A Phase 2 exploratory trial of Paired Reading in Spanish language in Colombia

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A Phase 2 exploratory trial of Paired Reading in Spanish language in Colombia

Abstract

There is good evidence that peer tutoring, when used in a structured manner can lead to attainment gains in English reading. Transferability of the technique to other languages and educational contexts are less well studied. This is a protocol for a Phase 2 exploratory trial designed to establish if peer tutoring, in the form of Paired Reading can transfer to the Colombian education system, and into the Spanish language. The protocol establishes success criteria to determine whether there is enough evidence of efficacy to warrant a Phase 3 definitive trial of the technique and will determine likely effects on Spanish reading attainment to help design a Phase 3 trial.

Introduction

Colombia was ranked 59th out of 71 countries in the last PISA 2018 assessments of international reading (OECD, 2018), meaning that on average school students in Colombia lag two-years behind world average reading attainment. Paired reading is a cost-effective way to improve reading in schools.

Paired Reading to improve reading in the UK was developed by Thurston and Topping (2007), and is an evidence-based peer-tutoring programme, first tested at scale in primary schools in Scotland (Tymms, Merrell Thurston et al, 2011). Thurston and Cockerill (QUB) refined the programme using co-design methodology with secondary school teachers (Cockerill & Thurston, 2015), followed by a large-scale Random Control Trial (RCT) in England. Paired Reading was found to be an effective low-cost programme to close the reading attainment gap of students with low literacy levels (Thurston, Cockerill & Craig, 2019). Such has been the success of the Paired Reading programme that a Latin American Spanish version will be used in an exploratory trial to determine if the effects of paired reading can be transferred to Spanish language contexts.

Effectiveness of Peer tutoring

Piaget (1978) proposed that children constructed internal schemas for understanding the world and organising knowledge through adaptive processes of assimilation and accommodation. Vygotsky (1978) noted that with a peer’s help, students could improve their level of performance. For effective learning to take place, Piagetian based peer tutoring can provide the right balance between the disequilibrium caused by cognitive challenge and social exchanges between peers (Palinscar, 1998). Tutoring involves cognitive challenge from peers and post-interactive reflection and restructuring. Both tutor and tutee have to fulfil their roles effectively, creating a social interdependence between them. Their individual success is linked through common goals and mutual dependence and is the process by which gains in the tutoring
process accrue. Without both tutor and tutee performing their roles in accordance with prescribed patterns for interaction, neither can benefit from the interaction; cooperative learning is stalled.

Peer tutoring is a structured form of cooperative learning characterized by specific role taking as either tutor or tutee. Theories underpinning social interaction during cooperative learning have been substantively developed and described by Social Interdependence Theory (Johnson, Johnson & Roseth, 2010; Johnson & Johnson 2012). For co-operative learning to be present during peer tutoring then social interdependence must be present in the form of:

- Goal structure. The pair work together with the aim of reading and understanding a piece of text;
- Positive interdependence. In the tutoring process, clear patterns for interaction are defined in the roles of tutor and tutee;
- Individual accountability. Both the tutor and tutee have responsibilities. In the form of tutoring used, each must reflect on both their own and their peer partner’s performance;
- Interaction patterns. The tutoring process is structured to stimulate promotive interaction and group processing, and to enhance social skills.

Following De Lisi and Golbeck (1999), Thurston and Topping (2007) developed a theoretical model of cognitive development that occurs during paired cooperative learning. In brief: students read a text together. The tutor listens to the tutee read. The tutor supports the tutee by reading hard sections together and after reading errors. In addition, the tutor will ask the tutee questions. Both of these processes, reading together/alone and forward scanning text whilst thinking of questions, require social interdependence (Johnson, Johnson & Roseth, 2010), and the processing of prior knowledge using metacognitive strategies to link previous learning to the current problem. These processes not only facilitate self-regulation, but also result in, concomitantly, enhanced metacognition as the processes are interlinked (Eggen & Kauchak, 1997), facilitating the assimilation of learning, the accommodation of new ideas, and, of course, new words. However, accommodation does not imply long-term change at this point. Retaining the “correct” cognitive structure over time relies on the student gaining deeper understanding of the new cognitive structures as a result of post-interactive reflection, leading to equilibration.

