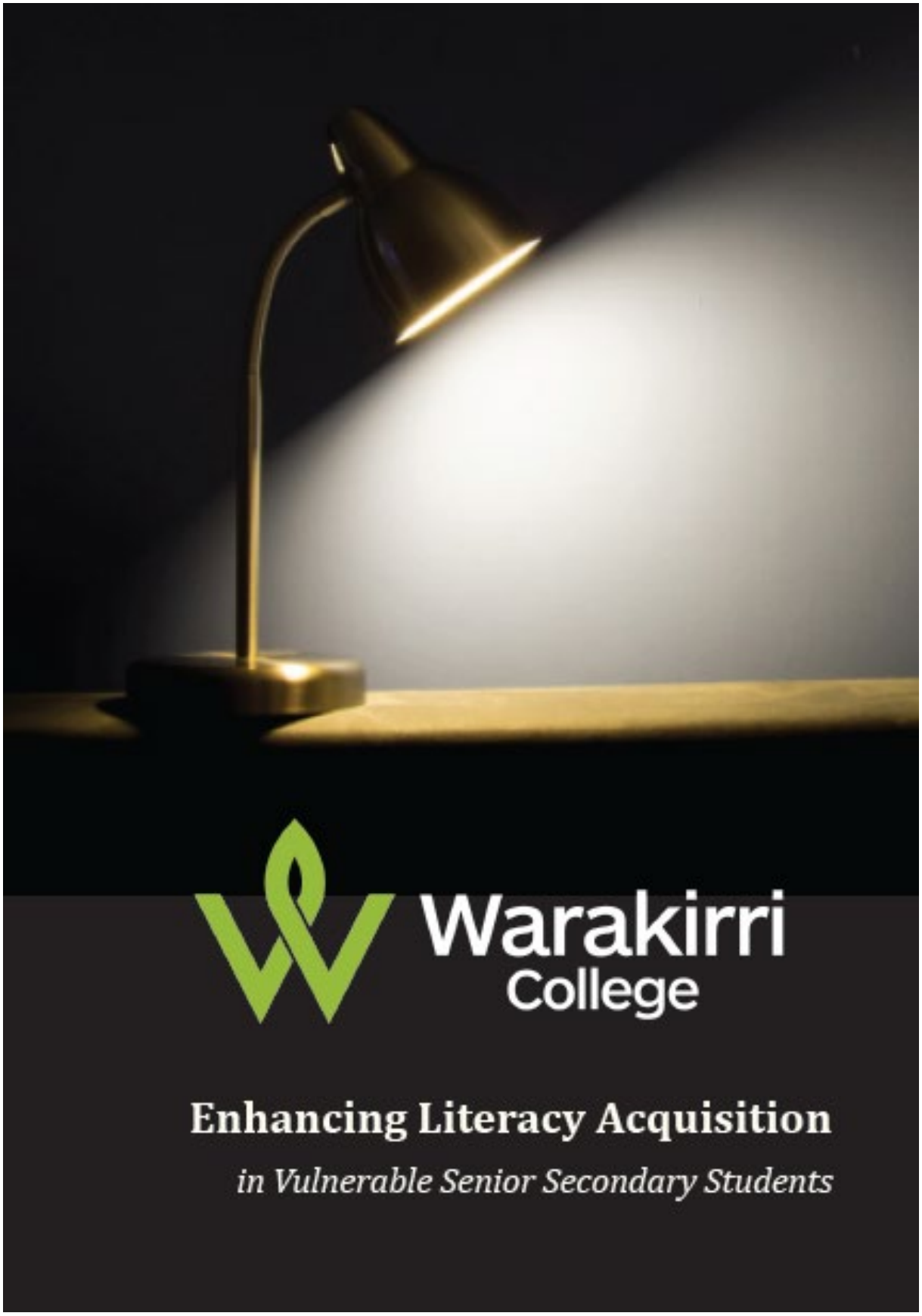
Warakirri
College
Enhancing Literacy Acquisition
in Vulnerable Senior Secondary Students

Enhancing Literacy Acquisition in Vulnerable Senior Secondary Students

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The more that you read, the more things you will know. The more you learn, the more places you'll go.

I Can Read With My Eyes Shut! by Dr. Seuss

Adolescent literacy plays an enormous role in future chances of obtaining employment opportunities, especially in our country's increasingly knowledge-based economy. This type of economy values innovation and knowledge—transforming those into very real outcomes like money and productivity. With most developing and developed countries participating in a digital revolution, it is vital to have the literacy skills necessary to learn about ways to stay current; otherwise, job opportunities may not be as plentiful or as lucrative for adolescents looking for work. To be part of this global shift towards knowledge-based economies, one must have basic literacy skills acquired by adolescence (The Literacy Project, 2022).

Executive Summary

The 'Enhancing Literacy Acquisition in Vulnerable Senior Secondary Students' research project (hitherto referred to as The Literacy Project; TLP) aimed to identify, implement, and evaluate strategies that will enable Stage 5 and 6 students with poor literacy skills to improve their ability to read, comprehend and evaluate classroom texts, as well as improve their ability to express their knowledge and thoughts in writing. A longer-term goal is to give these students improved outcomes as they move into employment, post-secondary training, and/or higher education and to function independently in the community once they leave school.

In 2021, Warakirri College administered the York Assessment for Reading and Comprehension-Australian Edition (Snowling et al., 2012) to all students to identify those students needing additional literacy intervention. The results showed that a considerable number, with an age range of 15-22 years, were reading and comprehending significantly below their biological age, with only 20% of students able to decode words accurately at a 15+ age level. Even more significant was the finding that, at one of the campuses, only 4% of students were able to comprehend what they were able to read at a 15+ age level. This extremely concerning finding led to a discussion by the Warakirri College executive about possible ways to address this problem, and, in turn, the formulation of The Literacy Project. The project was then funded and supported by the Association of Independent Schools of NSW (AISNSW).

The first premise driving the project was that students who have stronger language and literacy skills will have fewer behaviour issues, increased attendance, enhanced academic progress and improved self-esteem and wellbeing. There are good reasons to believe that under these conditions, students will be able to gain employment more readily and be less likely to enter the "school–to–prison pipeline" (Christle & Yell, 2008), although it would not be possible to reliably measure such factors within the scope of the project. A second premise was that language and literacy skills are modifiable, under the right conditions, with the appropriate levels of intervention support provided.

A broad aim of the project was to contribute to an evidence-based framework of supportive interventions for senior secondary students with language and literacy vulnerabilities. This

was attempted via a proactive and sustained collaboration between a speech-language pathologist and mainstream and learning support teachers. Speech-language pathologists have expertise in delivering services to young people with language and literacy difficulties and related communication disorders. However, access to regular speech-language pathology services for adolescent populations in Australia is limited (Shelton et al., 2021). Effective models of service delivery are increasingly focusing on the benefits of consultative, collaborative approaches, and there is evidence to demonstrate the efficacy of this model in secondary settings (e.g., Starling et al., 2012). The overarching objective of the project, therefore, was to design, deliver, and evaluate an approach where a speech-language pathologist provides a service to both school staff and students over a specified period, monitoring student 'buy-in' and developing an intervention/collaboration model that could be sustainable beyond the life of the project, given appropriate resourcing.

In this project, two campuses of Warakirri College in Sydney were assigned to one of two study arms, in a quasi-randomised controlled trial methodology. In the intervention group, professional learning was delivered to staff by the academic mentors (and, to a lesser extent by the on-site speech-language pathologist and her undergraduate students), together with a modified Response to Intervention framework to provide speech-language pathology consultation to staff and small-group intervention on targeted language and literacy skills for identified students. In the comparison group, staff engaged with the professional learning delivered by the academic mentors, but that campus did not receive the targeted speech-language pathology service.

Students in both arms of the project underwent pre- and post-testing on a range of language, literacy, and wellbeing measures at the start of each of three 20-week (two school semesters) waves of the study. These measures were administered by the speech-language pathologist involved in the project and by members of the Warakirri teaching staff.

In total, 103 students participated in the project; 57 of these were in the intervention group, of whom 33 completed both pre- and post-testing. Forty-six (46) students were in the comparison group, of whom 24 completed both pre-and post-testing. Interviews were conducted with two students and three staff at the conclusion of the project, in an effort to gauge stakeholder views on its impact.

In this document, we report on preliminary analysis of selected quantitative and qualitative data and reflect on aspects of the project that worked well, in addition to the barriers encountered. Students in both arms of the study made gains between Time 1 and Time 2, however, we did not find significant differences between study groups on the measures we report on here. A number of possible reasons for this are considered in the Discussion section.

Recommendations for classroom practice, professional learning and further research are made.

Background and Literature Review

Oral language skills encompass the ability to convey and process information via the spoken word. These skills begin emerging at birth and play a fundamental role in all aspects of human development across the lifespan. Being a competent communicator means being able to form and maintain relationships with others, as well as navigating a wide range of interpersonal exchanges in the business of everyday life. Importantly, oral language skills are also the foundation-stone for written language skills, which need to be acquired through years of explicit teaching and support, through school attendance (see Snow, 2020b for review). While oral language skills are biologically primary (meaning humans have an evolutionary advantage for their development; Geary, 2012), they are also highly vulnerable to a range of biopsychosocial threats and recent evidence indicates that two children in every mainstream class will meet criteria for a diagnosis of developmental language disorder (DLD), making DLD over ten times more common than for example, autism spectrum disorder (Norbury et al., 2016). Children and adolescents with DLD face an elevated risk for emotional, social, and academic difficulties, though their difficulties are often mis-attributed to other factors, particularly behaviour disturbance, and the likelihood of mismanagement is high (Cohen et al., 1993).

In the developmental period, language skills develop in conjunction with social skills, emotional self-regulation and social cognition skills; this development requires strong support and scaffolding from adults (parents and teachers) over the first two decades of life. These skills are highly sensitive to intrinsic and extrinsic factors in the child's life and conspire to make school either a pleasant and rewarding environment, or one that is characterised by struggle, frustration, shame, and resentment from an early age (Snow, 2020b).

There is strong evidence in the literature that students whose oral language and literacy levels prevent them from accessing the curriculum or participating in class work and associated activities are at risk of externalising behaviour disorders and disengagement from the class and from school (see Snow, 2019 for review). In a small but significant number of cases, this is associated with suspensions and expulsions, resulting in early school departure and affiliation with similarly disaffected, disengaged peers (Snow et al., 20219; Graham et al., 2020). Such students have a reduced sense of self efficacy for learning and all aspects of

academic success, they do not see themselves as competent or capable learners and they are prone to adopt maladaptive behaviours to save face with their peers and avoid engagement with activities they cannot accomplish (Cross, 2011; Graham et al., 2020; Snow, 2019; 2020a). On exiting school early, without marketable employment skills, these students face an elevated risk of engagement with youth justice services and later, the adult criminal justice system, in addition to being reliant on welfare support, public housing, mental health and/or substance abuse services (Snow, 2019). This pattern has been described by US researchers such as Christle and Yell (2008) as the "school-to-prison pipeline", a notional pathway away from school and all its prosocial protective factors, towards the youth justice system (and later to adult corrections) and all of its antisocial, criminogenic influences. This is pathway is filled with students whose academic profiles are weak, attendance records are patchy and who have a history of frequent changes of school (Christle & Yell, 2008). Notably, however, the school-to-prison pipeline does not refer only to literal prisons. Long-term social marginalisation is also a form of imprisonment, though it is far less obvious to policy makers and the community at large (Snow, 2019).

