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What are the Effects of a Cross-Age Tutoring Intervention on the Reading Attainment of Struggling Readers in a Primary School?

Learning to read is a complex process for most children and in particular for those who experience learning difficulties. Primary schools in Ireland today are faced with the challenge of maximising reading outcomes for students with an ever increasing range of academic and social inclusion needs. This article reports on a study conducted in a mainstream urban primary school where cross-age tutoring was used and evaluated as a means of improving the reading skills of a group of students who struggled with reading.

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INTRODUCTION

> *Learning to read involves learning how to decode words quickly and accurately with comprehension as the main goal of word recognition instruction*
>
> (Vacca, Vacca, Gove, Burkey, Lenhart and McKeon, 2009, p. xxii).

Much research has been conducted into the acquisition of reading and how best we can teach children to read. Research converges on the importance of building sight vocabulary as well as the ability to apply phonics cues effectively (National Reading Panel (NRP), 2000; Department of Education, Science and Training (DEST), 2005; Department for Education and Skills (DfES), 2006; Jennings, Caldwell and Lerner, 2006). It is in this context that O'Connor (2007) stresses the importance of extensive reading practice with books and stories. In order to facilitate oral reading practice, the Primary School Curriculum (Department of Education and Science (DES), 1999) recommends providing students with reading material at an appropriate level of difficulty, that is, material which contains words that are already in a student's speaking or listening vocabulary.

METHODOLOGY

In consultation with class teachers and parents, nine students from fifth and sixth class – those scoring at or below the 23rd percentile in the most recent MICRA-T[1] (Wall and Burke, 1998) – were selected to act as tutors (Table 1). This group consisted of five girls and four boys who ranged in age from ten years and ten months to twelve years and five months at the start of the intervention. In a similar consultation, nine third class students – scoring at or below the 12th percentile in the school's most recent MICRA-T reading test – were selected to act as tutees (Table 1). The third class students ranged in age from eight years and one month to ten years and eight months and that group similarly consisted of five girls and four boys.

Table 1: Selection of participants for cross-age tutoring

	Chronological Age September 09		MICRA-T Standard Score	MICRA-T Reading Age	
Tutors	years	months		years	months
Noreen	11	8	88	9	9
Andrew	11	9	89	9	8
Mary	11	6	86	9	7
Roisin	12	0	86	9	7
Paul	12	5	84	9	6
Frances	11	7	85	‹9	0
Dan	10	10	84	‹9	0
Sheila	11	9	79	‹9	0
David	11	9	73	‹9	0

[1] MICRA-T is a group administered, norm-referenced reading test consisting of four different levels. It is standardised on a sample of about 10,000 Irish primary school students and is designed to provide information on the reading performance of students in relation to the results of other students of the same age or the same class level.

	Chronological Age September 09		MICRA-T Standard Score	MICRA-T Reading Age	
Tutees					
William	8	4	82	6	10
Christine	8	10	81	6	9
Jane	8	2	80	6	8
Owen	9	0	80	6	8
James	8	1	79	6	7
Tanya	8	5	79	6	7
Claudia	10	8	77	‹6	7
Ultan	9	5	71	‹6	7
Carrie	8	10	‹70	‹6	7

Prior to commencement of the intervention, a number of further assessments were conducted. The Diagnostic Reading Analysis (DRA) (Crumpler and McCarty, 2004) was selected as it provides a norm referenced score in reading accuracy, comprehension and reading fluency/rate. The DRA was standardised on a large sample of students in the UK aged six years and six months to sixteen years and five months. The majority of the students in the standardization sample were from the bottom quartile of the reading ability range which makes this test suitable for use with students who are weaker readers. It yields a raw score for reading accuracy, fluency and comprehension. Raw scores for reading accuracy are converted into standardised scores, percentiles and reading ages. The DRA assesses comprehension by requiring the student to answer questions orally for each passage read. It yields a fluency score by calculating the average number of words a student reads per minute. Raw scores for fluency and comprehension are categorized according to chronological age in five bands, ranging from very weak to excellent. The DRA was administered individually; voice recorded and timed to facilitate a more detailed desk analysis of the results later.

