teaching hours and number of children in teaching group. In this way it was hoped to be able to quantify the teaching hours per child and to have data on the relative cost-effectiveness of interventions, as well as data on reading progress.

Qualitative data collected included information from completion of the Intervention Questionnaires: part 1. The Pre-intervention Questionnaire collected information on the reasons why the teacher chose a particular intervention programme, what they were hoping to achieve with the intervention programme, the things that would aid success and possible obstacles that may prevent completion of the intervention programme. The Review of Intervention Questionnaire elicited information on whether the teachers were happy with their chosen intervention, what they thought they had achieved so far, what things have helped with implementing the intervention programme, what the obstacles were, the disadvantages of the programme and how likely it was felt that the teachers would be able to complete their chosen intervention. Finally, the Post-intervention Questionnaire collected information relating to how happy the teachers were with the programme, what they thought they had achieved, what the main supports to completion of the programme were, what the main obstacles were, the best things about using the programme as well as the disadvantages and whether they would recommend the programme to other teachers.

The data was analysed and the results are presented in the following section.

PROJECT RESULTS AND DISCUSSION

In total 48 children in 12 schools participated in this project, which took place in Waterford schools from mid-February to the end of May 2007. The children ranged in age from 5 years 9 months to 13 years, 1 month. The average age was 9 years, 11 months. There were 23 girls and 19 boys in the study, with 6 participants for whom gender was not specified.

The following interventions were trialled, with the number of children in each group noted.

Table 1: Interventions, participants and teaching inputs

Name of programme	Number of children	Mean age at start of intervention	Mean number of teaching sessions	Mean number of teaching hours
Acceleread/Accelewrite	8	10 y, 2m	28	6.81
Barton-Gillingham	3	7y, 9m	62	9.58
Sound Linkage with Paired Reading	5	12y, 2m		
Paired (peer) Reading	20	9y, 7m	40	n/a
Precision Teaching (sight vocabulary)	3	8y, 1m	37	7.00
Toe by Toe	9	10y, 9m	38	12.70
Total	48	10y	39	9.98

Nearly all the children were taught either individually or in pairs, with 33% taught individually, 60% in pairs and 6% in groups of 3. Precision teaching was the only intervention delivered entirely on a one to one basis.

Children attended between 20 and 70 teaching sessions, with the average being 39 teaching sessions. Hours of tuition (based on adult teaching time divided by the number of children in the teaching group) varied from just over 3 hours to over 16 hours, with an average of 10 teaching hours per child.

Data was collected about the gains children made in reading using the NFER-Nelson Group Reading Test (NFER-Nelson, 1992) with pre and post-intervention testing. The word reading and sentence reading tests were used, as appropriate to the children's ages. There are two versions of each test (A and B for word reading and X and Y for sentence reading).

The results of this project are outlined below. These results need to be treated with considerable caution, for the reasons outlined below.

Table 2: Interventions and gains in word reading and sentence reading, with number of participants