Significantly, DLD has been shown to feature strongly in the profiles of some 50-60% of youth offenders (see Snow, 2019 for review). Recent evidence also shows alarmingly high rates of DLD in adolescents in flexible education settings (72%; Snow, 2019) and in adolescents in out-of-home-care (92%; Snow et al., 2019). Notably, there is a significant degree of overlap between the child protection, youth justice, and flexible education populations, and some 50% of youth offenders enter the justice system via child protection (Snow, 2019). This is significant because child maltreatment in itself is a known marker of risk for compromised language development (Lum et al., 2018).

As noted above, language and literacy skills are intimately connected because learning how to read is a language-based task but is one that is not biologically natural (unlike the development of oral language). Children require explicit school-based instruction in order to learn how to read, write and spell and children from lower socio-economic backgrounds face an increased risk of struggling with reading (Snow, 2019). For many years, tensions have existed within the pre-service teacher training sector as to the most effective way to teach reading (Rowe, 2005; Snow, 2020) and unfortunately this means that in most English-speaking industrialised nations, Australia included, there has been a dominance of

instructional approaches that are not aligned with strong cognitive psychology evidence about optimal ways to teach reading (Snow, 2020). A significant but unknown proportion of struggling adolescents are likely to be casualties of low-impact teaching methods in the early years of schooling, resulting in them appearing to have learning difficulties. When combined with other cumulative and often inter-generational psycho-social risk factors, the likelihood of them becoming competent in reading, writing, and spelling by middle primary school years is severely compromised. Conversely, the likelihood of them developing behavioural difficulties is greatly magnified (Snow, 2019). Children from more advantaged backgrounds, with a greater number of protective influences in their lives, are likely to become literate in spite of weak instruction, but this does not apply to at-risk children (Buckingham et al., 2013).

Children's externalising mental health problems (oppositional defiant disorder, conduct disorder, ADHD) are more obvious to adults in their world (parents and teachers) than are language disorders, so children are more likely to be labelled as having a behaviour disorder than as having a developmental language disorder (Cohen et al., 1993). A label of behaviour disorder often results in punitive approaches in schools and a lowering of academic expectations. This sets up a damaging and often irreversible vicious cycle.

Vulnerable students face cumulative risks across the level of community, school, home, and individual factors. Chaotic home environments, parents' mental health problems, unstable housing and frequent changes of school are common in their backgrounds and a significant proportion have contact with the child protection system (Snow, 2019). When coupled with school settings that are ill-equipped to meet their needs, the risk of early academic disengagement is high (Snow, 2019). Significantly, however, there is a small but growing body of evidence indicating that adolescents with language disorders, even those in custodial settings, can be engaged in speech-language pathology interventions aimed at improving their language and literacy skills and can make meaningful gains in this way (Woodward et al., 2019).

Children who transition from primary to secondary school with weak language and literacy skills and a raft of psycho-social risk factors are unlikely to make up lost ground and their usual trajectory is early school departure, often after a history of school exclusions. It is easy for entire systems to give up on these students and for the so-called "soft bigotry of low

expectations" to prevail in decisions that are made about their educational placements and plans (Snow, 2019).

According to the 2023 Equity Economics report on solving illiteracy in Australia (Del Rio et al., 2023) one of the five key areas for making a substantial investment in improving students' literacy skills is as follows: "Providing a multi-tiered system of support with high quality evidence-based instruction for all students and additional support (through small group tutoring and one-on-one intervention) for struggling students so they can catch up with their classmates" (Del Rio et al., 2023, p. 5).

Adolescence is not too late a time to intervene, but intervention must be purposeful and conducted by knowledgeable and highly skilled practitioners to (a) achieve engagement and 'buy-in' from the young people and (b) achieve meaningful gains (Woodward et al., 2019). It is important that intervention addresses these students' social-emotional needs (including their shame and embarrassment concerning their low literacy skills) as well as their oral language and literacy skills. There is additional evidence that, by supporting teachers in making modifications to their oral and written instructional language, students with language and literacy support needs are better able to access the curriculum (Starling et al., 2021).

Why Target Language and Literacy?

Literacy is broadly defined as the ability to read, write, speak and listen in a way that allows us to communicate effectively. Being truly literate allows an individual to understand ideas presented in the written word (online, in print and in others' writing), express themselves clearly, listen to and understand others, gain knowledge and, overall, build an understanding of the world around them.

Literacy defines the increasingly complex world in which we live. Developing good literacy skills is an essential aspect of a young person's overall personal development including academic and work outcomes, positive mental health, and forming successful personal relationships.

Language and literacy are not static skills; they continue to develop during our lifetime, and this is particularly the case during adolescence when many significant changes take place for

those with normally developing literacy abilities. The following are some changes that are occurring during adolescence that are pertinent to this study:

Cognitive changes: Thinking in older children and adolescents becomes more abstract and de-contextualised, so that they can better consider events removed in time and space, real or imagined. This has a particular impact on students' academic work, allowing them to analyse and synthesise texts that involve ideas that are unfamiliar to their personal experience. It also means that young people are developing abilities to acknowledge ideas and opinions stated by other people (Korkmaz, 2011).

Literacy changes: By and during adolescence, academic and life experiences become increasingly demanding on the need for a young person to have independent reading and writing skills. Keeping up with curriculum learning necessitates the ability to read (decode) and comprehend complex texts and instructions. Having a well-established ability to write a range of written genres (e.g. factual essays, expositions and creative writing) is crucial for students' demonstration of their learning, for assignments, assessments, topic tests and, ultimately, formal exams. Having satisfactory writing ability involves having well-developed literacy ability from word level (spelling and lexical knowledge), sentence and paragraph structure to whole text productions that are well structured and cohesive.

Language changes: Academic language becomes increasingly complex in the secondary school environment. Each curricular subject introduces a wide range of technical, sophisticated, and potentially unfamiliar vocabulary, placing high demands on a student's ability to process, retain and use new information. An additional aspect of cognitive development during adolescence is the ability to understand and use high order language, an awareness of how language works at an abstract, inferential level. We use high order language skills to form hypotheses, understand and use figurative language (such as similes, metaphors and idioms), understand jokes and cartoons, and understand social verbal interactions such as innuendo and sarcasm.

It is evident therefore that having poorly developed literacy skills sets a young person up to experience significant difficulties and often failure in many aspects of their personal and academic development. The following are well-documented results of adolescents experiencing language and literacy difficulties:

- reduced ability to access the school curriculum, across all subjects and grades (both processing and retaining)
- become disengaged in the classroom
- difficulty expressing themselves verbally and in writing
- experiencing poor mental health, including anxiety and depression
- becoming marginalised from their peer group
- developing behavioural problems such as acting out or withdrawing
- developing problems with substance abuse
- inconsistent school attendance
- being suspended and/or expelled from school
- juvenile offending and leaving school early and under-qualified without marketable employment skills.

The goals of the literacy intervention:

- for professionals (speech-language pathologists, classroom and learning support teachers) to work together to address the language and literacy support needs of identified secondary school students
- for secondary school classroom teachers to adopt a range of oral and written instructional language and literacy modification strategies that can be applied to their regular classroom teaching practices
- for secondary school students with poor language and literacy skills to be better able to access, process, retain, evaluate, and express their knowledge across-subject curriculum content
- for student learning support staff (SLSOs) to be trained by a speech-language pathologist in providing language and literacy support
- for a whole school community to become more aware of the nature and impact of poor language and literacy in secondary school students, and for all staff to become involved in supporting these students through teacher capacity building processes.

An additional aspiration of this project was to create an evidence-informed approach that can:

- continue to be used across the four Warakirri campuses (**sustainability**)
- can be replicated by other schools with similar student populations (**replication**)
- be shared widely with education and health professional groups, including the data results and identification of barriers to students' progress (**research translation**).

This project

Research questions addressed in this project

1. Does a whole-school language and literacy intervention have a positive impact on the academic progress of students identified as having poor literacy skills?

2. Does this whole-school literacy intervention also have a positive impact on the personal development (such as behaviour, mental health, and school engagement and attendance) of students identified as having poor language and/or literacy skills?

3. How do teachers and students perceive the contribution of additional language and literacy support via speech-language pathology service provision?

Context: Warakirri College

Warakirri College serves young people, 15-22 years old, who have disconnected from mainstream education. The school has campuses at Fairfield, Blacktown and Campbelltown (two campuses) with approximately 100 students on each. Students are referred by local high schools (often pre- or post-expulsion) or by community welfare organisations. Many students enrol after several years of school avoidance or extremely low attendance rates, often less than 20%. Warakirri only offers Years 10-12, preparing students for the NSW Year 10 Record of School Achievement (RoSA) or Higher School Certificate (HSC) which is delivered by a compressed curriculum model with students studying three HSC subjects at 8 hours per week in each year of NSW Curriculum Stage 6 (Years 11-12).

Typically, Warakirri students have disconnected from mainstream schooling due to severe mental health problems, including behaviour disturbance, anxiety, depression, and/or problems with peer relationships. Over 80% of Warakirri students have a social/emotional disability according to the Nationally Consistent Collection of Disability Data criteria, most commonly anxiety, depression, post-traumatic stress disorder, attention deficit hyperactivity /attention deficit disorder, and autism spectrum disorder. A significant number of Warakirri students have already had involvement with the juvenile justice system and a large percentage have a history of low school attendance including school refusal. Even at Warakirri College, which offers great flexibility and an encouraging learning environment, the average attendance rate is only 50%.

In 2021, Warakirri College staff administered the York Assessment for Reading and Comprehension-Australian Edition (YARC; Snowling et al., 2012) to all students to identify those students needing additional literacy intervention. The results showed that a considerable number, with an age range of 15-22 years, were reading and comprehending significantly below their biological age, with only 20% of students able to decode words accurately at a 15 + year level. Even more significant was the finding that, at one of the campuses, only 4% of students were able to comprehend what they were able to read at a 15+ year level. Our experience is that when these young people move to Stage 5 or Stage 6, they have teachers who are trained to teach the curriculum, but who cannot directly assist students who need to learn to read, comprehend and discuss what they are reading and hearing at an appropriate level**.**

The data from the YARC assessments indicated that a great many Warakirri students may well face significant barriers to their learning, such as:

- accessing the information provided in Stage 5 and 6 academic texts
- understanding the instructions provided in worksheets, test and examination papers
- participating in routine class activities such as reading a play or a novel, and discussing a topic or a piece of literature
- learning from reading a textbook
- providing written responses to questions and assessment tasks.

