



Explicit Phonological Awareness Instruction in Three Rural Northern Territory Preschools

Bea Staley

Charles Darwin University
bea.staley@cdu.edu.au

Leonard Freeman

James Cook University
leonard.freeman@jcu.edu.au

Jocelyn Seamer

Jocelyn Seamer Education
jseamer30@gmail.com

Lisa Papatraianou

Charles Darwin University
lisa.papatraianou@cdu.edu.au

Abstract

Phonological Awareness is an important skill set that supports later reading proficiency. This paper reports on a preschool oral language and phonological awareness project developed as a research and practice collaboration between three rural primary schools and a regional university. This research used the *Phonological Awareness Skills Test* to assess and monitor preschool (3–5-year-old) participants' Standard Australian English phonological awareness skills. The test includes sixteen subtests with six questions for each subtest to assess the subskills that make up the overarching 'umbrella' concept of phonological awareness. This paper investigates whether explicit preschool classroom-based phonological awareness teaching and small group literacy activities had a significant effect on the phonological awareness skills of the 110 rural preschool children who participated in this study. On average, the improvement in students' phonological awareness skills as measured by the test was statistically significant at the whole cohort, and individual school levels. Two participating schools experienced a very large effect size, and one school experienced a moderate effect size. These results affirm the positive impact that explicit phonological awareness instruction and associated activities can have on rural students' phonological awareness skill development. Furthermore, based on this finding, we call for education policy makers to ensure rural preschool educators across Australia have access to the professional development and resources necessary to implement this evidenced-based approach to teaching foundational language and literacy skills beyond these three rural Northern Territory schools.

Keywords: *phonological awareness, preschool, rural education, explicit teaching*

Introduction

There is an extensive body of literature on rural education, some of which documents rural education disadvantage (e.g. Gossner et al., 2025; Guenther et al. 2023), including reduced student literacy achievement in rural Australian communities (Sullivan et al., 2018). This is important to note because language and literacy skills underpin contemporary schooling, and students who have more early language and literacy experiences tend to begin formal schooling at an academic advantage over students who have not had these experiences or do not have these early skills (Stanovich, 1986). These students also typically go on to develop comparatively stronger language and literacy skills throughout their schooling, which enables them to realise

educational and vocational aspirations, within or beyond their community. To this end, the link between a child's early phonological awareness skills and success in later reading acquisition is well established in the literature (e.g. Ayres, 1995; Gersten, et al., 2007; Konza, 2014; Piasta & Hudson, 2022; Department of Education, 2023; Snow, 2020).

Phonological awareness is a broad concept, which encompasses subskills related to the ability to identify and manipulate sounds in words. For young Standard Australian English-speaking learners, the process of developing phonological awareness in the early years begins with forming an understanding of the larger units of sound, including the ability to identify words in speech, and syllables and onset-rime in individual words. Typically developing students, then progress on to acquiring the more complex skill of phonemic awareness (Castles, et al., 2018). Phonemic awareness is the ability to identify and manipulate individual phonemes in words and is strengthened as students learn about the alphabetic principle (Seamer, 2022). In preschool, all these skills are developed orally as students are taught how to perceive and produce Standard Australian English sounds in the context of meaningful (and pseudo) words.

A body of research exists, dating back over 30 years, regarding early phonological awareness for young children. For example, Lundberg et al.'s (1988) study of 235 Danish children found early phonological awareness training can lead to improved reading outcomes in primary aged children and the positive effects of phonological awareness intervention persisted until grade two, but that explicit instruction was required. Ayres' (1995) article supports Lundberg et al.'s (1988) findings and indicates that this work can be successful in large group, and whole class settings. Further, Kjeldsen et al.'s (2014) longitudinal study of 209 students from kindergarten to grade nine showed phonological awareness training at the class level yielded strong outcomes for decoding until grade three and comprehension until grade nine. But, as noted by Piasta and Hudson (2022) "*scientific findings do not teach children to read. Teachers do*" (p. 201).

Despite decades of research findings, phonological awareness instruction has not generally been well understood by teachers (Cheesman et al., 2009) and the implementation of intentional teaching in this area has not been widespread or embedded in Australia (Wilson, 2014). When phonological awareness instruction is provided in Australian schools, it is increasingly likely to be through a scripted program. Because teachers may have a limited understanding about *why* and *how*, the implementation of phonological awareness programs (if present) tends to be ad hoc.

Poor implementation of phonological awareness instruction has been a concern in Australia for some years, but is particularly relevant, when considering student populations with limited exposure to early literacy experiences, for whom early, explicit intervention has been shown to be greatly beneficial (Anthony & Francis, 2005). *A share in the future - Review of Indigenous education in the Northern Territory* (Wilson, 2014) found explicit phonological awareness instruction was largely absent in whole school literacy approaches being implemented in schools across the Northern Territory, despite being designed to address the needs of students with reading difficulties (Wilson, 2014). The same review (Wilson, 2014) recommended that all schools in the Northern Territory implement explicit teaching, assessing, and monitoring of students' phonological, phonemic and phonics knowledge and skills.

Background

This article reports on preschool data from the first year of the Rural Oral Language and Literacy (ROLL) project which was developed as a research and practice collaboration between speech pathologists and educators in three place conscious rural primary schools and a regional university in the Northern Territory, Australia.

The project grew out of concerns school staff had about the early oral language and literacy skills of the rural preschool children in their classrooms. Leadership noted that the foundational skills they expected were no longer present when children arrive on the mat on the first day of school.

These rural schools applied for and received funding to design a project to address a local problem of practice. For these rural schools, and these school leaders to focus on phonological awareness was remarkable, because at the time of the project it was not in line with the widespread practice of implementing whole-language approaches being used and advocated for by other (or neighboring) rural Northern Territory schools (for example see Chatto, 2021).

