

Research summary

Which skills are important for future literacy and numeracy learning?

How the Australian Early Development Census data reveal the building blocks for future reading, writing and numeracy performance

September 2023

This document summarises key findings and recommendations from an analysis of [Australian Early Development Census \(AEDC\)](#) data conducted by the Australian Education Research Organisation (AERO) in 2022.

For full background and explanation of this work, including methodology, please access the [full report](#).

Key findings

AERO's report marks the first time that the skills considered through the Language and Cognitive Skills (school-based) domain in AEDC have been mapped to the Australian Curriculum and National Literacy and Numeracy Learning Progressions (NLNLP), opening up new possibilities for teachers. This new work enables teachers to identify, when an individual child has not yet achieved a skill in that AEDC domain, where that skill is relevant to the curriculum or NLNLP, and decide where next to focus their teaching.

Foundation-year teachers can use the accompanying [skillmap](#) to look forward, and see the intermediate steps to teach, to support the child to reach the next step.

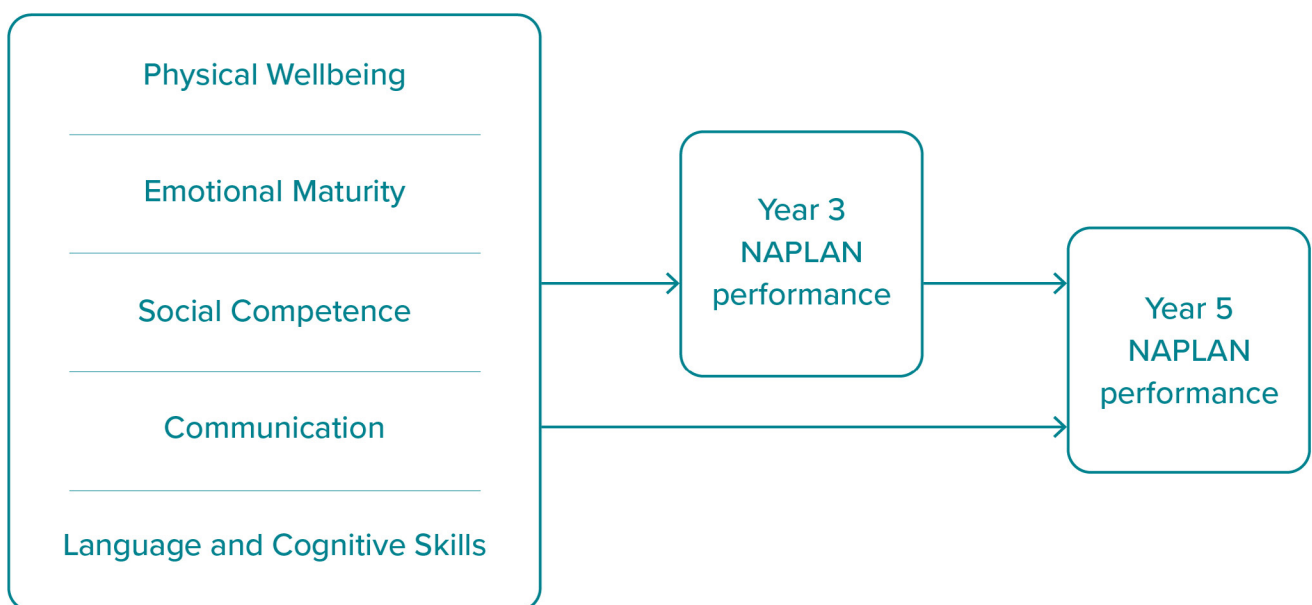
The report also links AEDC data with NAPLAN Reading, Writing and Numeracy data to Year 5, using a national sample, to reveal the building blocks of future academic achievement in schooling.

All 5 domains assessed by the AEDC are related to Year 3 and Year 5 NAPLAN performance

A range of skills and capabilities related to AEDC 5 key developmental domains of Physical Health and Wellbeing, Social Competence, Emotional Maturity, Language and Cognitive Skills (school-based), and Communication Skills and General Knowledge¹ contribute to children's literacy and numeracy success in primary school.

