Scan

The journal for educators

NSW GOVERNMENT

40 years of Scan

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Scan is a leading refereed journal, published quarterly between February and November. Scan aims to bring innovative change to the lives and learning of contemporary educators and students. Through Scan, teachers' practice is informed by critical engagement with peer-reviewed research that drives improved school and student outcomes across NSW, Australia and the world. Scan aims to leave teachers inspired, equipped and empowered, and students prepared.
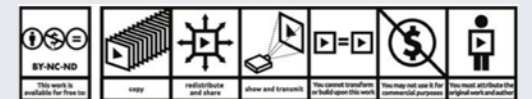
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In the rear-view mirror:
40 years of Scan

As Scan celebrates its 40-year anniversary, the editorial team launches a new online archive and reflects on the journal's evolution.

> **With each passing moment, the present becomes the past.**

The value of archives

The International Council on Archives (2016) defines archives as 'the documentary by-product of human activity retained for their long-term value' (para. 1). In providing this broad definition, the ICA throws open the range of analogic and digital media through which archives can be stored and delivered: from the most advanced technology to ancient rock art (Rademaker et al., 2022).

As well as broadening the scope of archival material, the seeming simplicity of the ICA's definition reduces the emphasis on archives as historical records or truthful accounts of human activity. Instead, the definition moves the focus to the consideration of archives through a hermeneutic lens as contextually located records produced from the perspective of their authors. In adopting this stance, readers of the Scan archive will gain insight into the development of the corporate memory of the educational community.

Educational insight gained from reading archival material can be used in a variety of ways. The preserved diversity of ideas and practice may underpin research and action that is dependent on a long view of developments in education. As well, the archive can provide background information to inform debate on contemporary and future educational priorities. Scan archival material can also provide elective professional development for educators who wish to expand their pedagogical toolkits. Used in these ways, 'archives are essential as much for our past as for our future' (National Archives UK, 2013).

Leading and responding to change: the Scan journey

First published in 1982 by the Library Services Division of the NSW Department of Education, Scan has consistently maintained its role of informing educators over the past 40 years. The archive will attest to the way Scan has morphed from a printed collection of carefully evaluated curriculum-based resources, through to a leading peer-reviewed publication – initially obtainable only by subscription, and now available as an open access online journal for educators in NSW and beyond.

Content

After its initial success as a journal that alerted educators to quality resources to support teaching across the curriculum, the second decade of Scan saw the establishment of a Scan Editorial Committee (1992) and there was a move to embrace academic mentors, such as Ross Todd, offering 'new directions for teacher-librarianship' (Scan, 11(4), p 2). Scan expanded to include a range of articles on educational theory and practice that supported curriculum and curriculum changes in primary and secondary schools in NSW.

Research

The first Scan issue of 1996 saw formalised links with academia and the inclusion of a research strand refereed by Dr Ross J. Todd (Department of Information Studies at the University of Technology). Scan has continued to include peer-reviewed research from academics who generously share their time and expertise. In addition, key educationalists including Len Unsworth and Jon Callow and, more recently, John Hattie and Pasi Sahlberg have contributed articles aimed at informing and inspiring teachers about future directions in education.

Best practice

Over the years, academics, education consultants, teachers and teacher-librarians in NSW and beyond have shared their experience, expertise and creativity by contributing a wide range of articles to foster best practice in learning and teaching.

As access to digital technology expanded, Scan initiated valuable programs for integrating technology in the classroom. Book Raps and Web Quests, for example, offered inspiring extensions to class work that enabled teachers and students to discover the educational attributes of ICT.

In addition, forward-thinking programs, such as the quality teaching model, Lighthouse Schools Project and Information Fluency Framework, have been spearheaded and supported by Scan.

> **Scan has been a steady and consistent flagship for the NSW Department of Education … casting a light towards the future [and] illuminating the path for educationalists and students.**

Writers and illustrators

With its strong focus on literacy and quality literature for children and young adults, Scan has featured the work of popular and emerging Australian writers and illustrators. Talented authors for children and young adults, including Melina Marchetta, John Marsden, Shaun Tan, Boori Monty Pryor, Meme McDonald, Libby Gleeson, Matt Ottley, James Moloney, Ursula Dubosarsky and many other notable creators have featured in articles offering inspiration for teachers and students throughout the state.