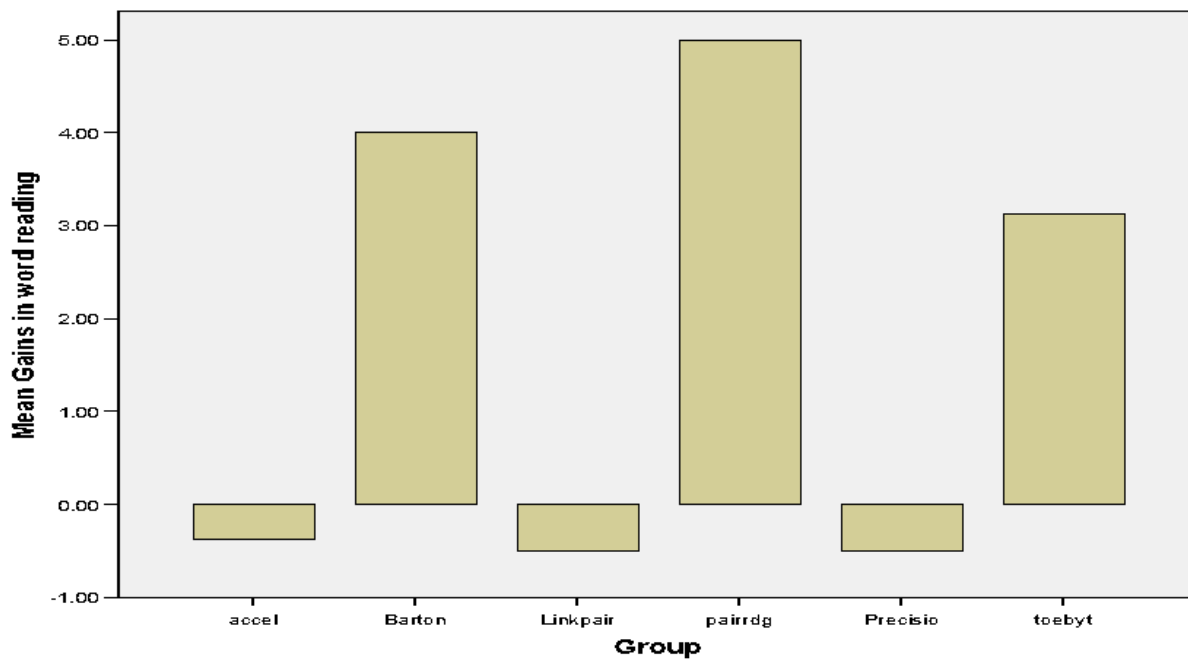
Name of Programme	Mean gains in word reading	Mean gains in sentence reading
Acceleread/ Accelewrite	-.37 N=8	2.00 N=4
Barton-Gillingham	4.00 N=2	3.00 N=1
Sound Linkage with Paired Reading	-.50 N=4	2.00 N=4
Paired (peer) Reading	5.00 N=4	6.17 N=6
Precision Teaching (sight vocabulary)	-.50 N=2	No data
Toe by Toe	3.12 N=8	9.37 N=8
Total	1.68 N=28	5.70 N=23

As can be seen from Table 2, the average participant made gains of almost two standard score points in word reading and almost six standard score points in sentence reading. It is typical that reading comprehension (as evidenced in sentence reading skills) responds better to intervention than word reading skills. These are impressive gains, given the short-term nature of the intervention and compare well to international standards in best practice. A study of learning support in Ireland (Shiel, Morgan & Larney, 1998) found that students made an average of 3.41 standard score point gains in reading comprehension in 2 years. Children in this study made almost twice as much progress in just 3-4 months! Paired Reading and Toe by Toe represented the most effective interventions. It should be noted that Paired Reading is also a most cost-effective intervention and that research indicates that this intervention has other benefits, such as improved self-esteem, attendance and social skills.