The skills and capabilities that children can demonstrate at the beginning of school significantly predict their level of academic achievement 3 years later. Children's performance in Year 5 NAPLAN can be traced not only to their achievement levels in Year 3, but also to independent effects from the skills and capabilities they were able to demonstrate, 5 years earlier, at the start of school. These key points are illustrated in Figure 1.

Figure 1: Skills measured at the start of full-time school can predict later NAPLAN results



The analysis sheds light in a new way on the continuing importance of early skills development as a child grows, and the ways in which these skills and capabilities set children up for acquiring new skills in the future.

¹ This report acknowledges that the AEDC full domain names are Physical Health and Wellbeing, Social Competence, Emotional Maturity, Language and Cognitive Skills (school-based), Communication Skills and General Knowledge. Where possible we have used the full names, however there are some instances in the report where the shortened version 'Language and Cognitive Skills' and 'Communication' were used for editorial, graphical and syntactical purposes.

It was found that:

1. Communication Skills and General Knowledge and Language and Cognitive Skills at the start of full-time school predict academic achievement in Year 3, which in turn predicts achievement in Year 5, and
2. Communication Skills and General Knowledge and Language and Cognitive Skills have an effect directly on Year 5 outcomes, which is additional to the effect that runs through Year 3 to Year 5 achievement.

This shows that early skills are important both for setting a child up for the next step in their learning, and for providing a foundation that supports the development of much later pieces of new learning.

Cognitive and Language Skills have a clear, direct, and positive impact on later academic achievement

Of the 5 domains tested by the AEDC, Language and Cognitive Skills had the strongest positive association with children's academic achievement in Year 3, with additional and sustained impact into Year 5. Communication Skills and General Knowledge had the second strongest impact on later academic achievement, having a direct but smaller effect on Year 3 and indirect impact on Year 5 results.

When looking at 4 sub-domains within the Language and Cognitive domain (Basic Literacy, Advanced Literacy, Basic Numeracy, and Interest in Literacy, Numeracy and Memory), it was shown that Basic Literacy and Basic Numeracy were of primary importance for predicting Year 3 results.

NAPLAN performance in Year 3 is correlated with 8 early Language and Cognitive Skills

A set of 8 skills from the Language and Cognitive Skills domain were shown to have a strong correlation with NAPLAN performance in Year 3 across Numeracy, Reading and Writing.

Our analysis showed that children entering primary school who had acquired these skills and capabilities were more likely to have future academic success throughout the primary years.

These 8 skills were: Recognise numbers 1 to 10; Read complex words; Count to 20; Remember things easily; Attach sounds to letters; Use one-to-one correspondence; Write his/her own name in English; Aware of writing directions in English.

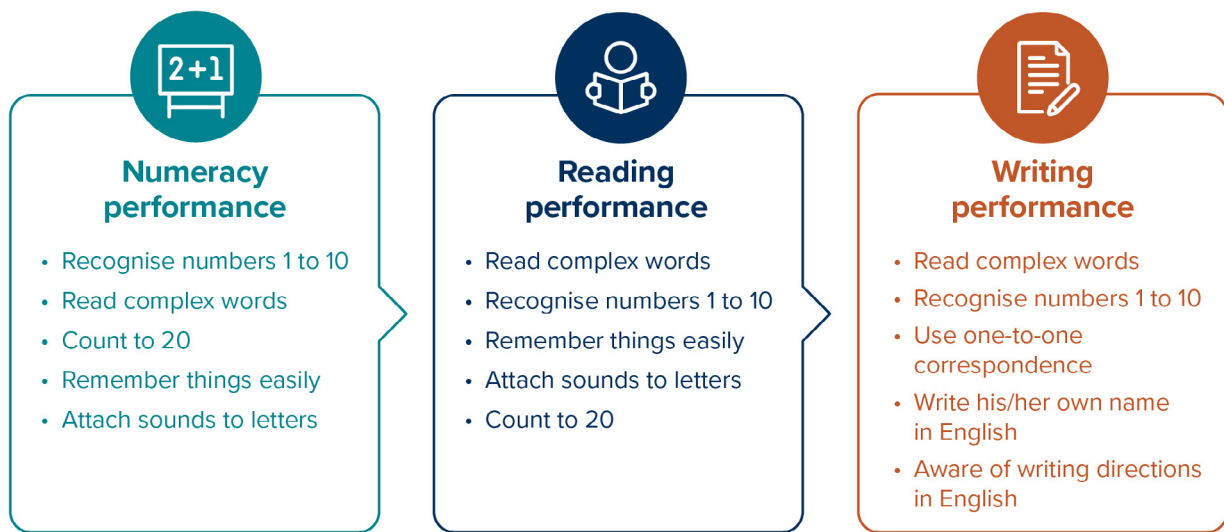
The skills that predict later learning are not necessarily the hardest to achieve, highlighting the importance of foundational skills for future learning