Over the past 4 decades, Scan has maintained high-quality content aimed at informing teacher practice through critical engagement with peer-reviewed research and an array of curriculum-related articles aimed to inspire, equip and empower the teachers and students of NSW and beyond. Scan has been a steady and consistent flagship for the NSW Department of Education and, as its more recent lighthouse logo suggests, a resource that by casting a light towards the future is illuminating the path for educationalists and students.

It is with gratitude that we look back on the generous contributions made by all those involved in the publication of Scan and those who have provided the invaluable content, which can be accessed through the newly created Scan archive. Four articles from the last decade that have fuelled and framed subsequent educational thought and practice remind us of the 'hidden treasures' that dwell within the Scan archive.

The [most-viewed article (PDF 7.4 MB)](#) in the Scan archive has been Lee-Anne Collins' (2017) description of the [quality teaching rounds (QTR) project](#), in which the [department's quality teaching model](#) was implemented using [quality teaching rounds](#) (QTR). The QTR approach taken in the project comprised triads of teachers working as professional learning communities (PLCs) to reflect on and discuss their classroom practice. While Collins notes that the notion of teachers teaching teachers is not new, the [QTR project findings](#) demonstrate 'the value of quality teaching rounds in improving teaching quality, teacher morale, and teaching cultures across a range of schools and classroom settings in diverse communities' (p v). Given the quality teaching model remains the NSW Department of Education's pedagogical model of choice, Collins' article is well worth revisiting.

At the beginning of this article about Scan's journey, the value of archival materials as a window into the life and times in which they were recorded was noted, as was the value of such material to be viewed longitudinally to provide insight into educational developments over time. For these reasons, Kathy Rushton's (2010) article, [The culture of silence: Why local stories matter (PDF 2.9 MB)](#), is worth revisiting to provide a refence point for reflection on our progress to acknowledge Aboriginal voices in our classrooms.

While the abstract of Rushton's article focuses on the importance of local stories in the teaching of reading in the early years, the article itself takes a much broader view on the issue of the exclusion and silencing of Aboriginal voices in schools (p 27). Rushton notes that, at the time, local stories told at school, 'no longer belong to or reflect the local community' (p 26) and gives consideration as to the reasons why. Rushton's reading project was an attempt to address this issue at a very local level by acknowledging emerging Aboriginal voices 'with new stories which reflect their lives in contemporary settings' (p 29). Twelve years later and with Aboriginal voices being heard in our classrooms, the question contemporary readers who revisit Rushton's article will be left with is not so much whether previously silent Aboriginal voices are now being heard, but rather, how loudly are they being heard and by whom?

Moving from the local focus of Rushton's article, [Julie Lindsay (2017, PDF 4.4 MB)](#) encourages readers to provide 'rich global, cultural and life-changing experiences to their students' (p 27) by developing global relationships using ICT. Lindsay notes, however, that making global connections requires a shift in practice by teachers and a willingness to modify and adapt curriculum. To assist teachers in this endeavour, Lindsay offers research-based pedagogical objectives and an instructional framework to guide the development of global connections. As well, Lindsay considers the theory and practice of connectivism that underpin the paradigm shift required to facilitate collaborative learning and digital fluency.

Considering the United Nations' call for global action through the [Sustainable Development Goals](#) and the OECD's call for the facilitation of [global competence in young people (PDF 3.4 MB)](#), there's valuable insight to be gained by educators through a re-reading of Lindsay's article, [Connecting beyond the classroom: Move from local to global learning modes (PDF 4.4 MB)](#).

Originally, Scan was published for an audience of teacher librarians and those working in Australian school libraries. In the last decade, however, Scan's target audience has expanded, and today's readership includes K-12 teachers, teacher librarians, technology integrators, principals and academics – primarily in Australia but also further afield. This wider audience of readers has been achieved through the broadened scope of Scan content to include 'all things educational,' and it is this notion of 'broadening' regarding the role of school libraries that provides the subject of our fourth recommended article from the Scan archive: Dr Ross Todd's (2012) [School libraries as pedagogical centres (PDF 6.3 MB)](#).