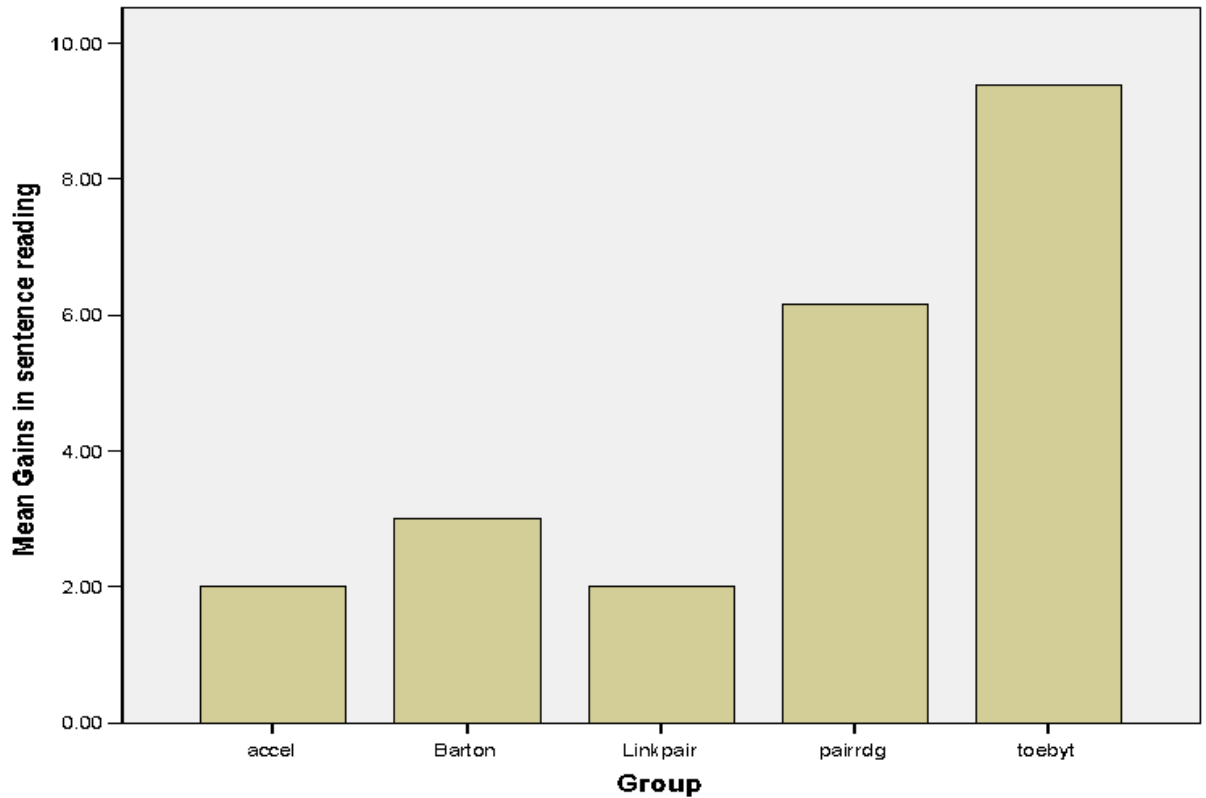
This data can also be understood in this way: The average participant (aged 10 years at the outset) would have had a word reading age of 8 years at pre-intervention and a word reading age of 8 years, 6 months at the end of the project. S/he would have had a sentence reading age of 7 years, 6 months at the beginning of the intervention and a sentence reading age of 8 years, 9 months at the end of the project. Obviously, these are 'averages' and there was considerable variability in outcomes, with some children doing less well and some children doing very well indeed.

This information can also be presented in graph form, which has some benefits in terms of visual presentation, but must be considered alongside other information.

Graph 1. Mean gains in word reading standard scores, by group



Graph 2: Mean gains in sentence reading standard scores by group.



Note that precision teaching is not represented on this graph, because the children in this group were too young to be tested on the sentence reading section.

LIMITATIONS OF THE STUDY

It should be noted that all the above results needed to be treated with caution, due to the small numbers involved in some groups and due to limitations of the reading test used. These limitations are outlined below.

Very young children often failed to earn any score, either on the pre or the post-intervention test and this meant that, while considerable progress may have taken place, it was not possible to measure it.

Also, the standardisation did not offer scores below 70, so all those who performed at the lowest end of the range, were represented as a standard score of 70, while scores in the 60s may have been more accurate. This made it difficult to quantify the extent of progress subsequently.

There seemed to be inconsistencies between the results earned on parallel tests, particularly between tests X and Y of the sentence reading test. The Y version of the test seemed to be significantly more difficult than the X version.

There was quite a lot of variability in scores earned by older and more able children from one test situation to another (this was usually relevant to children in the peer reading intervention). Therefore, in reporting the data below, six of the participants in the Paired Reading scheme, who had pre-intervention scores of 100 or more on the sentence reading test, were not included in the data analysis.

Some teachers noted that children were less motivated by the reading test during the second administration, perhaps because it was no longer a novelty and because of distractions associated with the end of the summer term. All participating teachers felt that the children involved in the different interventions had made progress and felt that the tests given did not readily capture this progress.