Before and during the intervention period students' reading was assessed by administering one minute reading probes. During one minute reading probes the number of words read correctly in one minute (wcpm) as well as the number of errors made while reading a passage of continuous prose was recorded. The one

minute reading probes helped to monitor the reading progress of the participants as well as ensure that the reading material used was at a consistently appropriate level of difficulty for them. Students' reading behaviour was recorded at ten session intervals using the Oral Reading Analysis (ORA) (Doherty, 2008). The ORA further yielded a large volume of qualitative data on the reading behaviour of the participants and traced a line of progression in reading skills over the course of the study.

Tutor-Tutee Pairings

In selecting tutoring pairs, the reading age of the tutor was at least two years ahead of the reading age of the tutee in the MICRA-T (Wall and Burke, 1998). The aim was to sustain an approximately similar differential in ability across all pairs as recommended by Topping (2005). When further assessments were conducted, however, this disparity in reading ages changed somewhat. Some of the pairings were then refined further in an effort to ensure sufficient expertise on the part of the tutor along with social compatibility between the partners. Previous studies in cross-age tutoring have found that gender matching of pairs was beneficial (Nugent, 2001). The nine pairs of students were matched according to gender, overall reading ability and social compatibility. The nine pairs established remained intact throughout the intervention period.

Focus of the Programme

The programme had three primary areas of focus. Firstly, it aimed to provide individual monitoring and immediate corrective feedback on the reading accuracy of the tutees by the tutors. To facilitate this monitoring and corrective feedback the Pause, Prompt and Praise strategy (McNaughton, Glynn and Limbrick, 1981) was used. This procedure was explained to the tutors as follows:

(i) Junior buddy meets a difficult word;
(ii) Count to five silently and give your buddy a chance to work it out;
(iii) If your buddy is still stuck, tell him/her to try to guess what the word might be by looking at the first letter;
(iv) If your buddy gets the word right, praise him/her;
(v) If your buddy is still stuck give him/her the word and ask him/her to read the sentence;
(vi) Praise your buddy for reading it correctly.

The second area of focus was reading fluency. In addition to increasing the volume of reading by the students, the programme aimed to achieve repeated reading of the same text as recommended by several scholars (Rasinski, 2000;

O'Connor, 2007; Ming and Dukes, 2008). The tutor read the text first. Next the tutee read the same text. A third reading was achieved by having the tutoring pair alternate in reading a paragraph or a page each.

The third area of focus in the programme was reading comprehension. The researcher aimed to promote an active approach to reading through applying prediction, questioning and retelling strategies. Before reading a book, the tutor guided the tutee through a predictive sequence, discussing the pictures and asking questions about the cover, title and illustrations. After reading the story, the pair discussed it and the tutor helped the tutee to seek clarification of the questions asked before reading. A prompt card was provided to assist the student pairs with this task.

Table 2 provides a summary of the objectives of the programme along with the strategies and resources used.

Table 2: Summary of objectives, strategies and resources

Objective	Strategy	Resource
Increase the volume of reading of the participants	Read with and for a partner in a cross-age tutoring setting. Follow a set procedure at each meeting	Collections of books at suitable interest and difficulty level Record sheets for pairs to record the books they read Reading buddy booklet
Improve reading accuracy through immediate guided feedback on reading	Use of "Pause, prompt, praise strategy" by tutor.	A prompt card outlining the Pause, prompt, praise strategy
Increase reading rate for slower readers	Repeated reading. Tutor reads, tutee reads with guidance from tutor. Partners alternate re-reading part of the story.	Prompt cards for tutors to assist with repeated reading