The late Dr Todd, ardent supporter of Scan and a member of its Editorial Board, was a well-respected driver of change in Australian school libraries. To this end, he recognised a decade ago, the need for school libraries to change the way in which they interact with students and staff. To maintain relevance, notes Todd, the school library of the future, regardless of its title, should be focused on a pedagogical rather than informational function, and its teacher librarians need to be seen as co-teachers and inquiry learning specialists.

Importantly, and tying school libraries to Julie Lindsay's article 5 years later, Todd notes the role that school libraries can play as a 'gateway to effectively, ethically, and safely participating in a globalised digital world' (p 34).

Digitising 40 years of Scan

To celebrate Scan's 40th anniversary, our editorial team has been eagerly preparing a new online archive. The digitisation project has been a labour of love, 18 months in the making. With substantial support from Euan Schaewel in the SCIS team, over 200 issues (and tens of thousands of pages!) have been scanned, cropped, cleaned-up and resized, with metadata applied. Euan has patiently rescanned pages and wrestled with scanner settings to balance the competing demands of image quality and file size. When gaps were found in our physical collection, he tracked down missing issues at the State Library of NSW and various tertiary libraries. The digitisation project couldn't have happened without Euan's meticulous planning, persistence, skill and good humour.

We're currently in the process of finalising the scanned PDFs and progressively uploading them to the [Past issues](#) section of our website. The most recent issues are now available via [Volume 31 to 40 (2012 to 2021)](#) and [2022](#). The complete archive, divided into separate decades, will be available early in the new year:

- [Volume 1 to 10 (1982-1991)](#)
- [Volume 11 to 20 (1992-2001)](#) } under construction
- [Volume 21 to 30 (2002-2011)](#)
- [Volume 31 to 40 (2012-2021)](#)

As much as possible, the digital issues available on the website have been resized for the web. However, we've also retained high-resolution originals, which will be offered to the State Library of NSW, the National Library of Australia, and research database providers under open access conditions. If you would like a high-resolution copy of a specific issue, keep an eye on these sources or contact us at [Editor.Scan@det.nsw.edu.au](#) with the publication details. These copies are a little crisper, particularly the images.

> The most recent issues are now available via **Volume 31 to 40 (2012 to 2021)** and **2022**. The complete archive, divided into separate decades, will be available early in the new year

Volume 31 to 40

2012

➤ • Contents: [Volume 31](#)
- [Volume 31, Issue 1 (PDF 5.7 MB)](#)
- [Volume 31, Issue 2 (PDF 4.9 MB)](#)
- [Volume 31, Issue 3 (PDF 6.3 MB)](#)
- [Volume 31, Issue 4 (PDF 5.7 MB)](#)

2013

➤ • Contents: [Volume 32](#)
- [Volume 32, Issue 1 (PDF 5.5 MB)](#)
- [Volume 32, Issue 2 (PDF 5.2 MB)](#)
- [Volume 32, Issue 3 (PDF 5.5 MB)](#)

Past issues from [2012 to 2021](#) are now available as PDF files via the Scan website. Use the contents pages to see an overview of all articles published within each issue.

Navigating the online archive

There are multiple ways of accessing content within Scan's [online archive](#). These include browsing by decade, using curated lists, and searching.

Browse by decade

As mentioned, issues are organised by decade in the online archive. For example, [Volume 31 to 40 (2012 to 2021)](#). To navigate to a specific issue, simply select the relevant **decade** from the [Past issues](#) area, then scroll through the list to locate the desired issue. Alternatively, use the linked **contents** pages (available for each volume/year in the list) to see an overview of all articles available within each issue. (For example, [Volume 36 2017](#).) For convenience, issues can be downloaded from both the decade page and the contents page.

Browse By

Browse by decade from the Past issues page or view lists of research articles and SPaRKs.

Browse research and Shared Practice and Resource Kits (SPaRKs)

The Peer-reviewed research page currently contains a complete list of all research articles published in Scan from 2011 to the present. Similarly, Shared Practice and Resource Kits (SPaRKs) offers a selection of SPaRKs and Australian Curriculum springboards published since 2015. Additional springboards can be found by searching for 'springboard' while filtering for 'documents'.

Search

Scan's archive can also be explored via the website's search facility or a search engine. However, bear in mind that the website's facility searches across **all** the department's pages. Filtering by 'document' generally helps, since past issues are available in PDF format. Select 'All' for 'Learning area' and 'Year level'.