The reported study was a form of peer tutoring that focused on reading. In this technique, an older tutor was paired with a younger tutee. For optimal performance of paired reading, there needs to be an attainment differential between tutors and tutees (Duran & Monereo, 2005). Without the gap, both tutor and tutee can be under stimulated (Greenwood, Terry, Arreaga-Mayer & Finney, 1992). Each had specific roles to play in the cooperative learning process. The tutee focused on reading the text aloud. The tutor focused on error correction and asking appropriate questions to check the tutee’s understanding. This technique is widely reported to have beneficial effects on learning (Duran & Monereo, 2005; Topping, 2001), and produced Effect
Sizes of 0.2 of a standard deviation in a previous RCT (Tymms et al., 2011). When paired reading is implemented with reasonably high implementation integrity, results are typically good (Duran & Monereo, 2005; Topping, 1987; Topping & Ehly, 1998). During paired reading, feedback from tutor to tutee is focused on error correction (Topping, 2001). In previous research low achieving tutees are reported to gain most from paired reading (Tudge & Rogoff, 1989; Topping, 2001).

Paired reading is widely reported to be an effective way of raising reading attainment in both primary age (Duran & Monereo, 2005) and secondary age students (Topping, 2001; Thurston, et al., 2019). In a quasi-experimental study, 32 inner-city pre-schoolers aged 3 years 8 months to 5 years 11 months undertook paired reading for 10 minutes per day for eight weeks. It was found that peer tutoring by paired reading was more effective than adult tutoring as measured by the number of words recognised and number of books read by children at the end of the study period (Hamblin & Hamblin, 1972). Another study reported positive effect sizes for experimental classes in respect of the number of words read correctly during reading aloud (ES=0.22), and the number of correctly answered questions about the read passages (ES=0.55). The study involved paired reading in 20 experimental and 20 control schools amongst nine and a half year-old students for 35 minutes per day, 3 days a week over a 15-week period (Fuchs & Fuchs, 2000).

Process observations have been reported to be an effective way of assessing implementation integrity in paired reading initiatives. In a 4-year study involving 33 control and 56 experimental students aged 7-10 years-old undertaking paired reading for 30 minutes per week, process observations showed significant advantages for experimental pupils in reading aloud (F(2,46)=21.26, p<0.001), academic talk (F(2,46)=10.34, p<0.01), and question asking F(2,46)=4.73, p<0.05) when compared to control pupils. In this study, significant advantages in reading attainment were also reported for experimental pupils (F(2,175)=16.43, p<0.0001) (Greenwood, Delquadri & Hall, 1989). Peer tutoring with explicit reading strategy instruction has also been reported to raise reading attainment levels (Van Keer, 2004; Van Keer, & Verhaeghe, 2005).

The intervention

The intervention will take place in four schools in Bogota, Colombia, over a period of 10-12 weeks, spanning the period March to July in one school year. It involves the following processes.

**Paired Reading technique:** The Paired Reading technique involves switching between the tutor and tutee reading together, and the tutee reading alone. The book chosen by the pairs has to be above the independent readability level of the tutee, but below that of the tutor and appropriate to their interest, to allow the tutor to help the tutee through the error correction process.
Readability level is decided by using a simple test. Tutees randomly select twenty words from the book from four different pages. They do this by closing their eyes and placing their outstretched fingers on the book. They read the word underneath their fingers. If the tutee can read between thirteen and nineteen words, the book is deemed to be at the right level of readability. Teachers also check the book’s readability during observations.