There are many possible reasons as to why so many of these students have such poor literacy abilities including:

- disabilities or disorders (diagnosed or undiagnosed), such as attention deficit hyperactivity disorder (ADHD), anxiety disorders, and autism spectrum disorder, that have interfered with their ability to self-regulate and pay attention in class, thereby causing them to miss key literacy instruction and opportunities to practise newly learned skills
- previously diagnosed/as yet undiagnosed neurodevelopmental disabilities and/or disorders impacting the normal development of language and literacy, for example developmental language disorder (DLD), dyslexia/reading disorder, and/or dysgraphia
- inconsistent school attendance/multiple school changes over a period of years
- a home language and literacy environment that was not conducive to supporting the development of strong literacy skills, such as parents who are unable to read themselves.

Methodology

This project was approved by the La Trobe Human Ethics Committee (HEC approval number HEC21395). Some minor modifications to the methodology were approved by the HEC during the project and no ethical incidents occurred.

A quasi-experimental randomised controlled trial (RCT) methodology was employed, across two of the four campuses (Fairfield and Blacktown) of Warakirri College in Sydney. Fairfield was the intervention campus (meaning that students underwent pre/post testing and were in classrooms impacted by TLP intervention), and Blacktown was the comparison campus (meaning that students underwent pre/post testing but were not exposed to TLP intervention).

Students were identified by the schools' SLSO staff based on a) having known or possible language and literacy difficulties, and b) being regular attenders. In total, 103 students were involved across the two schools and over the three study waves: 57 at Fairfield (intervention) and 46 at Blacktown (comparison).

Figure 1 shows an overview of the study timeline and student data-collection periods.

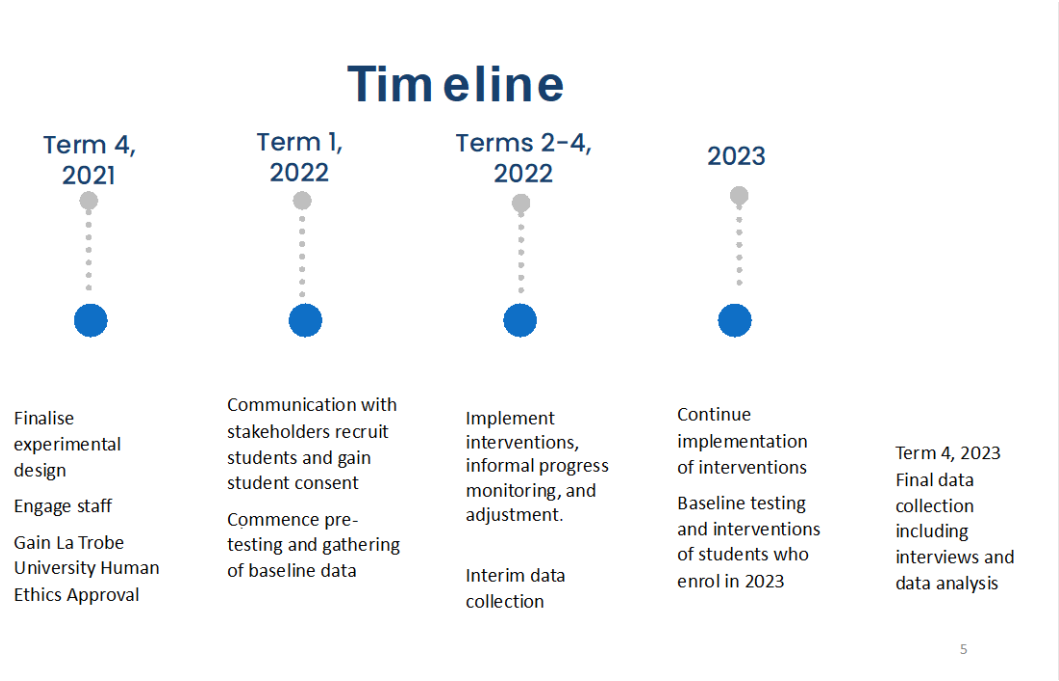


Figure 1 Timeline of The Literacy Project

Table 1 summarises the number and breakdown of students in each study group, wave and campus. As can be seen in this table, 103 students underwent pre-testing (albeit with some missing data on a significant proportion, particularly in the comparison group, at both pre- and post-intervention, and a total of 59 students underwent post-testing. Table 1 also outlines that some participant data was incomplete at both pre- and post-intervention, meaning that they may not have completed the full suite of assessments. This occurred for a range of reasons, including students' non-attendance on assessment days, students

declining specific tests, or challenges getting specific questionnaires completed by staff due to workload issues. Student attrition and incomplete data on those who were retained are significant barriers to interpretation of the results.

Table 1: Overview of student numbers in each study group, wave and campus

Campus	Wave	Number of students **pre-tested** C – Complete data I – Incomplete data	Number of students **post-tested** C – Complete data I – Incomplete data
Fairfield (Intervention)	1	21 (C:20, I:1)	14 (C:8, I:6)
	2	22 (C:22)	11 (C:10, I:1)
	3	14 (C:12, I:2)	10 (C:10)
Totals (Intervention)		**57 (C:54; I:3)**	**35 (C:28; I:7)**
Blacktown (Comparison)	1	19 (C:15, I:4)	11 (C:7, I:4)
	2	15 (C:1, I:14)	9 (C:2, I:7)
	3	12 (C:7, I:5)	4 (C:4)
Totals (Comparison)		**46 (C:23; I:23)**	**24 (C:13; I:11)**
GRAND TOTAL		**103 students pre-tested across both groups and all waves**	**59 students post-tested across both groups and all waves**

It is important to note that the complex nature of the setting and participant cohort contributed to a significant attrition rate across the study. Of the 57 students who commenced in the intervention group, 24 left prior to full completion of post-intervention testing. Of the 46 students who commenced in the comparison group, 20 left the study prior to full completion of post-intervention testing, including two students who elected for their pre-intervention data to also be removed for research purposes. Reasons for attrition are outlined in Table 2 and include two students who left the study after participating in some incomplete post-intervention testing.

Table 2: Overview of attrition rates and reasons in intervention and comparison group

Study Group	Attrition reason	Number	%
Intervention	Left school	15	26.3
	High absenteeism	7	12.3
	Expelled	2	3.5
	Refused post-tests	1	1.8
Comparison	Left school	10	21.7
	Withdrew from study	4	8.7
	High absenteeism	7	15.2
	Transferred campuses	1	2.2

Table 3 summarises the demographic characteristics of the student sample with respect to student age, gender, Aboriginal and Torres Strait Islander status, and English language status. As may be seen in this table, the gender ratio is similar across both groups, but there are notable differences in the cultural and linguistic diversity of each group.

Table 3: Demographic characteristics of the student sample across both study groups

Study group	**Age in years** (mean and SD)	**Current year level at school** 10 – Year 10 11 – Year 11 12 - Year 12	**Gender (%)** M – Male F – Female Non-binary	**Aboriginal and Torres Strait Islander? (%)** Y = Yes N = No	**English as Additional Language/Dialect (EAL/D)? (%)** Y = Yes N = No U = Unknown
Intervention	**Age 15 – 15;11: n= 23** **Age 16 – 16;11: n= 22** **Age 17+: n = 12**	Year 10 = 22 Year 11 = 35	M = 23 (40.4%) F = 33 (57.9%) NB = 1 (1.8%)	Y = 11 (19.3%) N = 46 (80.7%)	Y = 11 (19.3%) N = 46 (80.7%)
Comparison	**Age 15 – 15;11: n= 13** **Age 16 – 16;11: n= 12** **Age 17+: n = 18**	Year 10 = 14 Year 11 = 30	M – n= 17 (38.6%) F – n=27 (61.4%) NB – n=0 (0%)	Y = 1 (2.3%) N = 43 (97.7%)	Y = 4 (9.1%) N = 40 (90.9%)

Study Personnel

Individuals involved in the project included Dr Julia Starling, a speech-language pathologist experienced in creating and delivering supports to adolescents with language and literacy difficulties. Dr Starling was also able to enlist the assistance of 4th Year speech-language pathology students from the University of Sydney to administer the pre and post language assessments. A total of 24 students assisted on a volunteer basis over the three waves of the study, for a total of 45 occasions. Ms Carolyn Blanden, the Principal, has led the Warakirri staff team, with Ms Cassie Balk, a teacher involved in assessment, intervention and data collection and Ms Kirsty Rose, Deputy Principal, who has assisted the team intermittently with communication across the project. Student Learning Support Staff (SLSOs) completed professional learning and engaged with Dr Starling alongside classroom teachers in language and literacy-related coaching and support.

The academic mentors for the project were from the SOLAR Lab team at La Trobe University and included Professor Pamela Snow and Professor Tanya Serry, with the assistance of the SOLAR Lab Academic Intern, Mr Eamon Charles.

Measures

Students at Fairfield and Blacktown campuses were administered a range of assessments to obtain baseline data on their mental health, oral and written language, reading accuracy and comprehension, spelling, and alphabet code knowledge. These measures were selected for adequate sampling of key language and literacy constructs, their psychometric robustness, and their efficiency with respect to administration and scoring. Measures are listed below and additional details for each measure are provided in the Appendix.

- Clinical Evaluation of Language Fundamentals Australian and New Zealand 5th Edition (CELF-5; Wiig et al., 2017)
- Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995)
- York Assessment of Reading Comprehension Australian Secondary Edition (YARC; Snowling et al., 2012)
- Macquarie Oxford Reading Anxiety Test (MoRAT; Francis et al., 2020)

- Strengths and Difficulties Questionnaires - Student and Teacher versions (SDQ; Goodman, 1997)
- Diagnostic Spelling Test for Irregular Words; (DiSTi; Kohnen et al., 2012)
- Letter-Sound Knowledge Test (LeST; Larsen et al., 2015)

Assessments were carried out by the speech-language pathologist on the project (CELF-5, DiSTi and LeST), and the SLSO staff as well as the teacher assisting the project (YARC, MoRAT, DASS-21 and the two SDQs). Year 4 undergraduate speech-language pathology students from the University of Sydney assisted the speech-language pathologist with assessment administration and scoring at all three waves, working under her supervision.

The intervention

The intervention framework utilised at the Fairfield campus drew on aspects of the Response to Intervention (RTI) model (Fuchs & Fuchs, 2006; Hughes & Dexter, 2011; Nguyen, 2019), identifying three levels or tiers of intervention (see below). The intervention involved both Tiers 1 and 2, recognising that in some senses, a setting such as Warakirri College might be regarded as a 'Tier 4' setting, because of the complex nature of its student cohort and the necessarily flexible delivery of its programs.