This work grew from an action research agenda developed by school leadership with a strategic focus on partnership (Thiele et al., 2024), to change the patterns of reading development in their schools. It was a school leader who contacted the university partner to facilitate project design, data collection and analysis in collaboration with a leadership team made up of representation from all three schools. The leadership team reported that they wanted to further develop their understanding of their students' Standard Australian English oral language and early literacy learning skills so that classroom instruction could be better tailored to meet their students' developmental learning needs.

Within this context, the ROLL project sought to examine the effects of early phonological awareness instruction in early years classrooms and provide tools and professional learning to the teachers of the three schools involved in the project. Phonological skills were the focus of assessment to measure the effectiveness of the project. The first year of the project included six weeks of weekly classroom visits, plus three parent workshops (topics were: talk and your child; books and your child; play and your child). Classroom instruction included weekly whole class level lessons led by the first author, as well as small group follow up with games to practice the skills taught. Parents received a letter about the class session with suggestions and activities for extending the classroom learning at home.

Teachers were expected to repeat the activities for their students throughout the week. Children's phonological awareness skills were developed through teacher led, oral phonological awareness lessons, games, rhymes and story reading. Instruction included showing students how to produce the sounds being taught (elsewhere in the literature these are called "mouth moves," see Mesmer and Kambach, 2022). This article reports the data collected from the preschool students participating in the project across three schools over one school year.

The main objective of this present study was to investigate whether explicit classroom-based phonological awareness teaching and small group learning activities implemented as part of the ROLL project had a significant effect on the phonological awareness skills of the rural preschool children who participated in this study. Based on this objective, two research questions were considered:

1. Did the project's phonological awareness instruction and hands-on learning games, have a statistically significant impact on the phonological awareness skills of the preschool children who participated in the study overall? (cohort level data)
2. Did the project's phonological awareness instruction and hands-on learning games, have a statistically significant impact on the pre- and post- PAST test performances of the students at each school? (school level data)

Methodology

The data presented here were collected as a part of the ROLL project which took place across two school years and included students in Preschool and Transition (the first formal year of schooling in the Northern Territory) classes. This research was approved by the University's Human Ethics Research Committee, and the Northern Territory Department of Education. Given this project was funded by a Northern Territory Department of Education innovation grant and viewed as an attempt to transform classroom practice, all enrolled children and their teachers were required to participate in the project, though they could elect to opt out of inclusion in the research. That is, they could opt to have their data excluded from the research component of the

study. Even though all teachers elected to have their data included in the study, there were varying levels of teacher buy-in and participation across schools and classrooms. This is a reality of school-based research, even when the project has been conceived of, designed and funded by educators.

For each year of the study, teachers and teaching assistants in the three school's preschool and Transition rooms (19 educators and 13 classes each year) participated in one day- long professional development seminar on emergent literacy, oral language and phonological awareness presented by speech pathologists and external education collaborators. Teachers then received six classroom visits by a speech pathologist who modelled a whole group session including a read-aloud, introduction of specific sounds and letters and a phonological awareness skill.

Small group activities were then delivered to give students a chance to learn and practice the phonological awareness skill, as well as model games for teachers to use to support the development of the skill. Many of the materials used in this project came from existing Department of Education resources specifically developed for students in the Northern Territory. The images of people, animals and objects were designed to be familiar to children living in this context.

Author Positionality

The primary author Bea Staley is an academic and speech pathologist who has lived and worked in the Northern Territory for over a decade. Bea was recruited by school leadership and funded to design and deliver this project. The second author Leonard Freeman has been a teacher-linguist and principal in the Northern Territory and has expertise in teaching early language and literacy skills in Northern Territory Schools. Leonard completed the statistical analysis for this project. He also supported the assessment process across the three schools as well as co-authoring this manuscript. Jocelyn Seamer is a literacy consultant with years of experience in school leadership in the Northern Territory. Though Jocelyn was not directly involved with the implementation of the ROLL project, the first three authors have other relevant collaborations and Jocelyn shared in the writing of this manuscript. Lisa Papatraianou is an academic with expertise in qualitative methodologies and joined the project to support the analysis of the qualitative data, Lisa was a co-author on this manuscript.

Participating Schools

Three rural primary schools participated in this project. These schools were within 15 minutes' drive of each other. These schools frequently worked together and experienced some movement of students between the three schools. The location of the schools represents a rural community, characterised by homes on 5-acre blocks. The preschoolers often wore cowboy boots and conversational themes included big knives (for fishing) and snakes. These preschools were well established, and each school had at least one very experienced or committed preschool teacher. These preschools were on the property of the primary school the children would go on to attend. They each had large outdoor play spaces and students spent time outside engaged in a variety of free play opportunities including dramatic play and water play. The Index of Community Socio-Educational Advantage (ICSEA)¹ scores of the three schools ranged from 925 at the low end to 975 at the high end, placing them just below the national average (986). It should be noted that the average ICSEA score of schools operated by the Northern Territory Department of Education and Training is 845 and only 9% of Northern Territory schools have an ICSEA score above the national mean of 1000.

¹ The Index of Community Socio-Educational Advantage (ICSEA) is an index Australian schools use to allow for comparison of schools. Similar scores would suggest similar socio-educational backgrounds.

Across the three schools, there were 7 preschool classes, 5 preschool teachers, 4 teaching assistants, and 151 preschool students who participated in the project. Table 1 (below) presents the school demographics. The data presented here includes the 110 preschool students who sat both the pre- and post- phonological awareness testing.

Table 1: School Demographic Data

Primary School	Total enrolment	Teaching staff	Indigenous enrolment	Students with language background other than English	Number of Preschool classes
A	340	24	12%	7%	2
B	252	19	22%	14%	2
C	335	31	24%	20%	3

Note. This table includes data from school records as well as Myschool.edu.au

Method

This research used the *Phonological Awareness Skills Test (PAST)* (Zgonc, 2010) to assess and monitor each preschool participants' Standard Australian English phonological awareness skills. This tool was selected as it was already in use in School B and the researchers were confident the PAST was a reliable, valid tool for the purposes of this project. The PAST is administered to each child individually by an educator and takes 10-20 minutes per student.