The tutor and tutee start by reading together. The tutee signals to read alone. Upon an error, the tutor waits 4-5 seconds, and if the tutee does not self-correct, is corrected by the tutor. The tutee repeats the error word correctly and the pair read together again until the tutee signals to read alone. The tutee reads alone until the next error.

Pairs read together once per week, for a period of about 30 minutes (inclusive of time to move between classrooms, leaving about 20 minutes of actual reading time). Previous trials have reported that this represents the best pattern of contact and time to maximise potential reading gains (Tymms et al., 2011).

Matching of pairs: Pairs are matched on the basis of previous reading attainment. Using the pre-test reading assessment result, students in classes are ordered from highest to lowest in reading attainment. The top-attaining tutor in the older class tutors the top-attaining tutee in the younger class; the second top tutor tutors the second top tutee in the younger class, and so on. Once matched, the advice given to teachers is that pairs stay together for the duration of the intervention period. At the beginning of the intervention period, teachers are allowed some latitude to switch pairs who are clearly not able to form a working partnership. These processes were adopted on the basis of previous research which indicated that an attainment gap optimised the interactions between and benefits to pairs (Duran & Moreneo, 2005; Tymms et al., 2011). If there are uneven numbers of students in the older and younger classes, then the teacher forms some triads. These can be done using teacher discretion, but advice is always to think about pairs who may need additional support, or where absenteeism may be a problem. Whichever role ends up having two students (tutors or tutees) shares the time in that role, or supplements the work of their partner with additional input eg if two tutors one can listen to the reading whilst another makes a pop quiz on the book. The matching technique was originally reported and described in some detail by Fuchs et al. (1997). It had also been used for reading in the Fife Peer Learning study (Scotland) which used a similar technique with elementary school students (Tymms et al., 2011).

Continuing professional development (CPD) for teachers: Teachers attend two CPD sessions per year starting in March. The first day provides an overview of the techniques and research design. Demonstrations of the Paired Reading are given. A manual to support teachers is provided for each school. Finally, the teachers are allowed to forward-plan and to consider the issues that may arise for them when implementing the project. A second half-day in May will take place and be focussed
on sharing successes with teachers and having teachers evaluate the project. All teachers attend these events.

*Training of Pupils:* Teachers will be advised on how to model the techniques for students with another staff member.

**Theory of Change (ToC)**

Figure 1 illustrates the ToC. By providing a structured paired reading program and appropriate training to teachers and teaching assistants, it is proposed that the processes underpinning effective use of peer tutoring can be improved. This assumes that the training will impact on the professional action of teachers and teaching assistants, resulting in use of alternative pedagogies. As a result, it is projected that pupil use of approaches to peer feedback to improve their vocabulary skills, and questioning to improve their knowledge and comprehension of text will lead to improved reading.
Figure 1 Paired Reading program logic model

Inputs
- Schools participate including two designated teachers and teaching assistants as appropriate to deliver the program in every school.
- Teacher training includes: 1.5 days external training sessions, and school support session.
- All students in two classes (two years apart) take part in the study

Outputs
- Teachers plan and deliver the Paired Reading sessions to classes
- Paired Reading reduces power differentials and engages students in classes
- Over 10-12 weeks, once per week for 20-30 minutes each)

Short term Outcomes
- Student lexicon improves due to reading error corrections
- Student self-concept as a reader improves due to praise
- Student reading fluency improves when reading aloud
- Students have increased motivation to read

Medium term Outcomes
- Improved self-concept feeds further building of confidence in their ability
- Fluent improves student understanding
- Student reading comprehension improves when undertaking paired reading, due to questioning

Long term Outcomes
- Student range of vocabulary improves
- Student overall reading, when reading independently, improves
- Student reading comprehension improves when reading new texts independently
Goals and objectives