There were three elements of the intervention, the first two of which were provided only at the Fairfield (intervention) campus:

1. A small-group intervention that would enable vulnerable Year 10 and 11 **students** to improve their language-based literacy skills for both reading and writing, for comprehending and evaluating required texts; promoting the ability to process, analyse and retain information presented in the classroom in both written and oral forms; developing an expanded vocabulary base relevant to NSW Curriculum Stage 5 and 6 academic learning, and develop improved written expression abilities.

It was noted early in Wave 3 that the majority of the students assigned to the small groups were reluctant to come out of class to attend the sessions. After some discussion across the project team a decision was made that the group sessions would be run in the classrooms of three teachers who had responsibility for the lowest achieving students. The three HSC subjects involved were Numeracy, English Studies and Work Studies. This adaptation

worked particularly well in terms of student attendance: if they were at school, they participated in the group session.

2. A parallel intervention to address the instructional language used in the classroom by coaching classroom and learning support **teachers** in strategies to facilitate the above aim. The targets of this aspect of the project included: making written resources, such as assessment and test instructions, more language-accessible for students; adopting direct vocabulary Instruction strategies into their regular teaching practices.

3. Professional learning on the science of language and reading, delivered by the academic mentors to the project, Professors Snow and Serry, of La Trobe University, to staff across all Warakirri campuses. Due to COVID-19 restrictions in place in January 2022, the professional learning was delivered online, at the end of a staff development block at the school, ahead of the commencement of Term 1. This content was repeated via four hours of face-to-face professional learning at the Campbelltown campus in January 2023. Topics covered included:

- Human learning
    - Information processing
    - Working memory
    - Attention and other executive functions
    - The Forgetting Curve
- Cognitive Load Theory
    - Managing intrinsic and extrinsic cognitive load in classrooms
    - The role of explicit teaching in maximising student success
    - The importance of retrieval practice in student learning
- What is reading?
    - Oral language Vs written language
    - Reading Vs literacy
    - Why some students struggle with reading
- Building vocabulary
    - Tiers of vocabulary in English
    - The role of morphology and etymology in vocabulary development
- Developmental Language Disorder

The school-based intervention and data collection took place over three waves, each wave occurring over two school semesters (20 weeks each) and consisting of (1) pre-testing of students, (2) the school-based intervention (Fairfield) or a period of business-as-usual teaching (Blacktown), and (3) post-testing using the same assessment tools. Wave 1 involved Year 11 students, Wave 2, Year 10 students, and Wave 3, Year 11 students

Interviews with teaching staff and students were also carried out.

All data were deidentified via the assignment of unique alpha-numeric codes re-identifiable only by the research team and transferred to La Trobe University for analysis using SPSS (quantitative measures) and thematic analysis (qualitative measures).

At the Tier 1 level, Warakirri teachers were provided by the speech-language pathologist with strategies to utilise in their regular classroom teaching practices, to facilitate students' access to the NSW Stage 5 and 6 curriculum, across all grades and subjects. These adjustments to their regular teaching practices were aimed at improving students' access to the curriculum by coaching the teachers in oral and written language modification techniques. These strategies specifically targeted supporting students' reading comprehension, vocabulary, and writing skills. In summary, resources targeted the written and spoken language of the classroom, with additional instruction and resources targeting curriculum-specific vocabulary. Ideas, strategies, and resources were discussed at weekly staff meetings, posted on Microsoft Teams, and at as-indicated meetings between the speech-language pathologist and individual teachers.

As well as the direct coaching of the school teaching staff by the speech-language pathologist, *ad hoc* professional development was provided to all Warakirri staff as follows:

- Two Fairfield staff in-services presented by the project's speech pathologist on aspects of the Tier 1 collaborative intervention, specifically targeting teachers' oral and written teaching and direct vocabulary instruction.
- An in-service presented to Fairfield staff by two University of Sydney Masters' students on a 6-week placement in 2022, supervised by the project's speech-language pathologist. The topic of the in-service was the nature and impact of language and literacy difficulties, as applied to Warakirri students.

- At Tier 2, Fairfield students identified as potentially benefitting from literacy support, based on their language and literacy assessment results, were placed in small groups. Interventions designed by Dr Julia Starling were delivered twice weekly for an hour with each small group. Using the 'train the trainer' model, Warakirri's SLSOs participated in the group sessions in order to facilitate their ability to present the intervention independently, once the speech pathologist was no longer present.
- At Tier 2, Fairfield students identified as potentially benefitting from literacy interventions were placed in different groups. The interventions followed a program designed by speech-language pathologist Dr Julia Starling and were delivered twice weekly for a class period (one hour) with each small group, for a total of 18 sessions.

Following a 'train the trainer 'model, the Fairfield SLSOs participated directly in the group intervention so they could be trained to deliver these interventions independently once the speech pathologist was no longer present at the school. This was seen as highly important in addressing the long-term sustainability of the intervention.

Tier 3 intervention, involving one-on-one intensive services was not within the scope of this project.

Data analysis

Data entry and analysis has been undertaken by the La Trobe University academic mentor team. This has included ongoing statistical analysis of data from standardised tests, and a qualitative analysis of data collected during observations, interviews, and from students' work samples and teacher reports. For the purposes of this document, we report multiple t-Tests for pre/post comparison, with no correction for family-wise error rate, given the exploratory nature of the analysis. Pre-test comparisons are conducted as two-tailed tests, and post-intervention comparisons are conducted as one-tailed tests. Descriptive and inferential analysis was carried out using SPPS Version 29.

A student case study will complement the quantitative data to provide a richer understanding of the ways in which different students engage with and derive benefit from the intervention. These have not yet been completed.

Results

A breakdown of CELF-5 scores across both study groups and time points is provided below. The descriptions below summarise the key language, and literacy data across both groups at pre- and post-testing. It should be noted that at the time of writing, analysis of data pertaining to MORAT, DASS-21, SDQ, LST, and DiST-N is still be carried out and these measures are not included in this report (it should also be noted that these measures were most heavily impacted by missing data in the project).

Baseline (pre-intervention) measures and scores

Results in this section will be summarised both within and between groups at Time 1.

CELF-5 Core Language Score (CLS)

The mean pre-intervention CLS for students in the intervention group was 88.9 (SD = 17.7) and for students in the comparison group, this was 98.5 (SD=13.5). As can be seen, therefore, the starting point in the intervention group was slightly lower than in the comparison group, and this difference was statistically significant (t=-2.8; p=< 0.05).

CELF-5 Structured Writing

The purpose of the CELF-5 Structured Writing subtests is to evaluate the student's ability to use situational information given by a story title, an introductory sentence, and an incomplete sentence to create and write a thematic, structured narrative of increasing length. A scaled score of between 8 – 12 is within the average range.

The mean Structured Writing scaled score for participants in the intervention group was 6.9 (SD=4.9) at pre-intervention, and the mean Structured Writing scaled score for participants in the comparison group was 8.5 (SD=3.9). This difference was statistically significant (t=-2.4; p=< 0.05).

Figure 2 displays a clustered boxplots of the mean CELF-5 CLS scores across the two study groups and across the two time points. Figure 3 displays a clustered boxplot comparing the mean CELF-5 Structured Writing Scaled scores across the two study groups, and two time points. These two figures highlight that there are wide variations within the study groups at both time points. This variation should be considered alongside the unequal group sizes and attrition rates across both groups, and results should be interpreted with caution.

Figure 2. Clustered Boxplot of CELF5 Core Language (Standard) Score - comparing the intervention and comparison group at pre and post intervention

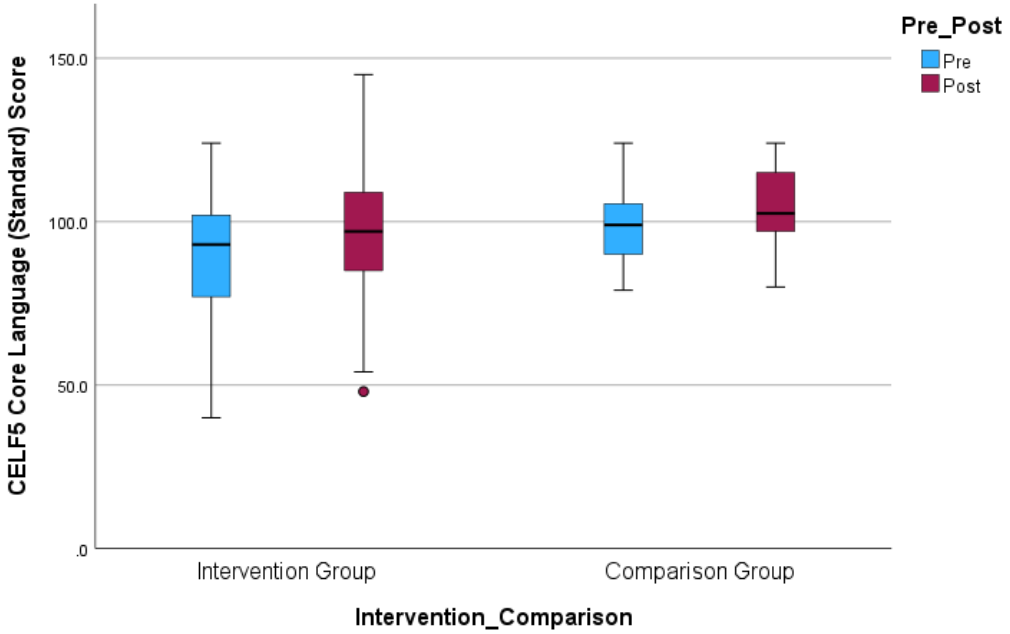
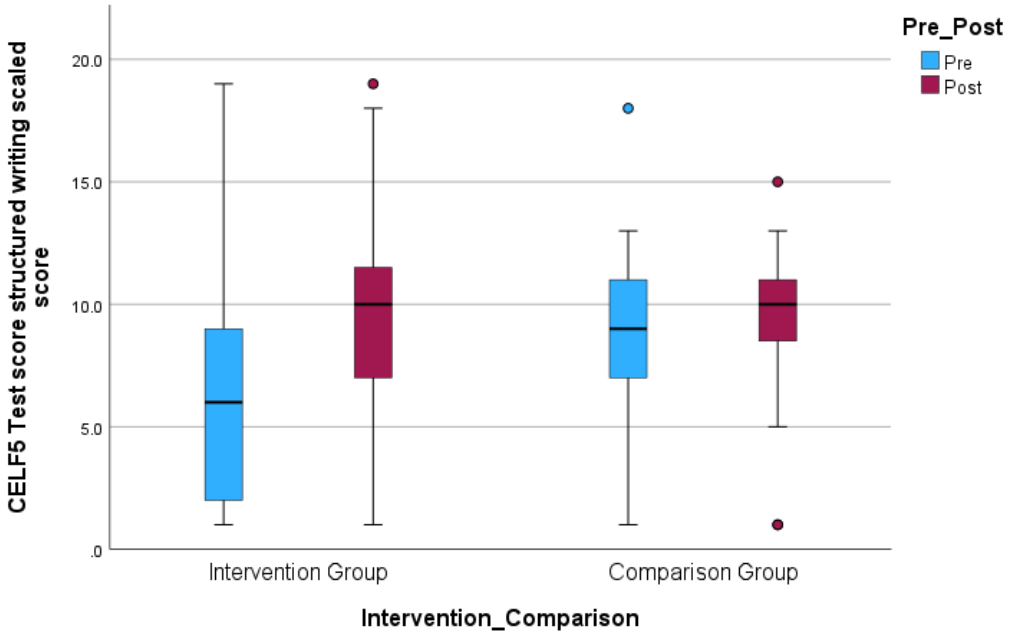


Figure 3. Clustered Boxplot of CELF5 structured writing scaled score - comparing the intervention and comparison group at pre and post intervention



York Assessment of Reading Comprehension

Standard scores within 1 SD of the mean (between 85 and 115) are considered average for all components of the YARC Secondary assessment. A score of 100 on these scales represents the performance of the typical student of a given age.