The PAST includes sixteen subtests with six questions for each subtest to assess the subskills that make up the overarching 'umbrella' concept of phonological awareness. Each test-item is scored correct or incorrect and is worth one mark. Student performances on the PAST are therefore marked out a total possible score of 96 points (16 subtests x 6 items = 96).

Pre- and post- intervention assessments were conducted to measure the effect phonological awareness instruction had on students' skills. Before the ROLL project commenced, the PAST was administered to determine each participant's initial phonological awareness score. The timeline for initial assessment varied between schools. Some schools assessed in late Term 1 (February-April), others not until early in Term 2 (April – July). For post-testing, the PAST was readministered across schools in Term 4 (October-December). The same instrument was used for both pre- and post- assessment, with no alterations made. It was judged that enough time (at least six months) had passed between the administration of pre- and post-tests to avoid concerns about participants giving memorised answers from their pre-test.

The statistical analyses presented focus on measuring the size and significance of the mean (average) improvement in student's performance on the PAST assessment. Specifically, the total raw test score (out of a possible 96) that students achieved on the PAST when it was administered before (pre-test) and after (post-test) the classroom-based phonological awareness teaching and learning activities.

It was not an option to include a control group for the study. All preschool classes participated in the project and all teachers and teaching assistants participated in related professional learning. Implementing the program across the three schools maximised the number of preschool students who participated resulted in the absence of an experimental comparison group. This is a natural constraint of real world, school funded and school-based research.

Results

The following research hypotheses were tested in this study:

Ho: There was no significant improvement in the phonological awareness (PA) skills of the preschool students who participated in this project after they had received explicit PA instruction and participated in hands-on PA learning games.

H1: There was a significant improvement in the learners' phonological awareness (PA) skills after they received explicit PA instruction and participated in hands-on PA learning games.

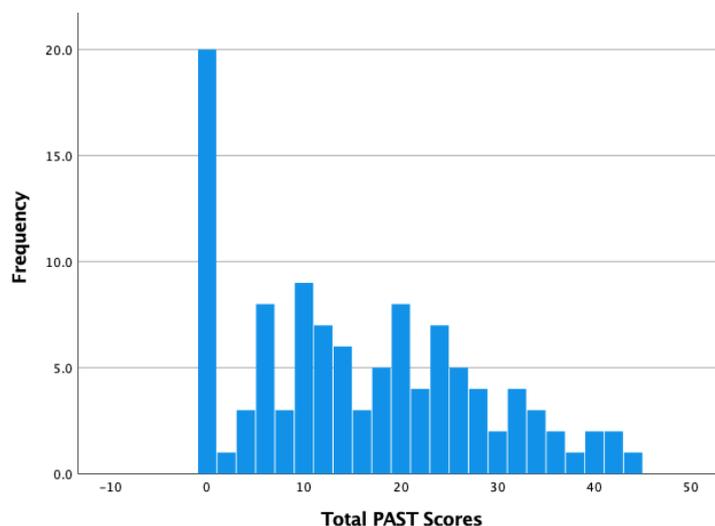
Participants

Across the three schools, 151 preschool students participated in the ROLL project and 124 students participated in the PAST pre-test. Of these 124 preschool students, 110 (89%) also participated in PAST post-testing. Our analyses seek to determine if the ROLL project's explicit teaching and learning activities had a statistically significant effect on students' phonological awareness (PA) skills, as measured by the PAST assessment. The analyses are therefore limited to matched student data. We only use data gathered from the test performances of the 110 students who sat PAST tests that were administered both before and after the PA teaching activities in their preschool classrooms.

Descriptive Statistics

The 110 preschool students who sat the pre- PAST test and achieved a mean (average) total score of 15.45 points (SD = 12). Figure 1 (below) presents a visual summary of the distribution of the total PAST scores achieved by this cohort of preschool students. Viewing data in a frequency histogram can be helpful for understanding and describing the shape and spread of results (Australian Bureau of Statistics, n.d.). Frequency histograms are presented and interpreted in this paper to develop our understanding of the shape and distribution of individual student achievement and the change in individual student's total test scores from the pre- to the post-test at both the whole cohort level and school level.

Figure 1: Distribution of PAST Test Scores (Pre-)



Like a bar chart, histograms present a visual display of frequencies using columns plotted on a graph. The Y-axis (vertical axis) represents the frequency count, while the X-axis (horizontal axis) represents the total of the variable being measured (i.e., total PAST test scores). The height of each column in Figure 1, shows the frequency (or number) of students who achieved a total PAST test score that lies within the specific range of values assigned to each column on the x-axis. In Figure 1, the scale along the x-axis ranges from zero to 50 PAST test marks (points). No student

achieved a score outside of this range the first time the PAST was administered early in the school year. Small columns with intervals of two points have been used from each column along the x-axis. In Figure 1, each student's performance on the PAST pre- test has been sorted (allocated/placed) into the column with the interval range that corresponds (is inclusive) of the total score that the student achieved.