1. An exploratory trial of peer tutoring/Paired Reading will be undertaken in 8 classes in Colombia (drawing on Spanish version of materials already developed by Cockerill & Thurston, with Universidad de los Andes in Chile).
2. Success criteria will be developed for the exploratory trial, the meeting of which will determine whether progression to a Phase 3 definitive trial (Medical Research Council, 2000) is warranted.
3. The Phase 2 exploratory trial will establish if the peer tutoring/Paired Reading pedagogy can transfer to the Colombian education system, and whether there is enough evidence of efficacy to warrant a Phase 3 definitive trial.
4. The exploratory trial (designed in-line with Medical Research Council on development of complex interventions) will include the piloting of teacher development materials, peer tutoring techniques, as well as piloting pre/post-test measures in reading assessment and self-concept in reading. The aim is to establish potential effect sizes and inter-cluster correlations for use in modelling and designing any subsequent large exploratory trial to take account of clustering effects. The trial will be designed with adequate control.

Research questions

The study will address the following research questions:

a) Can the peer tutoring programme be delivered in Colombian primary schools?

b) What is the impact of the Paired Reading pedagogy on:
   • Student’s reading ability?
   • Student’s self-concept about reading?

c) What are levels of implementation fidelity of the Paired Reading programme?

d) Is the adapted Latin American Spanish version of the Paired Reading programme scalable?

Answers to the above questions, and assessment against the success criteria stated in the analysis plan, will inform decisions as to whether the programme is ready to be scaled to an effectiveness/definitive randomized controlled trial.

Method

Sample

The sample will be comprised of four state funded elementary schools in Bogota. Two of these schools will implement Paired Reading with older children tutoring younger children (preferably about 10/11 year olds [Grade 5] tutoring 8/9 year olds [Grade 3]). This gives an active sample of four classes. Two schools will serve as comparison/control with classes matching the age group of the Paired Reading classes. This gives a comparison/control group of four classes. This gives a total sample of four schools, eight classes and approximately 280 students.
Recruitment and inclusion criteria
For this small-scale trial, recruitment will take place in state funded elementary schools in the Bogota area. They will be recruited using local networks of Pontificia Universidad Javeriana who have a number of active research projects in this geographical area. To be included, schools must be:

- Official/Public (state funded) schools with a minimum level of disadvantage of at least 85%, where levels of disadvantages refers to those students from strata 0, 1 or 2, according to Colombia classification of socioeconomic status (see below);
- Either half-day or full-day schools;
- Multiple class entry;
- Have cross age tutoring capability (i.e. two classes that can be paired that are two school years apart);
- Based in the Bogota metropolitan area;
- Be willing to work on the project from March 2021 onwards and implement the project for 10-12 weeks.

School socio-economic status
Socio-economic status of the school will be determined by the socioeconomic strata (in Spanish, estrato) of the students in 5th grade (tutors). Socioeconomic strata is given by the government and it is registered in administrative datasets (DANE and ICFES). Strata is derived using a formula that includes the physical characteristics of the dwellings and the environment located in the area. A person's strata is determined strictly by the geographic location of their primary domicile. The people is classified by the government into six different categories: two lower classes (1 lower-lower* and 2 lower”), three middle classes (3 lower-middle, 4 middle, and 5 upper-middle), and one upper class (6 upper). More recently, it was added an extra category “0”, which indicates that the person lives in a room, and it is related to lower class (DANE, undated).

A school will be classified as low socioeconomic status if 85% of the students are strata 0, 1 or 2.

Allocation to condition
Schools will be offered participation in the project as an intervention or wait-treatment control group. The control group will receive a copy of the manuals and materials as a wait-treatment at the end of the intervention. To this extent, there is equal benefit to the intervention and control groups as both will receive the intervention. In order to ensure balance between both the intervention and control sides of the exploratory trial (important to determine probable effects of the intervention), the four schools will be paired with their closest school in terms of socio-economic indicator and prior Spanish reading attainment and allocated to condition using a form of minimisation. Information to inform the pairing and allocation to condition will be collected from the schools with
an instrument collecting baseline data about the family context of the students. The instrument will request information regarding: (i) general characteristics, (ii) sociodemographic information, (ii) children academic performance perception, (iv) socioeconomic characteristics, including family education, income and household information (v) socioemotional characteristics (vi), Spanish and reading performance data. The answers are protected and confidential, according to the QUB and Javeriana's data privacy policy. Then each pair will be randomized to condition using a random number generator programme for iPhone: Version 5.5 123 The Random Number Generator by Nicolas Dean. This is set to generate an equal number of 0=control (N=2) and 1=paired reading (N=2) schools.