Objective	Strategy	Resource
Demonstrate comprehension of material read. Apply several strategies to improve reading.	Preview the book before reading. Ask questions. Look through the pictures in the book. Predict what will happen. After reading check if predictions were correct. Check if questions were answered. All of the above listed strategies are used in reading.	A prompt card to remind students to ask questions and predict what the story is about. On the inside cover of each book a number of questions were affixed to prompt tutors to ask questions. Inside the back cover of each book there were more questions to prompt the tutor to check for answers to questions posed at the start of the story A key-ring of the strategies in sequence

Organisation and Delivery of the Programme

Reading material was sourced to match the tutees instructional level, i.e. material they could read with between ninety and ninety-five percent accuracy. This material was at the independent reading level of the tutors, i.e. material they could read with greater than ninety-five percent accuracy. A simple survey was conducted to assist the researcher in sourcing material which would be of interest to her students. Initially 100 books were sourced from the school and public library and these were categorized into four levels of difficulty:

Table 3: Initial sets of books for paired reading

	Books	Description
Yellow Set:	PM Readers Red Set.	*Fiction & Non-fiction 32-150 words per book*
	Leapfrog Readers	*2-4 lines of text per page*
Orange Set:	PM Readers Yellow	*Fiction & Non-Fiction 100-180 words per book*
	Zig Zag Books	*1-3 lines of text per page*
	Reading Corner	*50-450 words per book*
Green Set:	Storyworlds	*2-4 lines of text per page*
	Rigby Star *(Blue & Orange)*	*3-6 lines of text per page*
	Go (Green & Blue)	*3-8 lines of text per page*
	Giggle Club	*3-7 lines of text per page*
Pink Set:	Gigglers Bubblegum	*approx 30 pages and glossary*
	Purple	*4 chapter story & glossary*
	Red	*5 chapter story approx 30 pages*
	Treetops (Oxford)	*4-14 lines per page, approx. 40 pages*

The intervention was discussed with the school principal and colleagues in October 2009. When consent from the board of management of the school was obtained, a pilot project was conducted during November-December 2009. Following an evaluation of the pilot project in December 2009, the main project commenced in December 2009 and continued until April 2010.

FINDINGS OF THE STUDY

Findings from the study suggest that providing younger struggling readers with ample opportunity to practice reading, with guided corrective feedback at their instructional level (ninety to ninety-five percent accuracy) has a positive impact on their reading accuracy and fluency. The research further suggests that for the older struggling readers, increasing their volume of easy reading (greater than ninety-five percent accuracy) as well as applying strategies to their reading served to enhance their reading accuracy, fluency and comprehension.

Table 4: Diagnostic reading analysis reading accuracy results

Tutoring Pairs	Pre Testing December 09					Post Testing March 10					
	Raw Score	Standard Score	Chron. Age years	Chron. Age months	Reading Age	Raw Score	Standard Score	Raw Score	Chron. Age years	Chron. Age months	Reading Age
Noreen[2]	282	›130	11	10	16y 4m	284	>130	12	1	16 y4m	**N/A**
Jane	126	99	8	4	8y 0m	143	107	8	7	8y 9m	**+9m**
Roisin	156	66	12	3	9y 6m	181	70	12	6	10y 8m	**+1y2m**
Claudia	125	73	10	10	8y 0m	133	66	11	1	8y 3m	**+3m**
Mary	184	88	11	9	10y 8m	223	103	12	0	12y 3m	**+1y 7m**
Christine	123	87	9	0	7y 9m	132	92	9	3	8y 3m	**+6m**
Sheila[3]	181	86	11	11	10y 8m	160	68	12	3	9y 10m	**-10m**
Tanya	122	91	8	7	7y 9m	136	99	8	11	8y 6m	**+9m**
Frances	136	‹65	11	10	8y 6m	159	67	12	2	9y 6m	**+1y**
Carrie	90	70	9	1	6y 4m	126	89	9	4	8 y 0m	**+1y 8m**
Paul	220	94	12	7	12y 3m	253	115	12	11	14y 0m	**+1y 9m**
William	127	94	8	6	8y 0m	143	102	8	10	8y 9m	**+9m**
Andrew	254	120	12	0	14y 0m	268	128	12	3	15y 3m	**+1y 3m**
James	134	103	8	4	8y 3m	138	100	8	7	8y 6m	**+3m**
David	186	89	11	11	10y 11m	250	118	12	2	14y 0m	**+3y 1m**
Owen	94	72	9	2	6y 4m	123	87	9	5	7y 9m	**+1y 5m**
Dan	184	93	11	1	10y 8m	191	96	11	4	11y 0m	**+4m**
Ultan	90	65	9	8	6y 4m	127	84	9	11	8y 0m	**+1y 8m**