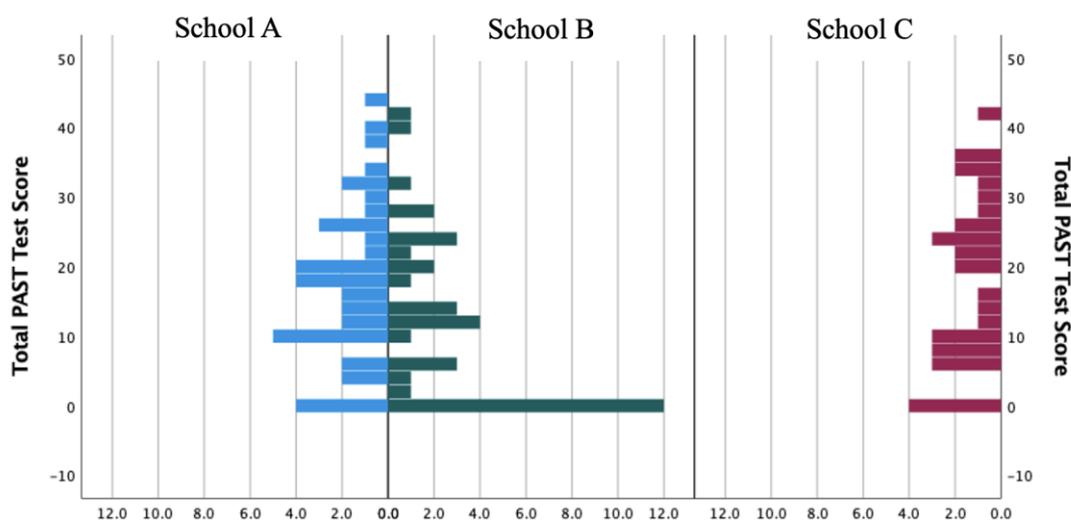
Interpreting the histogram, we can see that the first column presented on the left-hand side of the graph, which includes total PAST test scores of either zero or one, was the most frequent column. The height of this first column shows that 20 preschool students (or 18% of the preschool cohort with matched data) achieved a total PAST test score of either zero or one point. This means that prior to implementing the PA teaching and learning activities in these preschool classrooms, nearly one in five students only answered a maximum of one of the 96 PAST test-items (questions) correctly.

Table 2: The Mean Total PAST Scores for Each School (Pre-)

School	A	B	C
Number of participants (N)	33	37	40
Mean school	17.5	11.7	17.2
Standard Deviation	2.8	2.7	1.9

Figure 2 shows the distribution of total scores achieved by students on the pre- test grouped by the school they attend. Interpreting these histograms, we can see that 12 students from school B achieved a total score of either zero or one point on the PAST in Semester 1. Almost one-third (32%) of the 37 preschool students from school B, therefore achieved a total score of either zero or one out of a possible score of 96 on the PAST pre-test. Figure 2 also shows that the total PAST score achieved by students from both schools A and C on the pre-test were more evenly distributed across the range of student achievement (0 - 45 points) when compared to the PAST test results of students from school B.

Figure 2: Total PAST Test Scores (Pre-) by School



Investigating change in Student Achievement From Pre- to Post- Test (Whole Cohort)

Table 3 reports the descriptive statistics for the mean total PAST scores for all students with matched assessment data (n=110 students). The mean total score achieved by this cohort of rural

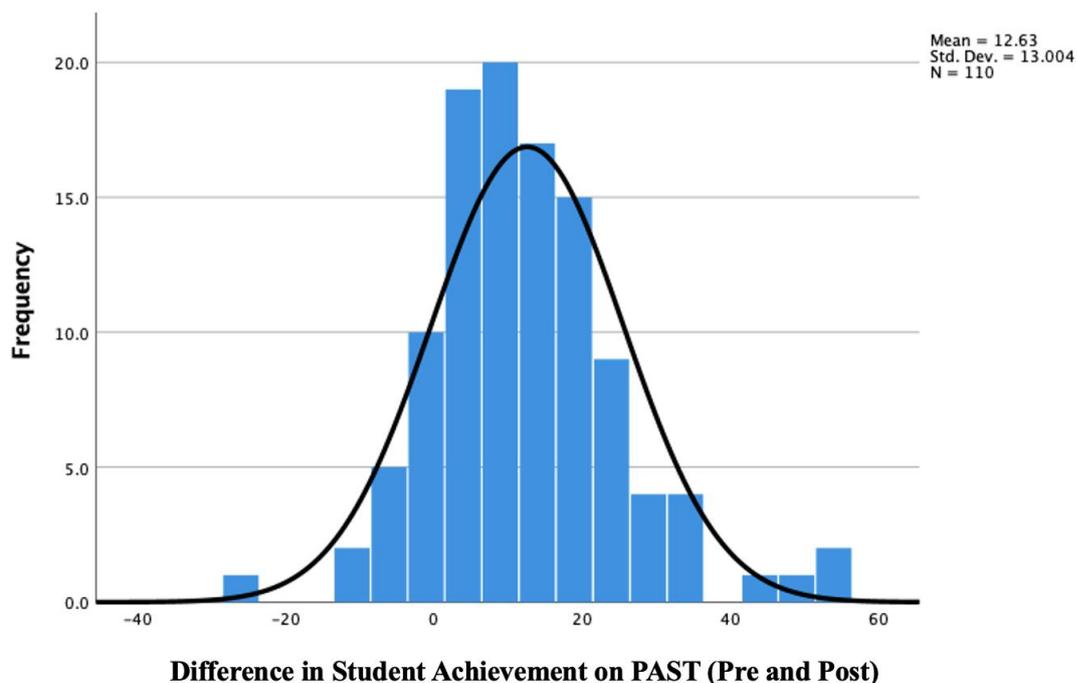
preschool students on the PAST post-test was on average, 12.63 points (SD = 13) higher than their score on the pre-test. Table 3 also reports that the mean total score on the post-test improved on average by 82% when compared to the pre-test mean total score.

Table 3. Comparing Mean Total PAST Scores Pre- and Post- Test

Whole cohort (n=110 students)	Mean Score (M)	Standard Deviation (SD)	M Difference	Total score improvement %
Pre-test (Sem 1)	15.45	11.96	12.62	82%
Post-test (Sem 2)	28.07	15.99		

Figure 3 presents a visual distribution of the change (difference) in student achievement on their two attempts at the PAST. The x-axis represents the change in student total test scores from the pre- to the post- test. The scale on the x-axis ranges from -40 to +60 points. To represent this range of values (data) in this histogram, an interval range (bin size) of five points has been used for each column.