Of the 26 AEDC Language and Cognitive Skills, the top 5 found to have the strongest correlation with high NAPLAN performance were not always the most difficult skills. This finding highlights 2 things:

1. The importance of the foundational skills for future learning success
2. The fact that not all children start school with these foundational skills.

Both of these findings are relevant for teachers as they work to establish and further develop children's foundational skills. These findings are shown in [Figure 2](#).

Figure 2: Strongest indicators of future Numeracy, Reading and Writing performance

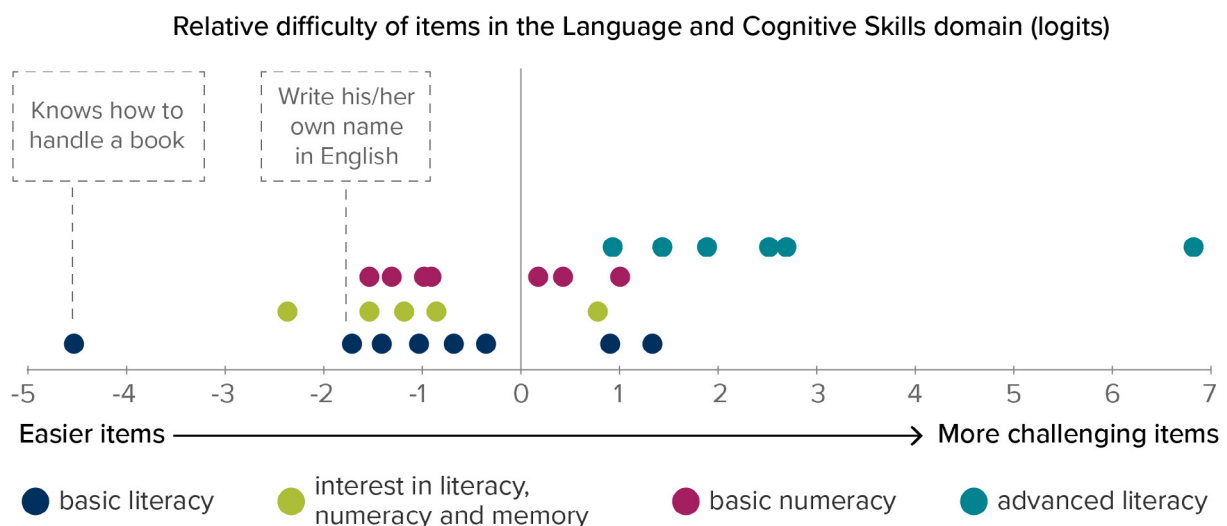


Moving along trajectories of skill development involves leaps between key skills

Helping children move from foundational skills towards more advanced skills is important for later achievement. However, the analysis conducted here shows that there are bigger gaps in difficulty between some literacy and numeracy skills compared to others. The analysis of the AEDC items highlights some significant leaps in developmental skills, which can be seen in Figure 3.