Table 4 illustrates the reading accuracy results pre- and post-intervention in the DRA for all the tutoring pairs. These results indicate a significant improvement in reading accuracy for most students. In terms of increased reading ages, the students showed a mean gain of 12.23 months in a three month period. There was a mean reading age gain of 10.65 months in the three month period by the tutees. The scores for one of the tutors, Noreen are excluded from the calculation of average gains in

[2] The DRA is designed for weak readers. Noreen's score for reading accuracy exceeded the scoring mechanism of this test both pre- and post-intervention.

[3] During the post-test, this student was noted to be very distracted and unfocused.

reading accuracy as she had reached the limit of the scoring mechanism for the DRA prior to intervention. The mean gain in reading age for the remaining eight tutors was 14.00 months in a three month period. Several tutors including Roisin, Mary, Frances, Paul and Andrew showed impressive gains in reading accuracy. In the Diagnostic Reading Analysis, raw scores for comprehension are categorized according to chronological age in five bands, ranging from very weak to excellent (Table 5).

Table 5: Diagnostic reading analysis reading comprehension results

Tutoring Pairs	Pre-intervention December 09				Post-intervention March 10			
	Chron. Age		Raw score	Descriptor Category	Chron. Age		Raw score	Descriptor Category
	years	months			years	months		
Noreen	11	10	13	Average	12	1	20	Well above average
Jane	8	4	7	Well below average	8	7	9	Average
Roisin	12	3	16	Average	12	6	15	Average
Claudia	10	10	10	Average	11	1	12	Average
Mary	11	9	14	Average	12	0	16	Average
Christine	9	0	6	Well below average	9	3	13	Well above average
Sheila	11	11	10	Well below average	12	3	15	Average
Tanya	8	7	5	Well below average	8	11	12	Well above average
Frances	11	10	117	Average	12	2	14	Average
Carrie	9	1	7	Average	9	4	11	Average
Paul	12	7	109	Well below average	12	11	13	Average
William	8	6	9	Average	8	10	10	Average
Andrew	12	0	109	Well below average	12	3	18	Well above average
James	8	4	9	Average	8	7	10	Average
David	11	11	4	Very weak	12	2	8	Well below average
Owen	9	2	9	Average	9	5	11	Average
Dan	11	1	128	Average	11	4	13	Average
Ultan	9	8	8	Average	9	11	8	Average

Table 5 illustrates reading comprehension raw scores for the students along with the descriptor category applied by the DRA to each student's score. Table 5 compares the raw scores for comprehension in the Diagnostic Reading Analysis for each student pre- and post-intervention, along with the description accorded. With the exception of Roisin all of the students demonstrated gains in overall comprehension scores. The total comprehension raw scores (number of questions answered correctly) of the tutors as a group increased from 100 to 132 and the total comprehension raw scores of the group of tutees increased from seventy to ninety-six.

Improvements in Reading Comprehension

Figure 1 illustrates how the comprehension of the tutors was rated pre- to post-intervention. The number of tutors described as average and well above average increased from five to eight while the number of tutors described as very weak or well below average decreased from four to one.