Figure 3: Change in Students' PAST Test Scores (Pre- and Post-)



The tallest bars on the histogram in Figure 3, are distributed around the central value (mean). The height of the bars also typically decreases the further they are from the center. Overall, the shape of the distribution of the difference (change) in preschool students' PAST scores is normally distributed. In a normally distributed population, 68% of the population lie within one standard deviation ($\pm 1SD$) of the mean. Given the mean change in total test scores was 12.63, the relatively normal distribution and one SD = 13, we can interpret from this data that most of these preschool students improved their total score on the PAST by between 0 to 26 marks. Outside of this range of values, the frequency with which the difference in student achievement on two PAST assessments had a higher or lower value decreases.

With an understanding of the distribution of the change in tests scores in this dataset established, we now analyze the size of the difference in students' pre- and post- test performances to determine if the improvement in student achievement is statistically significant.

The paired samples t-test is the statistical tool used to determine if we can be 95% confident that improvement we have measured in the mean total PAST scores of these preschool students was significant and did not simply occur by chance. As the probability that the explicit teaching activity had no effect on the population (i.e., the null hypothesis is true) decreases, we gain greater confidence that the alternative hypothesis (H1) is more plausible than the null hypothesis (H0).

The results of the paired samples t-test that we used to test whether our hypothesis is a good explanation of the pre- and post- test student achievement data are presented in Table 4 (below).

Table 4: Paired Samples T-test for the Pre- and Post- Tests (Whole Cohort)

Whole cohort (110 students)	Mean Score (M)	Standard Deviation (SD)	t	DF	Sig. (2-tailed)
Pre- test (Sem 1)	15.45	11.96	-10.184	109	<0.001
Post- test (Sem 2)	28.07	15.99			

The paired sample t-test analysis found the difference of -12.62 marks (BCa 95% CI [-15.05, -10.37] between the mean total score achieved by preschool students from these three schools on the pre- and post-tests, to be statistically significant, $t(109) = -10.18$, $df=109$, $p<0.001$). That is, after students had participated in explicit PA teaching and learning activities, the improvement in their PA awareness skills on the second PAST assessment was statistically significant. This finding does not support the null hypothesis that the PA teaching intervention had no effect on student learning. Instead, this finding provides support for the alternative hypothesis. That is, the chance of getting these data (statistical findings) if the alternative hypothesis is true are quite high. After implementing the explicit PA teaching and learning activities in the ROLL project, we observed a statistically significant improvement in the PA skills of these rural preschool students.

We then used Cohen's d (see equation below) to calculate the size of the change (effect size) in student achievement from the pre- test (PAST¹) to the post- test (PAST²).

$$\text{Cohen's } d = \frac{\bar{X}_{PAST2} - \bar{X}_{PAST1}}{\sigma_{PAST1}} = \frac{28.07 - 15.45}{11.985} = 1.05$$

A value of $d = 0.2$ or less is interpreted as a small effect size, 0.5 is considered a medium effect size and anything over 0.8 a large effect size (Field, 2018). Inserting the relevant values into the Cohen's equation we found a large effect size of 1.05 . Interpreting these statistics, the increase in total achievement (test score) of these preschool students on the post- test (PAST²) was on average for 1.05 standard deviations higher than mean total score these students achieved on the pre-test (PAST¹).

Investigating school-level change in student achievement from pre- to post- tests

This project was implemented across three schools, in the following section, the school level data are presented and analysed. Analysing the school level data helps us understand the degree to which the improvement in this cohort's mean test scores was uniform across schools or isolated within a school.

Table 5: Descriptive Statistics for Pre- and Post-Tests (School-level)

School	n	Mean (SD) Pre- Test (PAST ¹)	Mean Post- test (PAST ²)	Mean difference	Total score improvement (%)
A	33	17.55	31.76	14.21	81%
B	37	11.68	28.97	17.29	148%
C	40	17.2	24.2	7.00	41%

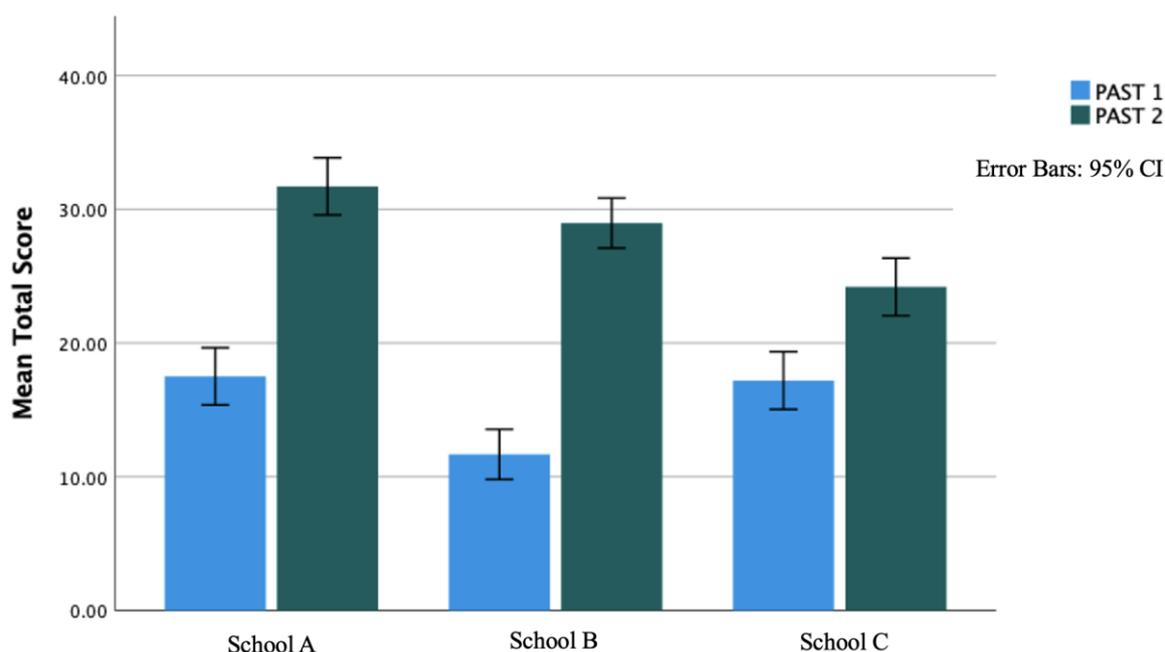
Figure 4: Bar Chart of Mean Total PAST 1 (Pre-) and PAST 2 (Post-) Scores by School