YARC Secondary Single Word Reading Test standard score

The mean standard score for participants in the intervention group at pre-intervention was 94.9 (SD = 18.3) and for students in the comparison group, this was 105.6 (SD=17.4). This difference was significant (t=-2.6; p<0.05).

YARC Secondary Reading Rate standard score

The mean standard score for participants in the intervention group at pre-intervention was 89.70 (SD = 15.95) and for students in the comparison group, this was 92.66 (17.63). This difference was not significant.

YARC Secondary Reading Comprehension standard score

The mean standard score for participants in the intervention group at pre-intervention was 84.76 (range = <70 – 114, SD = 13.10) and for students in the comparison group, this was 93.8 (SD=14.1). This difference was significant (t=-2.6; p<0.05).

YARC Secondary Fluency standard score

The mean standard score for participants in the intervention group at pre-intervention was 91.3 (SD = 15.1) at pre-intervention and for students in the comparison group, this was 93.4 (SD=11.3). This difference was not significant.

Time 2 (post-intervention) measures and scores

Results in this section will be summarised both within and between groups at Time 2.

CELF-5 CLS (Core Language Score)

In the intervention group, 23 participants did not complete post-testing. In the comparison group, 19 participants did not complete post-testing.

The mean post-intervention CLS for students in the intervention group was 97.2 (SD = 20.0) and for students in the comparison group, this was 103.3 (SD=12.0). As can be seen, therefore, the outcome score in the comparison group was slightly higher than in the intervention group, but this difference was not statistically significant.

At Time 2, the difference in pre/post scores in the intervention group (96.2 Vs 103.3) was statistically significant (t=-2,8; p= <0.05). The difference in pre/post scores in the comparison group (98.5 Vs 103.3) was also statistically significant (t=-2,3; p= <0.05).

This means that both groups made significant gains on this measure over the course of the intervention but a difference between the groups was not discernible.

CELF-5 Structured Writing

In the intervention group, 23 participants did not complete post-testing. In the comparison group, 19 participants did not complete post-testing.

The mean Structured Writing scaled score for participants in the intervention group was 9.3 (SD=3.8) at post-intervention, and the mean Structured Writing scaled score for participants in the comparison group was 9.1 (SD=3.7) at post-intervention. This difference was not statistically significant. The gains made within the intervention group were statistically significant (t=-2.7, p<0.05) as were the gains made in the comparison group (t=2.3, p<0.05).

York Assessment of Reading Comprehension

In the intervention group, 24 participants did not complete post-testing. In the comparison group, nine participants did not complete post-testing.

YARC Secondary Single Word Reading Test standard score

The mean standard score for participants in the intervention group at post-intervention was 102.6 (SD = 17.4) and for students in the comparison group, this was 113.0 (SD=16.4). This difference was not statistically significant. The pre/post difference was not statistically significant in either group.

YARC Secondary Reading Rate standard score

The mean standard score for participants in the intervention group at post-intervention was 102.6 (SD = 17.4) and for students in the comparison group, this was 100.7 (SD=13.5). This difference was not statistically significant. The pre/post difference was not statistically significant in either group.

YARC Secondary Reading Comprehension

The mean standard score for participants in the intervention group at post-intervention was 88.9 (SD = 15.5) and for students in the comparison group, this was 80.7 (SD=10.9). This difference was not statistically significant. The pre/post difference was not statistically significant in either group.

YARC Secondary Fluency

The mean standard score for participants in the intervention group at post-intervention was 88.8 (SD = 15.5) and for students in the comparison group, this was 80.8 (SD=10.9). This difference was not statistically significant. The pre/post difference was not statistically significant in the intervention group but was in the comparison group ($t=2.6$, $p<0.05$).

Overall, therefore, there was a pattern of scores increasing over time in both groups, but differences pre and post within the groups were mainly non-significant and a significant difference was not evident between the groups at Time 2.

Staff and student interviews: high-level thematic analysis

During the course of the project, six individual student interviews and two teacher group interviews were conducted, to explore the experiences, perceptions, practices and attitudes of teachers and students who participated in the project. Thematic analysis of these interviews is still ongoing, but one data set from each group has been analysed and preliminary high-level themes have been identified for the purpose of this report.

Focus group with staff

Analysis of one focus group conducted with three staff at the completion of the project resulted in the following high-level themes:

- Teachers most valued the speech-language pathologist when they could work alongside her in the classroom while she provided practical tips and strategies, and/or facilitated small group intervention.
- There was an openness to include the speech-language pathologist in unit planning in advance, particularly with respect to content dependent on language and literacy skills.

- Teachers varied in their understanding of the role of a speech-language pathologist in the setting within a Response to Intervention approach.
- There was an appreciation of professional development focused on the science of learning and the science of reading.
- Perceptions as to the extent to which they were able to implement practical classroom applications of the professional learning varied between teachers.
- The value teachers placed on the importance of whole class instructional routines in supporting the development of language and literacy skills and supporting student engagement, varied from teacher to teacher.
- There was a degree of ambivalence about the role of teachers in improving student language and literacy outcomes through curriculum, teaching, and learning.
- Relationship-based practices were highly valued in the setting.

Student interview

Six students were interviewed individually, two at each phase of the project. Some common responses included the following themes:

- The students believed that improving their reading and writing was important to all components of both their current life, and their future.
- The students said they would recommend working with a speech-language pathologist to their friends with language and literacy difficulties.
- During the intervention, the students appreciated explicit instruction in language and literacy related skills, with a particular focus on the perceived benefits of learning being broken down into small chunks.
- Small group intervention focused on language and literacy skills conducted in the classroom was preferred over withdrawal intervention.
- Some students were worried about falling behind on other work, while participating in the intervention.

Discussion

In this project we attempted a modest quasi experimental study in the real-world context of a flexible learning school. The focus of the intervention was improving students' oral language and literacy skills, to promote stronger academic engagement and achievement as well as promoting student wellbeing. Because of the high prevalence rates of unidentified language disorders in vulnerable adolescents, we engaged an experienced speech-language pathologist to be 'on the ground' with working and supporting classroom teachers, to promote optimal language and literacy instruction and support.

We worked with students in two study arms (intervention and comparison) across two sites of Warakirri College, over three intervention waves, in a two-year period. The commencement of the project was disrupted to some extent by the Covid-19 pandemic, as the La Trobe mentors were not able to deliver the 2022 professional learning component in person. They were, however, present on site for the 2023 professional learning component.

Although broadly similar at baseline, the two study groups did not score equivalently on all measures, and this needs to be taken into account when interpreting the findings. High levels of attrition and uneven numbers between the groups at both testing points is also problematic for statistical analysis. It is not possible to determine whether any systematic factors influenced attrition, resulting in higher or lower-performing students being lost to follow-up. Attrition is a common problem in intervention research, particularly when vulnerable groups are the focus. It is notable though that many students did engage, and were able to tolerate lengthy assessments, as a basis for determining intervention goals.

It can be seen that students across both arms of the study made gains over time on the standardised measures reported here, however, significant differences between the groups were not identified. This does not mean that significant differences are not present; it is possible that there was an advantage for the intervention group, but our measures were not sufficiently sensitive to detect these and/or the time period over which the intervention was conducted was too brief. It also must be considered that this model, while having strong theoretical and face validity, is not efficacious. This and other possibilities can only be tested via further research.

In spite of the lack of significant results in the measures reported here, a number of aspects of this project are instructive from a methodological and research perspective. These are summarised in Table 4 below.

Table 4: Summary of enablers and barriers to the project's success and methodological learnings

Topic	What worked	Challenges and barriers
Research study	This study has provided valuable information about the provision of evidence-informed language and literacy support to vulnerable senior secondary students with poor language and literacy skills. The school executive was highly supportive of the project from its inception, which in turn gave a positive message to the whole school community about the value to both teachers and students at both individual and collective levels.	The quasi-experimental study design necessitated employing an Intervention vs Comparison campuses model. It was therefore not possible to provide the student and teacher interventions in the Comparison campuses over the period of the study. Fidelity issues: The study was conducted in three waves, to maximise the number of students who could have access to the project. This meant that it was not possible to make any major changes to the way the study was being conducted in subsequent waves, as this would threaten the internal validity of the results. There was one exception made in Wave 3 outlined in the 'Intervention: students' section below.
Assessments (see Appendix 2 for more detail)	A wide range of assessment tools was used to gain a clear picture of students' language, literacy, and mental health at pre/post study times. It was deemed essential to view the interaction between individual students' oral and written	It took a longer-than-anticipated amount of time to administer the full set of assessment tools (around two to three class periods in total). The availability of school staff to complete the YARC and mental health questionnaires in a timely fashion was an issue. This led to

	language abilities, and their mental health status, as well as any changes over time (at post-testing). Having access to the University of Sydney Speech Pathology 4th Year undergraduate students to assist with the assessments was highly beneficial for accelerating the completion time. This was also seen as highly beneficial experience for the university students in gaining experience in interacting with adolescent populations and being involved in a research study. Each was given a certificate of involvement that can be used in their graduation portfolios.	many gaps in the pre/post data collection, in particular at the Comparison School. This was in large part due to staff shortages, as well as the lack of a regular physical presence at the school by those more directly involved with the study to ensure that the testing was being completed. Student attendance issues between pre- and post-testing: This is a mobile student population and consequently some students had left the school before the post-testing. High rates of absenteeism were also a challenge. Alignment of assessment tools with the point of performance: It is often difficult to employ assessment tools that provide quantitative data needed for statistical analysis, and at the same time are well aligned to students' academic work. For example, the written expression test (CELF-5 Structured Writing) uses narrative genres, whereas class work at NSW Stages 5 and 6 predominantly involves expository writing genres. This test did however demonstrate students' ability with formulating syntactically correct sentences, and their use of spelling and punctuation, which are not genre specific.