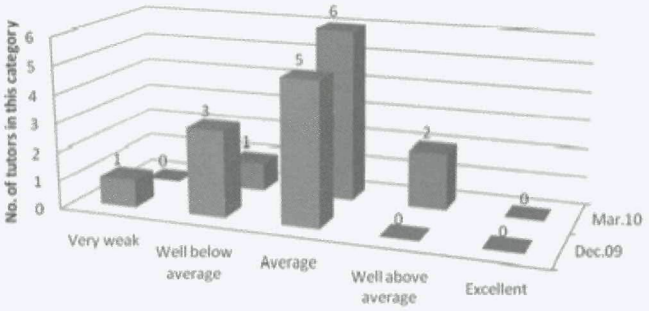

Figure 1: DRA comprehension description of tutors

A similar pattern of improvement in comprehension for the tutees is illustrated in Figure 2. The nine tutees achieved descriptions of average or well above average in post-intervention assessment. None of the tutees were described in the DRA as below average following the intervention despite three tutees having been accorded this description pre-intervention.

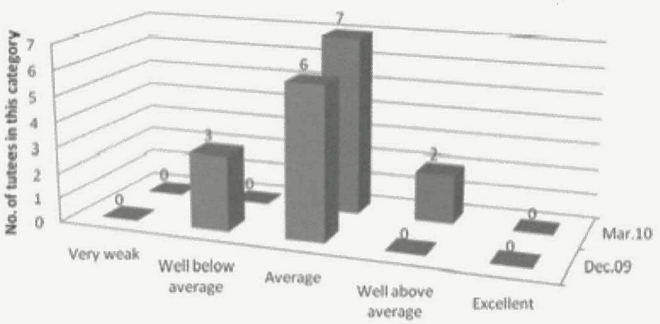

Figure 2: DRA comprehension description of tutees

While data analysis for comprehension attainment demonstrates a general improvement in comprehension scores in the DRA, an examination of the types of questions students answered successfully provides a more detailed picture of the impact of the intervention on the different levels of comprehension for the tutors and the tutees. Figure 3 shows a significant improvement in seven of the tutors' scores for inferential or summative questions. The score in inferential/ summative questioning increased from twenty-five to forty-three for the tutors as a group.

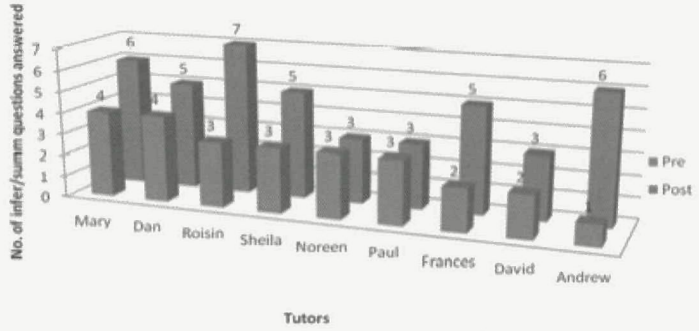

Figure 3: DRA inferential/summative comprehension tutors

Andrew and Roisin in particular demonstrated significant gains in their ability to answer inferential/summative probes. This finding lends further support to the finding of the National Reading Panel (NRP), (2000) that the application of

comprehension strategies is highly effective in enhancing understanding. Results for the tutors in the DRA comprehension assessment suggest that their engagement with higher order comprehension was enhanced indicating that struggling readers can learn to apply comprehension strategies effectively as part of a peer-tutoring programme. Noreen and Paul, however, did not demonstrate improvements in predictive/summative comprehension. While Noreen, who was probably the most able tutor, demonstrated significant improvement in predictive and vocabulary probes indicating improved higher order comprehension skills, Paul, who has receptive and expressive language difficulties, made improvements in literal comprehension only. Paul's lack of success in higher order comprehension questions suggests that students with significant language difficulties may need more individualised instruction on reading comprehension skills.