Table 4 presents the findings of the analysis of the change in the PAST results from schools A, B and C. After participating in the ROLL project, students from school A achieved a higher average PAST score (PAST² M = 31.76, SE = 2.7) than before they received explicit PA teaching (PAST¹ M = 17.55, SE = 2.10). The paired samples t-test reported that the mean change of -14.21 PAST marks (BCa 95% CI [-18.61, -10.50]) by school A students on the Post- test, was statistically significant, $t(32) = -6.71$, $p = 0.001$. The average improvement by school A students on the PAST Post- test was found to represent a very large effect size of $d = 1.18$.

School B students, on average, after participating in the ROLL project also achieved a higher total PAST test score (PAST² M = 28.97, SE = 2.59) than the pre- test (PAST¹ M = 11.68, SE = 1.97). The mean difference in students' Post- test score of -17.30 marks (BCa 95% CI [-21.22, -13.55]), was found to be statistically significant, $t(36) = -9.37$, $p = 0.001$, and is interpreted a very large effect size of $d = 1.54$.

On average, school C students also achieved a higher total score on the PAST after they had participated in the ROLL project (PAST² M = 24.2, SE = 2.55) compared to their initial Pre- test (PAST¹ M = 17.2, SE = 1.79). The difference of -7.00 points (BCa 95% CI [-11.42, -2.93]) in school C students' average total PAST scores was found to be statistically significant, $t(39) = -3.29$, $p = 0.007$. The change in mean total achievement on the PAST at school C had an effect size of $d = 0.52$, which is interpreted as a moderate impact (change/improvement).

Table 6: Paired Samples T-test of Pre- and Post- PAST Scores for Schools A, B and C

School	n	Mean PAST 1- PAST 2	SD	t	DF	Sig. (2- tailed)
A	33	-14.21	12.08	-6.71	32	0.001
B	37	-17.30	11.23	-9.37	36	0.001
C	40	-7.00	13.47	-3.288	39	0.007

In participating in this study, teachers also reported they enjoyed the professional learning, the modelling of practice and in-class support. The provision of practical resources, and support for small group instruction and assessment were seen as strengths of the ROLL program.

In the post-educator survey, all educators agreed that the project: provided new information to support students' learning of sounds; initiated changes in their practice that has improved students' knowledge of letter names, sounds, and other phonological awareness skills; introduced them to new picture books that will continue to be used in their classrooms, and; has been fun and engaging for both staff and students.

Discussion

In the *Independent Review into Regional, Rural and Remote Education*, Halsey (2018) states “the key challenge for regional, rural and remote education is ensuring, regardless of location or circumstances, that every young person has access to high quality schooling and opportunities” (p.78). This was a school-initiated research project where the schools partnered with a regional university to access professional development and support to trial implementing high quality evidence-based teaching practices.

Here, leadership identified a contemporary problem of practice, applied for funding, and approached the university seeking partnership and expertise. This collaboration enabled teaching staff to improve their skills in an area of need and then develop the phonological awareness skills of their young learners. Further, collaborating researchers were able to demonstrate the impact classroom implementation of phonological awareness activities had on the students' emergent literacy skills. While informal reporting, including anecdotes, were a positive outcome of the project, the collaboration with the university included quantitative data analysis. This meant the size of the positive impact was measured and presented in a report the school could share with the Department of Education. Overall, teachers, administrators and the school community were encouraged by the positive impact and results of the study.

Data from post- instruction testing indicated that students' phonological awareness skills positively changed over the duration of the project. Despite the variance in school demographics, teacher buy in and implementation, overall, there were positive changes in the skills of students' phonological awareness skills. This change was statistically significant, supporting the hypothesis that explicit, intentional instruction in phonological awareness had a positive and significant effect on the phonological awareness skills of the rural preschool students who participated in this study.

It should be noted that the pre-test data indicated that students who attend these three schools, were on average starting at different baselines. That is, the skills their children started preschool with were different (i.e., statistically significant), but the difference measured in mean phonological awareness skills for each school in post-testing was not different (i.e., not statistically significant). It is important to note that in this research we did not see a Matthew Effect (Stanovich, 1986), where the children who started with more advanced skills made the

most gains. On average, students made gains across schools and classes, and those who started behind closed the gap.

That is, despite some schools having students present to preschool with more developed phonological awareness skills, when everyone received the same explicit instruction, at the end of the program we found this school level disparity had been ameliorated. Arguably this phonological awareness instruction provided a safety net that helped close the gap for these rural students in these key emergent literacy skills. This finding warrants careful consideration if we are genuinely committed to achieving equitable and excellent outcomes for all Australian students.