Analysis plan

Due to this being a Phase 2 trial, that is not scaled or powered to determine main effects of the intervention compared to a control group, modelling of effects will not be undertaken. Instead main effects of pre/post-test reading attainment changes in intervention and control classes will be reported as Effect Sizes (Cohen’s d) with 95% confidence intervals. This would be appropriate for this stage of development and would provide data to inform experimental design, should recommendations be made to proceed to a Phase 3 study. However, within condition student t-test will be undertaken to determine significance of changes as per best practice for Phase 2 trials that are not designed to have sufficient power to determine between condition effects, as suggested by the Consolidated Standards of Reporting Trials (CONSORT, 2010). This would also inform design in terms of understanding patterns of student reading attainment, with, and without the intervention.

In addition to analysing outcomes in reading attainment the project will undertake a cost/benefit analysis when post-testing is completed. This will calculate the cost per pupil of the intervention, and will examine this data in light of the benefit per pupil receiving the intervention. Costs will include provision of manuals, substitute teacher cover for teachers to be trained, and costs of any additional materials required by the schools to implement the intervention.

Finally, the project will analyse the success of the project against defined success criteria. Dependent on whether these criteria are met, recommendations will be made regarding progression to a Phase 3 definitive trial. These criteria are:

- That professional development in use of Paired Reading can be delivered in line with specification to Colombian school teachers/teaching assistants;
- That Paired Reading can be delivered in line with specification to students in Colombian primary schools;
- That Colombian primary school teachers/teaching assistants evaluate their use of Paired Reading positively enough to conclude that it could be scaled up;
- That the use of Paired Reading, when compared to a control group not using the technique, can result in a positive Effect Size for students using the technique.
Primary outcome measures

**Reading attainment:** Attainment in reading will be determined using Dialect Assessment, a Spanish language reading test developed by Universidad de los Andes, Chile (UANDES). It is an adaptive computerised test that draws text from 40 passages of varying difficulty. It had a reported alpha of 0.97 when tested with a sample of 1186 Grade 3, 893 Grade 5, and 1531 Grade 8 students (MetaMetrics, 2015).

**Self-concept in reading:** Self-concept in reading will be assessed using the Self-Description Questionnaire II (SDQ II). This has been adapted from Marsh and O’Neill (1984), and Marsh, Plucker and Stocking (1997). A copy of the SDQ II adaptation is contained in Appendix I. The adaptation to the instrument involved substituting the word ‘Spanish’ where ‘English’ had been used in the original instrument.

Process evaluation

A process evaluation will supplement the RCT to measure the fidelity to implementation of the program. Guided by the MRC Framework (Moore, Audrey, Barker, et al., 2015) the process evaluation will seek to assess whether the paired reading training was attended, teacher engagement, and dosage of implementation. To help assess, teacher leads and teaching assistants will complete a post-programme perception survey. Students will also complete a short survey on their perceptions of using the technique.

Ethics

The trial was approved through three ethics procedures. The intervention of the trial and testing will also be approved by the Headteachers who take part in the trial. The subsequent matching, combining and analysis of data was approved by the School of Social Sciences, Education and Social Work Ethics Committee from Queen’s University Belfast. Work was also assessed by the Pontificia Universidad Javeriana Ethical Review Board. School principals will be asked to give consent for their school to participate in the project. Prior to providing consent they will be provided with specifies details regarding: (i) the general description of the intervention, (ii) the grades involved in the program (3th and 5th), (iii) the time requirements, (iv) the pre-test and post-test requirements for participants, and (v) the monetary contribution for schools. Parents/guardians will also be provided with information in the form of a letter that informs them that the paired reading tutoring are going to take place in their son/daughter’s school. It explains all the details of the project such as: (i) third graders shall receive tutoring from fifth graders with the support of the Spanish teacher, (ii) the
program is completely free, (iii) the time requirements, (iv) the pre-test and post-test requirements for participants, and (v) the data privacy policy.