In some cases, a better option is to interrogate the online archive via a search engine. For example, try a Google Advanced Search for **Scan** plus your **search terms**, limiting your results by format (**PDF**) and by site (**https://education.nsw.gov.au**). For instance, a search for Scan articles about the Information Fluency Framework might look like:

> **Scan**, "Information Fluency Framework",
> **site**:https://education.nsw.gov.au, **filetype**:PDF

Feedback welcome

Found a glitch? Having trouble locating an article you'd previously bookmarked? Got feedback? We'd love to hear from you! Email us at Editor.Scan@det.nsw.edu.au for help or to share your thoughts. As always, we value your feedback, which informs our ongoing work on the archive and shapes our next chapter.

Update your bookmarks!

Links to some articles have changed. Use a Google Advanced Search (see search tips) to find their new location on the website or browse by decade if you know the issue.

To get you started, here are new links to some of our most popular articles, research and SPaRKs.

Articles

- Quality teaching in our schools – Lee-Anne Collins in *Scan 36(4)*, pp 29-33 (PDF 7.4 MB)
- Cultural competency: Reconciliation in action – Alanna Raymond in *Scan 39(9)*, pp 9-14 (PDF 1.1 MB)
- Flexible learning spaces – Julie Grazotis in *Scan 33(4)*, pp 14-17 (PDF 7.6 MB)
- Book Bento Boxes: Creative reading response – Dr Jennie Bales and Louise Saint-John in *Scan 39(3)*, pp 2-9 (PDF 2.6 MB)
- Bounce Back: A positive education approach – Toni Noble and Helen McGrath in *Scan 37(3)*, pp 11-17 (PDF 2.0 MB)
- Interoception as a proactive tool to decrease challenging behaviour – Dr Emma Goodall in *Scan 39(1)*, pp 20-24 (PDF 1.4 MB)
- Representation in English – James Hoffman in *Scan 36(3)*, pp 4-13 (PDF 4.2 MB)
- Examining persuasive techniques using visual and digital texts – Jennifer Asha in *Scan 39(1)*, pp 15-19 (PDF 1.4 MB)
- Design thinking across the curriculum – Tahlea Taylor in *Scan 39(2)*, pp 8-13 (PDF 1.6 MB)
- Teaching visual grammar in the context of digital texts – Jennifer Asha in *Scan 37(7)*, pp 1-4 (PDF 4.1 MB)
- Teaching mathematics through picture books – Catherine Attard in *Scan 36(4)*, pp 6-9 (PDF 7.4 MB)
- Challenges and rewards of a collaborative teaching environment – Narelle Walton and Kieran Sly in *Scan 37(2)*, pp 1-7 (PDF 1.9 MB)
- Developing EAL/D student writing practices in a digital age: A focus on informative text types – Sussan Allaou in *Scan 39(7)*, pp 9-15 (PDF 1.7 MB)

Research

- Let's look at spelling – Dr Lorraine Beveridge and Jane Lieschke in *Scan 38(1)*, pp 2-15 (PDF 2.3 MB)
- Connecting beyond the classroom – Move from local to global learning modes – Julie Lindsay in *Scan 36(2)*, pp 24-38 (PDF 4.4 MB)
- 'It's all lighted up because this is a happy ending.' Beginning critical literacy young – young children's responses when reading image and text – Alicia Rankine and Jon Callow in *Scan 36(4)*, pp 46-54 (PDF 7.4 MB)
- Innovative teaching and learning: From research to practice. Part 1 – Dr Kylie Shaw, Dr Kathryn Holmes, Greg Preston, Max Smith and Emeritus Professor Sid Bourke in *Scan 33(2)*, pp 19-28 (PDF 4.9 MB)

SPaRKs

- Lion: A Long Way Home – Kelly Hodkinson in *Scan 36(2)*, pp 42-46 (PDF 4.4 MB)
- The Bone Sparrow – Kelly Hodkinson in *Scan 36(3)*, pp 50-54 (PDF 4.2 MB)
- My Two Blankets – Mira Najdovska and Kelly Hodkinson in *Scan 36(1)*, pp 50-53 (PDF 3.7 MB)

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Todd, R. J. (2012). School libraries as pedagogical centres (PDF 6.3 MB). *Scan, 31*(3), 27-36.