		Vulnerable students and assessment validity: It is possible that students' scores on assessment tasks were not always a true reflection of their abilities. All tasks required a student to be able to concentrate for an extended period of time on tasks that they often found quite intrinsically difficult. There were many possible interfering factors: performance and/or general anxiety, stress, or being distracted by a pre-existing life situation.
Intervention: Teachers	All Fairfield teaching staff were able to access the professional development provided by the speech-language pathologist, over the course of the 2-year study. Information was made available at staff PD presentations, by verbal presentations at staff meetings, by posting resources on Microsoft Teams, and via one-to-one conversations on an as-required basis. For example, when an assessment notification was being given out to students, the teacher and the speech-language pathologist worked together to ensure that the information was accessible to all students. There were regular consultations about new and potentially unfamiliar and complex vocabulary associated with new curricular topics.	As would be the case with any group of school staff, there were some teachers who were more engaged in the project than others. This may have been for a variety of reasons: the misconception about the link between language, literacy, and particular curriculum teaching, and/or a perceived lack of time and 'mental energy' to commit to adopting new ideas, especially in the wake of the Covid-19 pandemic. This was only the case for a small minority of the teaching staff over the course of the project.

Intervention: students	The majority of the students assessed at the Intervention school (Fairfield) were identified as having some degree and type of language and literacy difficulty, in many cases quite significantly so. All of these students were assigned to small groups, with the students with no identified language and literacy difficulty receiving classroom only instruction. Students attending the small groups had the opportunity to attend 18 one-hour sessions over the period of two school semesters. The sessions have been described elsewhere in this report, in summary the focus being on language and literacy skills as they were directly relevant to the students' current class work. Anecdotally, the most noted improvements occurred when (a) individual students attended school, and therefore the group sessions, regularly, and (b) the speech-language pathologist, SLSOs and teachers were able to work together on applying newly learned strategies to specific classroom assignments. For example, before the intervention, one student could not readily access the instructions for a Business Studies test	There were a few issues with aspects of the small group intervention. In the main these are unsurprising given the nature of the school and the student population. a) Student attendance: it was rare to have the full complement of students at any one group session, due to inconsistent school attendance in general. Even when they were at school, students sometimes chose to not attend the sessions; needing to spend time on an assignment and having time with one of the counsellors being amongst the most common reasons. b) Formation of the groups: having the SLSOs and teachers involved with making decisions about who should be in which group was very important. Initially, decisions were made based on the type and degree of literacy support needed; additional 'fine-tuning' was often needed as a result of both positive or negative interactions (compatibility) between the students. c) Time factors: Finding times for two sessions a week, each taking up a whole class time, was challenging. Which

	question and wrote a single sentence in response to an extended response task; after a semester of the intervention (group sessions and classroom support) they were able to write a cohesive and appropriate six-paragraph response to a similar task.	classes could be missed on a regular basis? Should the sessions be split between two class times (half of one class then half of the next?). d) Wave 3: As noted earlier, it was apparent early in this wave that the majority of the students assigned to the groups were reluctant to come out of class to attend the sessions. After some discussion across the project team a decision was made that the group sessions would be run in the classrooms of three teachers who had responsibility for the lowest achieving students. The three HSC subjects involved were Numeracy, English Studies and Work Studies. This model worked particularly well in terms of student attendance: if they were at school, they would be participating in the group session. Additionally, the classroom-based sessions allowed a more direct collaboration between the speech-language pathologist, the SLSOs and the teachers, both at pre-planning and strategy application stages. There were natural interruptions to the group schedules, such as exam week and student excursions. It was however, possible to

		work the 18 sessions into the two semester time frame for each wave.
School Learning Support Officers (SLSOs)	Some of the SLSOs became directly involved in running the small group sessions, so that (a) there were always at least two people with the group: the speech-language pathologist and one or two SLSOs, and (b) they were involved in contributing further ideas for the content of the group sessions.	It was clear early in the study that the role of the SLSOs in this project had not been adequately understood. However, this was addressed with some clarification and discussion. The main issues during the project were staff changes, and time factors (e.g. fitting in an 'extra' responsibility).

Recommendations for classroom practice and for future research

From the point of the identification of the need for this project, through the brainstorming and planning stages, to the actual implementation and data gathering over the two years of the research study, an emphasis on the many **challenges** has been highlighted:

- **The challenges** faced by a population of adolescents whose language and literacy skill development has been significantly impacted by their life experiences, leading to high risk of academic struggle and long-term social and vocational marginalisation.
- **The challenge** of conceiving and then creating a research study that would address these issues as well as provide useful quantitative and qualitative data, leading to
- **The challenge** of creating and implementing a well-planned and structured pre- and post-assessment and intervention program in an alternative education senior secondary environment, leading to
- **The challenge** of working through the data and the findings and understanding what it all means.

In this report, we have presented an overview of all these aspects and stages of The Literacy Project, from the identification of the need for such a study to the reporting of the data. In this 'wrap up' section we take all this information and look ahead: what we have learned from this project, and how might this help us, and others, build on these findings for future projects and interventions.

1. Early intervention and prevention

> The ability of a population to read and write at standards considered competent, and not merely functional, confers widespread opportunities to succeed academically and gain post-school training and education, even in the context of inter-generational academic under-attainment. This in turn affords opportunities for larger numbers to be part of the social and economic mainstream and sits at the core of reading ability as a pressing public health issue and as a modifiable form of social inequity and disadvantage (Snow, 2016).

As indicated in the quote above, first and foremost it is clear that all students should have access to high quality literacy instruction from the start of, and throughout, school. It was not possible to ascertain the reading instruction background for the students at the Warakirri schools. What is evident is the negative and damaging impact that having poor language and literacy abilities has on a young person by the time they enter senior secondary school. These difficulties are magnified for students who struggle in mainstream settings and are referred to flexible/alternative education settings.

2. Inter-team communication

The implementation of this study involved many people: school leaders, academic advisors, classroom and learning support teachers, and a speech-language pathologist. It was an innovative study, with no precedence and guidelines on which to build. It became clear early on that regular communication between the study team members was important for the effective carrying out of the project at all stages.

The team was assisted by regular online meetings between the academic advisors at La Trobe University and the Warakirri-based project team; biannual research project updates at AISNSW; regular meetings between the speech pathologist and Fairfield school staff (SLSOs and teachers) to present and discuss classroom-based and group session goals and strategies.

Challenges lay in difficulties finding time for regular school-team meetings when a group of busy people is involved. Forward planning and prioritising were key to making this work. It was also evident in the early stages of the project that not everyone was clear about their various roles and responsibilities, such as the expectations and reasons for the SLSOs involvement, and the understanding of a speech pathologist's involvement in the 'literacy' space. Early communication to provide specific clarification of these and similar issues could avoid such misunderstandings and confusions.

3. Small group intervention targets

Providing literacy support for the targeted students: as discussed in the introduction and background sections of the report, literacy is complex and different students have different needs. Literacy may mean 'reading instruction' at school entry; it may mean 'functional literacy' for adults needing to read timetables and medication dosages; it may now mean 'digital literacy' and the ability to understand and use social networking for communication. For senior secondary students, improved literacy may mean that they have a better chance of reading and understanding a range of curriculum-based written materials (textbooks, handouts, assignment notifications and test papers for a start), as well as an improved ability to express their knowledge and ideas in age and academic appropriate oral and written language.

In planning the group sessions, it was essential to target interventions that were seen by the students themselves to be of immediate use to them, with knowledge and strategies that could be applied to their curriculum learning. Research has shown that to be effective, language and literacy interventions need to be applicable and generalisable, and involve direct instruction (Dollaghan, 2007). When applied to language and literacy targets this translated to the need to focus on three main areas: reading comprehension, written expression, and vocabulary expansion.

Many of the students in the study had significantly poor reading accuracy (decoding) and spelling (encoding); realistically these difficulties would need to be addressed in an intensive one-on-one therapy program which was not possible given their academic commitments, and neither was it within the scope of the project. However, attention was paid to the mechanics of decoding and encoding as incidental learning in the group sessions, in particular when the focus was on vocabulary expansion.

In future iterations there needs to be early and robust discussion about the specific targets of the intervention, to ensure the most effective use of time and resources to address the students' literacy needs. We also recommend that future researchers make the nature of the research intervention process more visible for students, so that they can make clear connections between small-group work they are doing with a speech-language pathologist and tasks and activities undertaken in the classroom.

4. Teacher engagement

An essential aspect of the project was engaging and involving all teachers in adopting a range of oral and written instructional teaching strategies, to ensure that their classrooms were 'language and literacy-friendly' environments. These are classrooms where all students are supported in accessing the curriculum, that is to engage in, understand and retain all presented information, as well as then express their knowledge and ideas in oral and written language. Teachers at alternative education schools such as the Warakirri are skilled in instructing students with a range of learning issues (including gaps in their pre-existing knowledge, issues with attention, concentration and motivation, and mental health problems).

Variability in teacher engagement in the project might, in part, be explained by the perceived amount of time, energy and motivation available to individual teachers enabling them to be open to new ideas, and changes to their teaching practices. Some teachers varied in their view of the importance of literacy across the curriculum, in all subjects. In the event these barriers to proactive involvement were only applicable to a small minority, and there was a very positive collaboration between the speech pathologist and the majority of the teaching staff during the project.

Possible motivators: The motivators for teachers' involvement in this project were intrinsic, and highly dependent on individual teachers' perception of the relevance and benefits of the intervention for themselves and for their students. It could be that providing external motivators might strengthen teacher engagement, by creating initiatives such as portfolio credits for early career teachers, or by providing short online teaching modules completed for professional learning credit.

Conclusion

Intervening to support the language and literacy skills of vulnerable adolescents is extremely challenging and resource-intensive. For many at-risk students, settings such as Warakirri are 'last chance' opportunities to engage academically and gain a sense of self-efficacy as a learner. There is growing awareness in education circles of the high prevalence of undiagnosed language disorders in mainstream and specialist education settings, and with this, an appreciation of the value-add of interdisciplinary teams that include allied health professionals such as speech-language pathologists. Speech-language pathologists have a role in up-skilling classroom teachers on language and the linguistic basis of reading and writing, as well as working alongside teachers in Response to Intervention models that are adapted to suit the needs of particular settings. In spite of patchy attendance, students generally engaged well with the intervention model that was trialled in this project and it was positively received by staff. It is not possible, on the basis of the findings reported here to determine definitively that this kind of approach does or does not work. However, we cannot be confident that the language and literacy needs of vulnerable students are met through conventional classroom models of instruction, even in flexible education settings. The entry of such students into child protection and youth justice settings magnifies their risk and threatens their connection with education. This results in significant costs to the community across a range of service-delivery systems well beyond education.