For instance, when we look at Figure 3, we can see a sizeable gap between the least advanced indicator (or dot) of the Basic Literacy skill, which is ‘Knows how to handle a book’, and the next indicator, ‘Write his/her own name in English’. This suggests that there is a big developmental leap for children starting with the basic literacy skill of ‘handling a book’ and then progressing to the second milestone of being able to write their name.

Figure 3: Item difficulty distribution for the Language and Cognitive Skills AEDC domain



The reason that this information is relevant is because it provides evidence relating to which early skills children find easier or more difficult. It also demonstrates where in their learning journey they might need additional support to bridge a large gap between skills and capabilities.

Our analysis showed that, apart from a small number of exceptions,² the order in which children acquire foundational skills identified by the AEDC follows the same pattern identified by the curriculum and the NLNLP. This alignment may be useful for teachers to more easily identify the next step in a child's learning. If a child cannot yet demonstrate a skill measured in the AEDC, the teacher may locate the skill within the Australian Curriculum and NLNLP to consider the next step teaching for the child.

Teachers and school leaders may use [AERO's interactive Language and Cognitive Skillmap](#) to locate AEDC skills within the Australian Curriculum and the NLNLP.

Opportunity for more granular understanding of advanced literacy and numeracy skills on entry to primary school

The analysis found that the skills and capabilities within the AEDC Language and Cognitive Skills domain do not distinguish high and low levels of development as well as those in the other domains of the AEDC. This finding is important, as further analysis highlights that, for children at the high end of the Language and Cognitive developmental scale, the AEDC does not provide a granular insight into more advanced literacy and numeracy skills.

The AEDC was not designed for the purpose of identifying children at the high end of early childhood skills development. However, there is opportunity to provide greater understanding of how to support future literacy and numeracy achievement for children who start school with comparatively higher levels of literacy and numeracy development.

Background

The early years of a child's life, from birth to age 8, are a crucial period for learning and development. High-quality early childhood education and care (ECEC), and continuity from ECEC into school, provide children with a strong foundation for lifelong learning. Understanding how language and cognitive skills develop during this period of a child's life can help policymakers and education practitioners optimise the support offered to children. This research has sought to understand how children's learning and development progresses in the early years of school by examining the skills and capabilities children have on entry to school and how those relate to later literacy and numeracy achievement.

The study analyses the data of 1,927 children who started full-time school in Australia in 2009, drawn from the [Australian Early Development Census \(AEDC\)](#) and [National Assessment Program – Literacy and Numeracy \(NAPLAN\)](#). The AEDC is a triennial national census, in which teachers report on children's development during their first year of full-time school against 5 key developmental domains: Physical Health and Wellbeing, Social Competence, Emotional Maturity, Language and Cognitive Skills (school-based), and Communication Skills and General Knowledge. NAPLAN is a national annual assessment of literacy and numeracy skills, undertaken in Years 3, 5, 7 and 9.

² 'interested in reading' and 'shows awareness of rhyming words' were found to be more difficult than other items placed as more basic or foundational skills in the NLNLP.

Implications

The findings of this research have implications for both teachers and policymakers.

- Given that early skills development, particularly in Language and Cognitive Skills and in Communication Skills and General Knowledge, has been found to significantly influence a child's schooling achievement, there is potential for a greater focus on targeting these skills in the early years of schooling.
- It has long been known that children's learning and development in the early years is critical; in particular, the development of the 'whole child' is important to build language, literacy and social-emotional skills and capabilities. Developing children's skills and capabilities in Social Competence, Emotional Maturity and Physical Health and Wellbeing is also important. These skills are associated with children's development and mastering of Language and Cognition and Communication Skills and General Knowledge, which in turn directly impacts later literacy and numeracy achievement.

Next steps

Based on our research findings, AERO has developed an [interactive practical guide](#) for early primary teachers and school leaders to:

1. Understand the skills with the strongest correlation to successful Year 3 NAPLAN performance in Numeracy, Reading and Writing; and
2. Be able to locate those skills within the Australian Curriculum (AC) and the National Literacy and Numeracy Learning Progressions (NLNLP).