Key project milestones or outputs of the project

Key project milestones/outputs are listed in Table 1.

Table 1: Key project milestones/outputs

<table>
<thead>
<tr>
<th>Dates</th>
<th>Milestone/Output</th>
</tr>
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<tbody>
<tr>
<td>Month 1 (starting July 2020)</td>
<td>Initial team meeting has taken place.</td>
</tr>
<tr>
<td>Month 1</td>
<td>Goals and objectives set for exploratory trial. Success criteria developed for exploratory pilot trial.</td>
</tr>
<tr>
<td>Month 3</td>
<td>School recruitment started. Memorandum of Understanding prepared and signed as recruitment proceeds.</td>
</tr>
<tr>
<td>Month 4/5</td>
<td>School recruitment completed with assignment to condition/treatment. Schools recruited to trial with four active classes in the development trial. School recruited with four active classes to act as comparator/control group. Piloting of materials, measures and professional development.</td>
</tr>
<tr>
<td>Month 9-March 2021</td>
<td>Training and professional development for staff in schools in preparation for school year 2021.</td>
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<tr>
<td>Month 9</td>
<td>Pre-testing undertaken in schools.</td>
</tr>
<tr>
<td>Month 9/10/11</td>
<td>Peer tutoring implemented in schools for period of 10-12 weeks.</td>
</tr>
<tr>
<td>Month 11</td>
<td>Post-testing undertaken in schools. Questionnaires completed by teachers. Interviews undertaken with teachers.</td>
</tr>
<tr>
<td>Month 11</td>
<td>Data analysis Data cleansed. Data analysed looking at effect sizes with 95% CIs for treatment vs comparison. Assessment made against success criteria for recommendation of trial progression to definitive Phase 3 trial.</td>
</tr>
<tr>
<td>Month 12</td>
<td>Team meeting 2 has taken place</td>
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<tr>
<td>Month 13 (ending July 2021)</td>
<td>Academic manuscript submitted for publication in peer reviewed journal. New grant application prepared and targeted at GCRF.</td>
</tr>
<tr>
<td>Month 13</td>
<td>Materials and manuals provided to control/wait treatment group.</td>
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</tbody>
</table>

References


Medical Research Council (2000). A framework for the development and evaluation of RCTs for complex interventions to improve health. (London: Medical Research Council)


Appendix I-Self-Description Questionnaire II

Name: ..........................

Class: ............................................  School: ............................................

PLEASE READ THESE INSTRUCTIONS FIRST

This is not a test - there are no right or wrong answers.

This is a chance for you to look at how you think and feel about yourself. It is important that you:
- are honest
- give your own views about yourself, without talking to others
- report how you feel NOW (not how you felt at another time in your life, or how you might feel tomorrow)

Your answers are confidential and will only be used for research or program development. Your answers will not be used in any way to refer to you as an individual.

Use the six-point scale to indicate how false (unlike you), or how true (like you), each statement is as a description of you. Please do not leave any statements blank.

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<tr>
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</thead>
<tbody>
<tr>
<td>False</td>
<td>Not like me at all</td>
<td>True</td>
<td>This statement describes me well</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. I am hopeless in SPANISH classes
2. I look forward to SPANISH classes
3. I do badly on tests that need a lot of READING ability
4. Work in SPANISH classes is easy for me
5. I am not very good at READING
6. SPANISH is one of my best subjects
7. I hate READING
8. I get good marks in SPANISH
9. I have trouble expressing myself when I try to write something
10. I learn things quickly in SPANISH classes