Further research is needed to refine intervention models such as this with respect to content and 'dose' to determine whether the learning trajectories of vulnerable students can be significantly improved as a result of targeted and specialised language and literacy intervention and interdisciplinary teamwork.

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Appendix 1: Descriptions of assessment measures

CELF-5 Core Language Score

The CELF-5 Core Language Score (CLS) is a measure of general language ability. It is comprised of subtests *Formulated Sentences, Recalling Sentences, Understanding Spoken Paragraphs,* and *Semantic Relationships*. Standard scores within 1 SD of the mean (between 86 and 114) are considered average. A score of 100 on this scale represents the performance of the typical student of a given age.

CELF-5 Writing

The Structured Writing test is a supplementary test. It is used to evaluate the student's ability to use situational information (i.e., a story title, an introductory sentence, and an incomplete sentence) to create a short narrative. The mean for the Structured Writing test is 10, and scores between 8 and 12 are considered to be in the average range for a typical student of a given age.

YARC Secondary Single Word Reading Test

The YARC SecondaryAus Single Word Reading Test standard score is a measure of word recognition, in which students read a series of single words in isolation.

YARC Secondary Reading Rate Test

The YARC SecondaryAus Reading Rate standard score is a timed measure of reading rate, in which students read silently.

YARC Secondary Reading Comprehension Test

The YARC SecondaryAus Reading Comprehension standard score is a measure of reading comprehension, in which students are asked comprehension questions after they have read the text.

YARC Secondary Reading Fluency Test

The YARC SecondaryAus Fluency standard score is a timed measure of reading fluency, in which students read aloud.

Depression, Anxiety and Stress Scale (DASS)

The DASS is a 42-item self-report instrument designed to measure the three related negative emotional states of depression, anxiety and tension/stress.

Macquarie Oxford Reading Anxiety Test (MoRAT)

The MoRAT is a questionnaire that measures a person's level of reading anxiety.

Strengths and Difficulties Questionnaires - Student and Teacher versions (SDQ)

The Strengths and Difficulties Questionnaire (SDQ) is a brief behavioural screening questionnaire about 2-17 year olds focused on psychological attributes, with different version completed by the student and teacher.

Diagnostic Spelling Test for Irregular Words (DiSTi)

The Diagnostic Spelling Test for Irregular Words (DiSTi) assesses a person's ability to spell irregular words, and is composed of 74 items. The irregular words are read aloud by the assessor and the student attempts to spell the words as accurately as possible, by writing the words down.

Letter-Sound Knowledge Test (LeST)

The Letter Sound Test (LeST) assesses a student's ability to sound out single letters and letter combinations (51 graphemes in total) that they read.

Appendix 2: Additional data from mental health questionnaires

Table 1. Strengths and Difficulties Questionnaire (SDQ) Scale Scores – Teacher Version																
	Intervention Group								Comparison Group							
	Pre-intervention				Post-intervention				Pre-intervention				Post-intervention			
	N	Missing	Mean	Standard Deviation	N	Missing	Mean	Standard Deviation	N	Missing	Mean	Standard Deviation	N	Missing	Mean	Standard Deviation
SDQ total difficulties /40	43	14	15.4	5.7	28	29	15.8	7.5	7	37	9	5.3	6	38	13.8	9.5
SDQ Impact Score/6	42	15	1.7	1.7	28	29	1.3	1.3	7	37	.9	1.5	6	38	0.5	1.2
SDQ Emotional Problems/10	42	15	3.9	2.8	28	29	3.6	2.8	7	37	3.0	2.9	6	38	4.2	2.1
SDQ Conduct Problems/10	42	15	2.6	2.4	28	29	2.9	3	7	37	1.6	2.4	6	38	2.0	2.4
SDQ Hyperactivity Score/10	42	15	5.2	3.4	28	29	5.2	2.8	7	37	2.1	2.1	6	38	4.3	4.0
SDQ Peer Problems score/10	42	15	3.7	2.2	28	29	4.2	2.5	7	37	2.3	1.1	6	38	3.3	2.8
SDQ Prosocial score /10	41	16	6.9	2.4	28	29	7.6	2.1	7	37	6.3	4.0	6	38	6.3	2.3

Score Descriptors – Teacher Version

Total difficulties Teacher: Close to Average (0-11), Slightly Raised (12-15), High (16-18), Very High (19-40)

Impact score Teacher: Close to average (0), Slightly Raised (1), High (2), Very High (3-6).

Emotional problems: Close to average (0-3), Slightly Raised (4), High (5), Very High (6-10)

Conduct problems: Close to average (0-2), Slightly Raised (3), High (4), Very High (5-10)

Hyperactivity: Close to average (0-5), Slightly Raised (6-7), High (8), Very High (9-10)

Peer problems: Close to average (0-2), Slightly Raised (3-4), High (5), Very High (6-10)

Prosocial: Close to average (6-10), Slightly Low (5), Low (4), Very Low (0-3)

Table 2. Strengths and Difficulties Questionnaire (SDQ) Scale Scores – Student Version																
	Pre-intervention				Post-Intervention				Pre-intervention				Post-Intervention			
	N	Missing	Mean	Standard Deviation	N	Missing	Mean	Standard Deviation	N	Missing	Mean	Standard Deviation	N	Missing	Mean	Standard Deviation
SDQ total difficulties /40	52	5	19	5.6	21	36	16.7	6	15	29	17.0	5.9	15	29	20.1	7.1
SDQ Impact Score/10	52	5	2.9	2.9	21	36	2.3	3.1	15	29	3.5	2.9	15	29	3.7	3.1
SDQ Emotional Problems/10	52	5	5.6	2.8	21	36	4.4	2.4	15	29	4.6	2.7	15	29	6.2	3.0
SDQ Conduct Problems/10	52	5	3.5	2.3	21	36	2.7	1.6	15	29	2.1	2.6	15	29	3.0	2.5
SDQ Hyperactivity Score/10	52	5	6.4	1.9	21	36	6.2	2.7	15	29	5.9	2.3	15	29	6.6	2.8
SDQ Peer Problems score/10	52	5	3.6	1.7	21	36	3.3	1.5	15	29	4.4	2.1	15	29	4.3	1.9
SDQ Prosocial score/10	52	5	6.5	2.4	21	36	6.6	2.2	15	29	7.3	1.5	15	29	7.5	1.9

Score Descriptors – Student Version

Total difficulties Teacher: Close to Average (0-14), Slightly Raised (15-17), High (18-19), Very High (20-40)

Impact score Teacher: Close to average (0), Slightly Raised (1), High (2), Very High (3-6)

Emotional problems: Close to average (0-4), Slightly Raised (5), High (6), Very High (7-10)

Conduct problems: Close to average (0-3), Slightly Raised (4), High (5), Very High (6-10)

Hyperactivity: Close to average (0-5), Slightly Raised (6), High (7), Very High (8-10)

Peer problems: Close to average (0-2), Slightly Raised (3), High (4), Very High (6-10)

Prosocial: Close to average (7-10), Slightly Low (6), Low (5), Very Low (0-4)

The Strengths and Difficulties Questionnaire (SDQ) is a brief behavioural screening questionnaire about 2 to 17 year olds. The SDQ can be completed by teachers, student or parents. In this project, we used both the teacher and student version. The SDQ asks about 25 attributes, some positive and others negative. These 25 items are divided between 5 scales; 1) emotional symptoms (5 items), 2) conduct problems (5 items), 3) hyperactivity/inattention (5 items), 4) peer relationship problems (5 items), and 5) prosocial behaviour (5 items), which are all combined for a Total Difficulties category. Both the teacher and student version include an impact supplement, which asks whether the respondent thinks the young person has a problem, and if so, enquires further about chronicity, distress, social impairment, and burden to others. Descriptive for score ranges are available for both versions.

Data collection for the SDQ teacher (table 1) and student (table 2) version was impacted by missing data and attrition in both the intervention group and comparison group. Missing data was largely due to challenges getting teachers and students to complete the questionnaire, and students leaving the school and dropping out of the study between time points. Inconsistent student attendance often impacted the capacity of the research team to complete this tool with students, as they may have not been on site on data collection days. The low number of teacher version questionnaires completed by the comparison group may have been impacted by the fact that a research team member was not regularly on site at that campus. The mean SDQ total difficulties teacher version score for the intervention group was 15.4 (*n*=42) at pre-intervention and 15.8 (*n*=28) at post intervention, and for the comparison group was 9 (*n*=7) at pre-intervention and 13.8 (*n=6)* at post-intervention. The mean SDQ total difficulties student version score for the intervention group was 19 (*n*=52) at pre-intervention and 16.7 (*n*=21) at post intervention, and for the comparison group was 17 (*n*=15) at pre-intervention and 20.1 (*n=15)* at post-intervention. It is difficult to compare changes to mean SDQ Teacher and Student version scores between groups due to the missing data in the comparison group at pre and post intervention, and the missing data in the intervention group at post intervention. Descriptive results should therefore be treated with caution, and not used to measure the effectiveness of the intervention.

In order to sound out words when reading, students need to know which sound a letter or letter combination corresponds to. The Letter Sound Test (LeST) evaluates which letter(s) a person can sound out in isolation (e.g., not in the context of a word or nonword). The LeST is a simple reading aloud task and contains 51 graphemes (single

letters and letter combinations). The test allows the administrator to get an overview of the graphemes a reader can sound out in isolation. Raw scores are calculated for a total correct out of 51. Results for the LeST are outlined in table 3. The mean raw score for the LeST for the intervention group was 44.9 (*n*=55) at pre-intervention and 46.7 (*n*=31) at post intervention, and for the comparison group was 46.3 (*n*=44) at pre-intervention and 47.4 (*n=24)* at post-intervention. While both groups saw marginal increases to mean raw scores between pre and post intervention measures, it is difficult to compare changes to mean scores between groups due to the level of attrition from pre to post intervention. Descriptive results should therefore be treated with caution, and not used to measure the effectiveness of the intervention.