Although 48 children participated in the programme, valid pre and post-intervention data on the NFER-Nelson Group Reading Test was only analysed for 35 participants. One child was absent for post-intervention testing, and six children were tested on an alternative (non-standardised) test and, as noted above, six children were excluded because of inconsistencies in reading scores. It should be noted that only small numbers of children were involved in some interventions, such as Precision Teaching and Barton Gillingham.

It should be noted that the children in the Toe by Toe group and the Paired Reading group had the lowest literacy skills at the outset, with mean pre-intervention literacy scores in the range 77-79. Research suggests that those with the lowest scores at the outset are likely to make the least progress, but this was not the case in this small scale study.

The oldest children were in the Sound Linkage/Paired Reading programme, and these children therefore had a long history of reading difficulties. Consistent with our own results, research would suggest that older children with long standing difficulties are the most difficult to remediate.

QUALITATIVE RESULTS

Participants were asked to complete questionnaires on three occasions. At the pre, mid and post-intervention stages. The main concerns and issues for participants at these times are outlined below.

(A) Pre-intervention

Reasons for choosing an intervention programme?

The main reasons given were recommendations including in-service and the need to try something different.

Main obstacles to completion of the programme?

The most common response was absenteeism, lack of support (from parents) and time constraints.

(B) During the intervention

Main obstacles to carrying out the programme?

The main obstacles identified were time constraints, school interruptions and absenteeism.

Can you do anything to overcome these obstacles?

The main responses included the need to restructure timetables and involve parents more.

(C) Post-intervention

Are you happy with the programme?

100% of participants responded positively to this question

What do you think you have achieved?

Responses included improvements for pupils in reading ability, fluency, confidence, self-esteem, enjoyment and interest in reading.

What were the main obstacles to carrying out the programme?

During the intervention responses included time constraints, school interruptions and absenteeism.

How did you overcome these obstacles?

The main responses were structural/organisational, for example, the use of daily short sessions (10-20 minutes).

Would you recommend this programme to other teachers?

All participants were happy to recommend the programmes they chose.

BENEFITS OF THE PROJECT

The reading project appears to have had a number of benefits for all involved i.e. school pupils, teachers and psychologists.

The pupils achieved:

- Raised word reading scores
- Raised sentence reading scores
- Increased self-confidence, sense of achievement and enjoyment of reading (dependent of programme)
- Improved literacy levels as reported anecdotally.

The teachers gained:

- An opportunity to use a different reading programme
- An opportunity to use a new reading test
- Knowledge about a range of reading programmes
- Development of teaching skills
- Forum to discuss reading issues

- An opportunity to reconsider and modify their management of learning support (time tables etc).
- An opportunity to trial reading programmes and assist in testing their effectiveness in a local setting
- An opportunity to trial new reading tests and assist in testing their effectiveness in a local setting.

The educational psychologists gained:

- An opportunity to do team work with colleagues
- An opportunity to present information on various reading programmes to a group of teachers
- An opportunity to deliver effective support and development work with a group of motivated teachers
- An opportunity to trial reading programmes and test their effectiveness in a local setting
- An opportunity to trial new reading tests and test their effectiveness in a local setting.

CONCLUSION

This action research project focused on effective interventions for children with literacy difficulties in primary schools. It was found that using a structured programme for a block of time on a daily basis helps children's reading. Short daily sessions (10-20 minutes) appear to be most effective for programme delivery. Therefore, there is a need for timetabling of learning support to reflect this, with frequent, short sessions, being preferable to longer, but infrequent sessions. In this project, Toe by Toe and Paired Reading had particularly positive results. However, this was a small-scale project and there is a need to replicate this type of project and expand its pupil and teacher base in order to overcome some of the size limitations which affected overall reliability of findings and to maximise its benefits for pupils and teachers alike. Future studies which use new/relatively untried reading tests need to be aware of the difficulties encountered with the test used in the current study.

Participation in such action research was found to have multiple benefits for teachers, pupils and psychologists and contributes to our collective endeavour to build best practice in meeting the needs of children with literacy difficulties.

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