The primary limitations of this research are realities of a school-based intervention, designed and driven by school leaders seeking to trial an intervention designed to upskill teachers and address an important area of practice. Firstly, the lack of a control group means it's difficult to know whether the large and positive change observed in participating students' pre- and post-test scores is due to the intervention or another factor (de Vaus, 2007). The appropriateness and ethics of using control groups in school-based education research is a concern commonly raised by educators because assigning some students or classes to a control group, will mean those students will be denied access to an intervention that may be beneficial for their education (Gopalan et.al, 2020). Secondly, the fact school leadership sought out this intervention and actively encouraged staff to participate, may also mean the teachers who participated in this study were more engaged and thus more likely to try and to perceive with implementing the modelled explicit phonological awareness activities in their classrooms.

That said, the large effect size we saw suggests that the documented change in students' skills exceed what would be expected over time, development and classroom practice alone. Recall the effect size for school A is 1.18, for school B is 1.54 and for school C is 0.52. Hattie (2008) categorises an effect size > 0.4 a moderate improvement, such as the one observed at school C, is unlikely to occur in the absence of intentional, explicit instruction in phonological and phonemic skills. Based on our finding that phonological awareness instruction was associated with either moderate or large effect size improvement across all participating schools, we think this successful collaboration and the positive impact it had on rural students' learning, is a story worth sharing.

There is an existing international literature base recommending explicit phonological awareness programs with young school aged learners (see. Gersten et al., 2007; Konza, 2014). Here we have applied the evidence-based teaching strategies in three rural schools with preschool learners, aged 3-5 years. This research is "*not only asking 'what works' but also 'what works for whom under what conditions'*" (Petscher et al., 2020, p.s 276).

This work is about nuancing practice for a rural Northern Territory context to demonstrate that focused school initiatives can be successful. Our results align with the broader literature, and our experience with these teachers and students and the outcomes of the study has us believe that intentional and explicit teaching of these phonological skills with our youngest learners will lead to similar results for other children in rural Australian contexts. In the future we would better plan for data collection to capture caregiver perspectives, and the impact (if any) of the caregiver workshops and weekly parent letters home with activity suggestions. Further research in remote Northern Territory schools with predominantly Aboriginal students is needed.

We view the communities in this study (and indeed rural communities) as "*dynamic and emergent*" (Corbett & d'Entremont, 2024, p. 2) and we believe this work demonstrates "*current, useful practices that entail socially just education*" (Cuervo, 2016, p. 203). The large gains in the students' phonological awareness skills in this study indicate that when rural educators can access professional development and hone their own skill set, they can implement practices which unlock student capacity at an age where children are primed for oral language acquisition.

Further, professional development focused on training teachers to implement phonological awareness activities has the potential to generate sustained benefits, contingent upon the continued application of the program with future cohorts of rural preschool students.

Conclusion

Phonological awareness development in the early years has been shown to be a substantial predictor of students' later reading ability (Konza, 2014; Lonigan, 2007; Storch & Whitehurst, 2002). We believe these results are not simply a one off, which can be explained by an invested teaching cohort, and a school-initiated research project. We designed a program focused on teaching young children phonological awareness skills because the literature suggests this is where you can have a big impact in developing children's reading readiness (e.g. Department of Education, 2023; Snow, 2020).

Note that of these 110 rural preschool children, a large proportion started preschool with few to no phonological awareness skills. By supporting teachers to deliver a phonological awareness program that was enjoyable and effective, where the implementation periods were short and frequent, our littlest learners started their first year of formal schooling with the skills they would need to become reading ready. We saw that teaching young children to first identify phonemes then later manipulate them was feasible and fun. Phonological awareness is a first step in learning to read, but an important one that gives all our students, including rural preschoolers, a strong foundation to become fluent readers.

Acknowledgements

This work was funded by a Northern Territory Government Department of Education innovation grant. We would like to pay our respects to the Wulgurukaba, Plairhekillerplue and Kurna elders past, present and emerging, the traditional custodians and original storytellers of the lands on which we live and work. We acknowledge the Larrakia and Limilngan-Wulna people as the traditional custodians of the unceded land on which this work took place. We also acknowledge Jasmine Shannon for her insight and collaboration, as well as Narelle Dahl, Tamara Johansen and Nicole Grant and their leadership within their school communities

References

- Anthony, J., & Francis, D. (2005). Development of Phonological Awareness. *Current Directions in Psychological Science*, 14(5), 255-259. <http://www.jstor.org/stable/20183039>
- Australian Bureau of Statistics (ABS). Statistical Language – frequency distribution. <https://www.abs.gov.au/websitedbs/D3310114.nsf/home/statistical+language+-+frequency+distribution>
- Ayres, L.R. (1995). The efficacy of three training conditions on phonological awareness of Kindergarten children and the longitudinal effect of each on later reading acquisition. *Reading Research Quarterly*, 30(4), 604-606. <https://doi.org/10.2307/748191>
- Castles, A., Rastle, K. & Nation, K. (2018). Ending the reading wars: reading acquisition from novice to expert. *Psychological Science in the Public Interest*, 19(1), 5-51. <https://doi.org/10.1177/1529100618772271>
- Chatto, H. (2021). Girraween Primary School success story. *Practical Literacy: The Early and Primary Years*, 26(3), 7–11. <https://search.informit.org/doi/10.3316/informit.067743815931133>