Table 3. Letter Sound Test Raw Scores					
Intervention/Comparison		N	Missing	Mean	Std. Deviation
Intervention (Fairfield)	No. Correct/51 Pre-Intervention	55	2	44.9	9.2
	No. Correct/51 Post-Intervention	31	26	46.7	5.9
Comparison (Blacktown)	No. Correct/51 Pre-Intervention	44	0	46.3	4.5
	No. Correct/51 Post-Intervention	24	20	47.4	3.4

Table 4. Diagnostic Spelling Test – Irregular Words Raw Scores					
Intervention/Comparison		N	Missing	Mean	Std. Deviation
Intervention (Fairfield)	No. Correct/74 Pre-Intervention	56	1	51.1	17.9
	No. Correct/74 Post-Intervention	31	26	54.2	16.7
Comparison (Blacktown)	No. Correct/74 Pre-Intervention	43	1	57.5	12.4
	No. Correct/74 Post-Intervention	22	22	59.0	10.8

The Diagnostic Spelling Test for Irregular Words (DiSTi) tests how well a person can spell irregular words. Proficient spellers use two key processes: translating sounds to letters using sound-letter-rules, and knowledge of spellings of whole words. The DiSTi uses irregular words to test knowledge of whole word spellings. Irregular words are used because they cannot be spelled correctly by following the typical sound-letter rules of English and therefore must be learnt as whole words. Raw scores are calculated for a total correct out of 74. Results for the DiSTi are outlined in table 4. The mean raw score for the DiSTi for the intervention group was 51.1 (*n*=56) at pre-intervention and 54.2 (*n*=31) at post intervention, and for the comparison group was 57.5 (*n*=43) at pre-intervention and 59 (*n=22)* at post-intervention. While both groups saw marginal increases to mean raw scores between pre and post intervention measures, it is difficult to compare changes to mean scores between groups due to the level of attrition from pre to post intervention. Descriptive results should therefore be treated with caution, and not used to measure the effectiveness of the intervention.

Table 5. Depression Anxiety Stress Scales (DASS21)					
Intervention/Comparison		N	Missing	Mean	Std. Deviation
Intervention (Fairfield)	Depression raw score Pre-Intervention	53	4	17.6	12.9
	Depression score Post-Intervention	24	33	14.5	12.9
	Anxiety raw score Pre-Intervention	53	4	16.5	12.3
	Anxiety score raw Post-Intervention	24	33	14.2	12.2
	Stress raw score Pre-Intervention	53	4	19.2	11.4
	Stress score Post-Intervention	24	33	15.9	11.1
Comparison (Blacktown)	Depression raw score Pre-Intervention	14	30	19.6	14.7
	Depression score Post-Intervention	14	30	24.4	12.4
	Anxiety raw score Pre-Intervention	14	30	14.6	10.2
	Anxiety score raw Post-Intervention	14	30	20.9	13.2
	Stress raw score Pre-Intervention	14	30	17.6	10.4
	Stress score Post-Intervention	14	30	19.5	12.1

Stress Category Descriptors
Normal (0-14)
Mild (15-18)
Moderate (19-25)
Severe (26-33)
Extremely severe (34+)

Anxiety Category Descriptors
Normal (0-7)
Mild (8-9)
Moderate (10-14)
Severe (15-19)
Extremely severe (20+)

Depression Category Descriptors
Normal (0-9)
Mild (10-13)
Moderate (14-20)
Severe (21-27)
Extremely severe (28+)

The DASS21 is a quantitative measure of distress along the 3 axes of depression, anxiety and stress. It does not equate to a clinical diagnosis but provides a measure on a continuum of severity for each scale. Category descriptors for each scale are available to greater understand the level of severity. Table 5 outlines mean raw scores for the DASS21 for both groups at pre and post-intervention. Mean scores for the 53 participants in the intervention group at pre intervention were; Depression = 17.6, Anxiety = 16.5 and Stress = 19.2. Mean scores for the remaining 24 participants in the intervention group at post intervention were; Depression = 14.5, Anxiety = 14.2 and Stress = 15.9. Mean scores for the 14 participants in the intervention group at pre intervention were; Depression = 19.6, Anxiety = 14.6 and Stress = 17.6. Mean scores for the remaining 14 participants in the intervention group at post intervention were; Depression = 24.4, Anxiety = 20.9 and Stress = 19.5. It is difficult to compare changes to mean DASS21 scores between groups due to the missing data in the intervention group at post intervention, and the missing data in the comparison group at pre and post intervention. Descriptive results should therefore be treated with caution, and not used to measure the effectiveness of the intervention.

Table 6. Macquarie Oxford Reading Anxiety Test (Adolescent) Raw Scores					
Intervention/Comparison		N	Missing	Mean	Std. Deviation
Intervention (Fairfield)	Generalised anxiety raw score Pre-Intervention	53	4	9.5	9.3
	Generalised anxiety raw score Post-Intervention	25	32	5.5	8.4
	Social anxiety raw score Pre-Intervention	53	4	8.0	6.3
	Social anxiety raw score Post-Intervention	25	32	6.2	6.6
	Physical symptoms raw score Pre-Intervention	53	4	1.5	2.3
	Physical symptoms raw score Post-Intervention	25	32	1.1	1.7
	Total Anxiety raw score Pre-Intervention	53	4	19.1	15.7
	Total Anxiety raw score Post-Intervention	25	32	12.5	14.4
Comparison (Blacktown)	Generalised anxiety raw score Pre-Intervention	14	30	8.4	8.7
	Generalised anxiety raw score Post-Intervention	14	30	8.5	9.9
	Social anxiety raw score Pre-Intervention	14	30	7.5	6.0
	Social anxiety raw score Post-Intervention	14	30	4.9	6.4
	Physical symptoms raw score Pre-Intervention	14	30	1.0	1.4
	Physical symptoms raw score Post-Intervention	14	30	1.3	2.1
	Total Anxiety raw score Pre-Intervention	14	30	16.3	14.5
	Total Anxiety raw score Post-Intervention	14	30	15.8	17.1

Interpreting MORAT Data

Generalised reading anxiety: Scores of 14 and above indicate elevated anxiety in the 86th and above percentile.

Social Reading anxiety: Scores of 14 and above indicate elevated anxiety in the 87th and above percentile.

Physical symptoms: Scores of 3 and above indicate elevated anxiety in the 86th and above percentile.

Total: Scores of 26 and above indicate elevated anxiety in the 84th and above percentile.

The Macquarie Oxford Reading Anxiety Test (MORAT) is designed to detect elevated levels of anxiety related to reading for adolescents. It can be analysed through four categories; Generalised Reading Anxiety, Social Reading Anxiety, Physical Symptoms and Total Anxiety. Results for raw scores are available in table 6. Mean scores for the 53 participants in the intervention group at pre intervention were; Generalised Anxiety = 9.5, Social Anxiety = 8, Physical Symptoms = 1.5, and Total Anxiety = 19.1. Mean scores for the remaining 25 participants in the intervention group at post intervention were; Generalised Anxiety = 5.5, Social Anxiety = 6.2, Physical Symptoms = 1.1, and Total Anxiety = 12.5. Mean scores for the 14 participants in the comparison group at pre intervention were; Generalised Anxiety = 8.4, Social Anxiety = 7.5, Physical Symptoms = 1, and Total Anxiety = 16.3. Mean scores for the remaining 14 participants in the intervention group at post intervention were; Generalised Anxiety = 8.5, Social Anxiety = 4.9, Physical Symptoms = 1.3, and Total Anxiety = 15.8. While both groups predominantly experienced reductions in mean raw scores across categories, it is difficult to compare changes to mean scores between groups. This is due to the level of attrition from pre to post intervention in the intervention group, and the small sample size in the comparison group (impacted by missing data at pre and post-intervention). Descriptive results should therefore be treated with caution, and not used to measure the effectiveness of the intervention.

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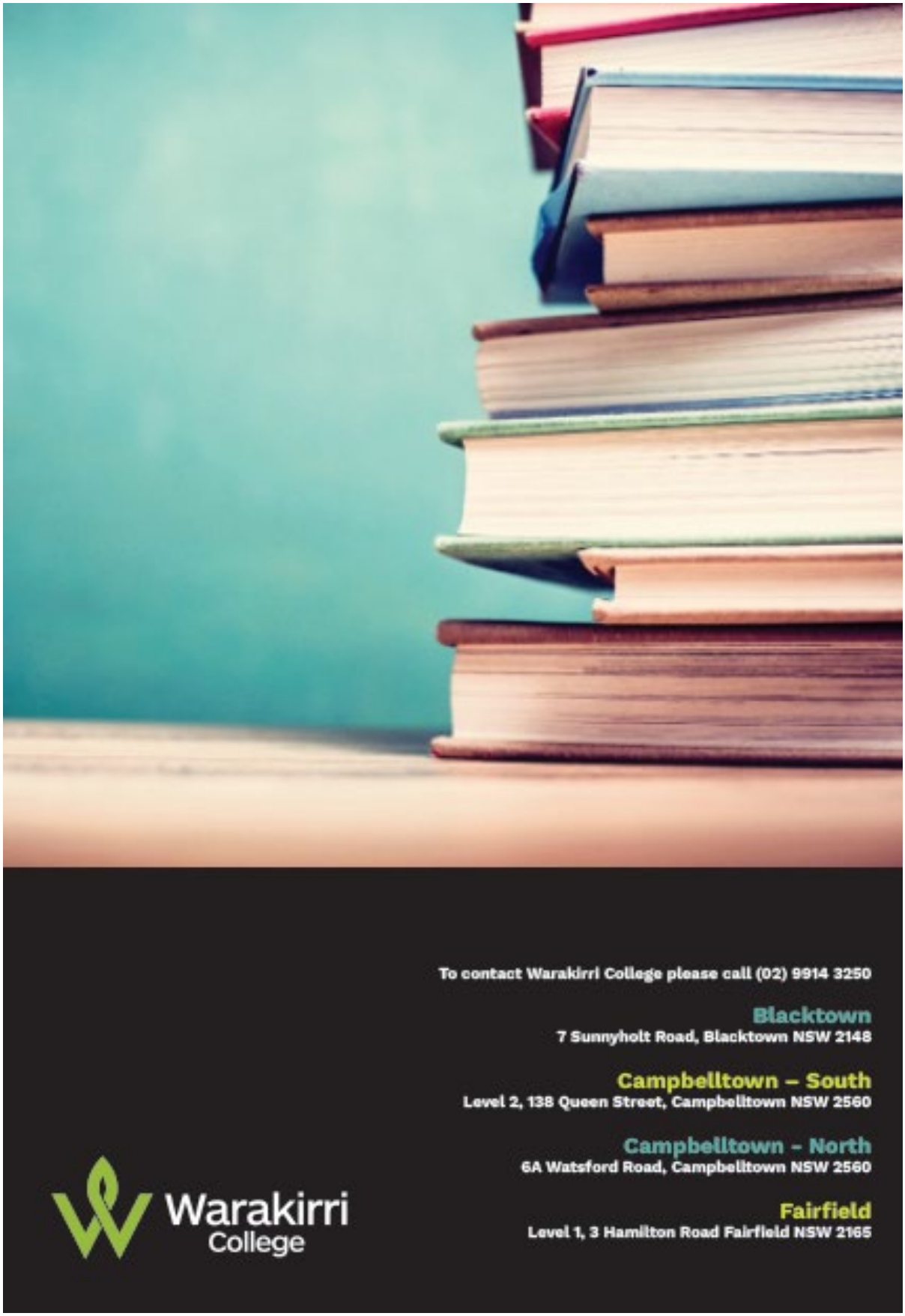
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