Understanding equity in education.
Part 2: What can we do?

Dr Pasi Sahlberg
Professor of Education, Southern Cross University

In his second article in a two-part series, Dr Pasi Sahlberg considers the power of family background on student learning and suggests practical ways that schools can strengthen equity of education.

Ever since students' performance in school has been measured by standardised assessments, one question has trumped all others: What explains variability in these tests?

The question really is, why are some students more successful in school than other students? Some parents think that their children don't work hard enough for success in school. There are authorities who think that students' success in school depends directly on how good or bad the teachers are. Students may believe that their learning outcomes vary because some students are simply smarter learners.

Whatever the answer is, our aim must be clear. In the Alice Springs (Mparntwe) Education Declaration,

education ministers have promised to improve learning outcomes of each and every student in Australia. This means that we need to do more to strengthen equity in education.

We need better data to evaluate equity

Understanding what educational equity looks like in practice requires reliable information about individual students' learning outcomes and some background data about these students' life circumstances. As it is now, there is systematic and comparable data in Australia about student achievement in literacy and numeracy, and also in scientific literacy via international student assessments. Because NAPLAN data don't include enough information about students' family backgrounds, not much can be said about the equity of these outcomes.

The tests like NAPLAN that are used to evaluate student achievement must be sound measures of what students know and are able to do. When individual student achievement is linked to information about the student's family background (or socio-economic status), basic indexes of equity of education outcomes can be created. Measuring equity of education outcomes requires estimating the strength of the relationship between students' family background and their respective tests scores.

Good tests that measure student achievement should be capable of providing score comparisons between different students. The more these outcomes are associated with students' family background, the less equitable education becomes. As we saw in Part 1 (PDF 6.9 MB), equity in education requires that students in different social groups have similar learning outcomes and that the range of these outcomes is similar across different social groups.

> **Good tests that measure student achievement should be capable of providing score comparisons between different students. The more these outcomes are associated with students' family background, the less equitable education becomes.**

The power of family background

Over the past 50 years, research has shown us that family background is a far more important factor in explaining student learning than people often think. Stanford University professor Edward Haertel (2013) concluded that outside of school factors account for about 60% of the variability in students' test scores in school. David Berliner (2014) and many other scholars have come to similar conclusions.

An important consequence of this conclusion is that – since school-specific factors account for about 20% of the variability in students' test results (and another 20% of the total variability remains unexplained) – the best opportunities for improving quality and equity of education outcomes are found in system-level conditions (American Statistical Association, 2014). Most importantly, schools alone can't fix existing education inequities in our schools.

Learning happens everywhere, not only in schools. Hobbies, recreational activities, civic engagement, and community learning settings are examples of out of school places to learn. Digital technologies at home offer another way to learn something that previously was taught in school. During school age, children spend about 15% of their time in school. School is an important place to learn but it is not the only place learning can happen.

What can we do?

Make no mistake, schools can do a lot to help all students thrive in school. Here is something to get started with equity improvement.

First, make sure that teachers, parents and students have a similar understanding of what equity in education means. For many people, it is synonymous with equality of educational opportunities, which can lead to misconceptions about equity (see Part 1). Then, help everyone to realise why equity matters, not just for some students but for all of them. Evidence suggests that when equity of outcomes becomes stronger, the overall quality of education also improves. Finally, avoid using equity as a fashionable term in school improvement plans without understandable meaning. Instead, turn it into concrete operations that includes teachers,

students, parents and the community so that progress in equity can be monitored and evaluated.

When everyone understands better what equity means, why it matters, and what it could look like, go and revisit – and, if necessary, redesign – structures or operations in your school to positively influence equity.

Here are three examples:

1. Adopt a whole child approach to education

The key idea in a whole child approach to education is to change the focus of education from narrowly defined academic achievement of literacy and numeracy to one that values broader learning and long-term development through arts, music, physical activity, and play. A whole child approach assumes that students' education outcomes depend on their access to rich and safe learning environments in school, at home and in the community.