- Cheesman, E., & McGuire, J., & Shankweiler, D., & Coyne, M. (2009). First-year teacher knowledge of phonemic awareness and its instruction. *Teacher Education and Special Education: The Journal of The Teacher Education Division of The Council for Exceptional Children*, 32(3), 270-289. <https://doi.org/10.1177/0888406409339685> .
- Corbett, M., & d'Entremont, D.A. (2024). There are many communities here: Teaching in complex rural geographies. *Teaching and Teacher Education*, 142. <https://doi.org/10.1016/j.tate.2024.104544>
- Cuervo, H. (2016) *Understanding social justice in education*. Palgrave MacMillan
- Department of Education. (2023). An overview of the literature. Effective teaching of reading: Queensland Government. <https://education.qld.gov.au/curriculum/Documents/Literature-review.pdf>
- De Vaus, D. A. (2007). *Research design in social research*. SAGE Publications Ltd.
- Field, A. (2018). *Discovering statistics using SPSS* (5th edition). Sage Publications
- Gersten, R., Baker, S. K., Shanahan, T., Linan-Thompson, S., Collins, P., & Scarcella, R. (2007). Effective literacy and English language instruction for English learners in the elementary grades. IES Practice Guide. *What Works Clearinghouse*. <https://ies.ed.gov/ncee/WWC/Docs/PracticeGuide/20074011.pdf>
- Gopalan, M., Rosinger, K., Ahn, J.B. (2020). Use of quasi-experimental research designs in education research: Growth, promise, and challenges. *Review of Research in Education*, 44(1), 218-243. <https://doi.org/10.3102/0091732X20903302>
- Gossner, M., Dittman, C.K., Lole, L., & Miller-Lewis, L. (2025). Community insights into school disengagement: Perspectives from a regional-rural Australian context. *Australian and International Journal of Rural Education*, 35(2), 33-50. <https://doi.org/10.47381/aijre.v35i2.791>
- Guenther, J., Fuqua, M., Ledger, S., Davie, S., Cuervo, H., Lasselle, L., & Downes, N. (2023). The perennials and trends of rural education: Discourses that shape research and practice. *Australian and International Journal of Rural Education*, 33(3), 1-31. <https://doi.org/10.47381/aijre.v33i3.701>
- Hattie, J. (2008). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Halsey, J. (2018). *Independent Review into Regional, Rural and Remote Education*. Department of Education and Training. <https://www.education.gov.au/recurrent-funding-schools/resources/independent-review-regional-rural-and-remote-education-final-report>
- Kjeldsen, A.C., Kärnä, A., Niemi, P., Olofsson, A. & Witting, K. (2014). Gains from training in phonological awareness in kindergarten predict reading comprehension in grade 9. *Scientific Studies of Reading*, 18(6), 452-467. <https://doi.org/10.1080/10888438.2014.940080>
- Konza, D. (2014). Teaching Reading: Why the “Fab Five” should be the “Big Six”. *Australian Journal of Teacher Education*, 39(12). <https://doi.org/10.14221/ajte.2014v39n12.10>

- Lonigan, C. J. (2007). Vocabulary development and the development of phonological awareness skills in preschool children. In R. Wagner, A. Muse, & K. Tannenbaum (Eds.), *Vocabulary acquisition: Implications for reading comprehension* (pp. 15–31). Guilford.
- Lundberg, I., Frost, J., & Petersen, O. (1988). Effects of an extensive program for stimulating phonological awareness in preschool children. *Reading Research Quarterly*, 23, 263–284. <https://www.jstor.org/stable/748042>
- Mesmer, H.A., & Kambach, A. (2022). Beyond labels and agendas: Research teachers need to know about phonics and phonological awareness. *The Reading Teacher*, 76(1), 62-72. <https://doi.org/10.1002/trtr.2102>
- Northern Territory Department of Education and Training (2024). *2023-2024 Annual report*. <https://education.nt.gov.au/media/docs/annual-reports/doe-annual-report-2023-24.pdf>
- Petscher, Y., Cabell, S.Q., Catts, H.W., Compton, D.L., Foorman, B.R., Hart, S.A., Lonigan, C.J., Phillips, B.M., Schatschneider, C., Steacy, L.M., Patton Terry, N., & Wagner, R.K. (2020). How the Science of Reading Informs 21st-Century Education. *Reading Research Quarterly*, 55(Suppl 1): S267–S282. <https://doi.org/10.1002/rrq.352> .
- Piasta, S.B., & Hudson, A.K. (2022). Key knowledge to support phonological awareness and phonics instruction. *The Reading Teacher*, 76(2), 201-210. <https://doi.org/10.1002/trtr.2093>
- Seamer, J. (2022). *Reading Success in the Early Primary Years: A Teacher’s Guide to Systematic Instruction*. Routledge.
- Snow, P.C. (2020). SOLAR: The science of language and reading. *Child Language Teaching and Therapy*, 37(3), 222-233. <https://doi.org/10.1177/026565902094781>
- Storch, S. A., & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: evidence from a longitudinal structural model. *Developmental Psychology*, 38(6), 934-937, <https://doi.org/10.1037/0012-1649.38.6.934>.
- Stanovich, K. E. (1986). Matthew Effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, 21(4), 360–407. <https://doi.org/10.1598/RRQ.21.4.1>
- Sullivan, K., McConney, A., & Perry, L.B. (2018). A comparison of rural educational disadvantage in Australia, Canada, and New Zealand using OECD’s PISA. *SAGE Open*, 8(4), <https://doi.org/10.1177/2158244018805791>
- Thiele, C., Simon, S., Casey, J., Dole, S., & Eager, L. (2024). Foregrounding leadership connectedness: A preschool teacher preparation program to staff Australian regional, rural and remote schools. *Australian and International Journal of Rural Education*, 34(3) <https://doi.org/10.47381/aijre.v34i3.744> .
- Wilson (2014). A share in the future – Review of Indigenous Education in the Northern Territory. Northern Territory Department of Education. https://education.nt.gov.au/__data/assets/pdf_file/0020/229016/A-Share-in-the-Future-The-Review-of-Indigenous-Education-in-the-Northern-Territory.pdf
- Zgonc, Y. (2010). *Phonological awareness: Assessment tools and strategies*. Routledge.



Except where otherwise noted, content in this journal is licensed under a [Creative Commons Attribution 4.0 International Licence](https://creativecommons.org/licenses/by/4.0/). As an open access journal, articles are free to use with proper attribution. ISSN 1839-7387