The most significant comprehension gain for the group of tutees was in literal comprehension. The tutees had a 55 percent success rate with literal comprehension probes encountered in the pre-intervention DRA. This success rate increased substantially to 83 percent success with literal comprehension probes encountered in the post-intervention DRA as illustrated in Figure 4.

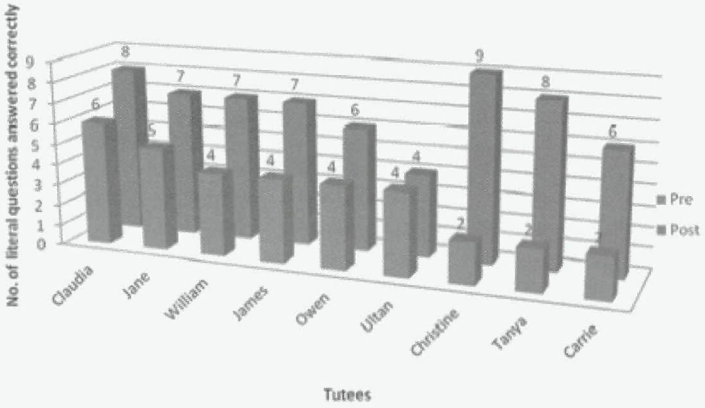

Figure 4: DRA literal comprehension tutees

Figure 4 illustrates that eight of the nine tutees made significant gains in the DRA literal comprehension assessment. This improvement suggests that the guided application of comprehension strategies to reading in the peer-tutoring setting was an effective means of enhancing their literal comprehension.

Unlike the tutors however, the tutees did not demonstrate improvements in higher order comprehension skills post-intervention. On close analysis of their responses to inferential/summative probes encountered, it emerges that as a group they answered approximately seventy-three percent of inferential/summative probes correctly both pre- and post-intervention. One possible explanation for this was that the reading material used in the intervention programme was at the tutees' instructional level suggesting that much of their cognitive capacity was tied to word identification with less cognitive capacity available for comprehension (LaBerge and Samuels, 1974). The tutors on the other hand, were reading material at their independent reading level and were therefore free from word identification difficulties. This freedom from word identification difficulties may have promoted their engagement with comprehension as suggested by several experts (Blevins, 2002; Allington, 2006; O'Connor, 2007; Blachowicz and Ogle, 2008; Rasinski and Padak, 2008; Duke and Pearson, 2009).

CONCLUSION

This was a small scale but intensive study of effective means of improving the reading attainment of students who struggle with reading. However, due to the very limited sample size, the findings cannot be stated to be generalisable to the overall Irish primary school population. There are clear implications for professionals working in inclusive educational settings who wish to build on the benefits and findings of this research study. The study underlines the importance of having a sound knowledge base relating to theoretical underpinnings of literacy instruction and peer and cross-age tutoring. It also highlights the importance of using this knowledge to inform the selection of instructional practices. Cross-age tutoring proved to be an efficient means of providing students with much needed practice in reading. The current study found that when clear objectives informed the design and planning of a cross-age tutoring programme students made significant progress in the targeted areas. Cross-age tutoring proved to be a powerful tool for enhancing the reading skills of struggling readers. It is intended as a means of practising rather than initially acquiring new skills and should be used to complement the work of the class teacher. In the current study collaboration with the class teachers of the students involved in the study helped to inform the objectives of the programme.

The cross-age tutoring programme was a worthwhile but demanding programme. Extensive pre-intervention assessment was crucial to informing the starting point of the tutoring programme while ongoing monitoring was necessary to ensure that all the participants made optimal progress. Findings from this study suggest that the success of the programme did not depend on one single factor. The availability

of high interest reading material at an appropriate reading level, ongoing tutor training, using a structured lesson format with visual reminders, and regular assessment of progress were all critical factors that in combination contributed to positive outcomes. The following comment by one reluctant reader tutor, Roisin, at the end of the intervention sums up the benefits of the programme, "I would be happy to read out loud in class now".

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