A whole child approach to teaching and learning can fundamentally change students' educational experiences. In practice, this means redesigning curriculum, instruction, and assessments so that they support the needs and interests of every child. Strengthening positive relationships within schools and enhancing communication between school and the community will further strengthen students' belonging, wellbeing and learning in school.

> **… turn [equity] into concrete operations that includes teachers, students, parents and the community so that progress in equity can be monitored and evaluated.**
>
> **When everyone understands better what equity means, why it matters, and what it could look like, go and revisit – and, if necessary, redesign – structures or operations in your school to positively influence equity.**

> **A whole child approach to teaching and learning can fundamentally change students' educational experiences. In practice, this means redesigning curriculum, instruction, and assessments so that they support the needs and interests of every child.**

2. Provide active early intervention to support students with additional learning needs

Students come to school with different expectations and needs. Most schools have set up different services to help students by addressing these needs. Some of these needs are directly educational, some may be linked to students' wellbeing and health. The earlier the intervention happens, the better its impact will be on children and equity of education.

Those schools that have different early intervention mechanisms in place often monitor and assess individual students' health, wellbeing and learning during their schooling. Regular health checks, daily meals, regular recess during school days, and wellbeing teams are examples of structures in schools that wish to address educational equities through early intervention and targeted support to students. Close collaboration between teachers and parents is important in understanding what different students need to succeed in school.

3. Tell students that it takes more than grit to succeed in school

> How often do we convince our students that success in school requires hard work? Contemporary individual development trends suggest that intelligence is not fixed or inherited and that through grit and 'growth mindset' it can be grown like a muscle. If students would only work harder, would that be a way to more equitable education? Not so fast, research suggests.
>
> A study conducted at Harvard University (Gonzalez et al., 2022) reveals that it is not enough to believe that grit and hard work would lead to success in an increasingly unequal

world. The study suggests that, instead, we need candid conversations with children and young people about how social barriers in many students' lives can block success, and how they can break down some of these barriers. Making students believe that it is only hard work that leads to success may lead them to think that not making the mark is a consequence of not trying hard enough. That may make already unequal situations even worse.

Ashely Whillans explained this in an interview to Michael Blanding (2022):

> **If you are learning that effort is the way to achieve success, and you see people who have less, you might assume they didn't work hard enough – as opposed to recognizing the systems and institutions we know can stand in the way.**

We should help students to understand this reality. Parents and teachers ought to explain that students have different conditions and opportunities to learn

> **Evidence suggests that when equity of outcomes becomes stronger, the overall quality of education also improves.**

at home, and that the starting point to learning at school is not the same for all.

Small steps can pave the way

Some say that schools change slowly. This is true if we try to do that alone. Teachers, principals, parents, policymakers, community leaders and students together can do better than we do now. But it takes all of us together to work for that better and fairer future by implementing small but meaningful improvements in our ingrained systems (Gonski Institute for Education, 2020).

As an African proverb says, 'If you think you are too small to make a difference, you haven't spent the night with a mosquito'.

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Fostering student equity and excellence through oracy development:
An opportunity for Australian schools

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Dr Sue Ollerhead draws on research from Australia and overseas to argue the significance of explicitly teaching oracy across the school curriculum.

Throughout the Australian education system, literacy and numeracy are stridently emphasised as key building blocks for children's educational success, their socialisation and future employment. Not only are literacy and numeracy two of the seven general capabilities included in the Foundation to Year 10 Australian Curriculum, but they are also judiciously measured each year as part of the National Assessment Program for Literacy and Numeracy (NAPLAN). However, starkly absent from the public discourse around students' fundamental learning capabilities is any mention of 'oracy', a term coined by Andrew Wilkinson in 1965 to denote general proficiency in speaking and listening. The relative invisibility of oracy in Australian schools sits at odds with the fact that the ability to talk fluently and effectively is an essential ingredient for success both within the school and beyond. Crucially, oral language is the driving force in shaping children's social, linguistic and cultural identities. According to Áine Cregan:

> **Oral language is the child's first, most important, and most frequently used structured medium of communication. It is the primary means through which each individual child will be enabled to structure, to evaluate, to describe and to control his/her experience. In addition, and most significantly, oral language is the primary mediator of culture, the way in which children locate themselves in the world and define themselves with it and within it (Cregan, 1998, cited in Archer, Cregan, McGough & Shiel, 2012, p 7).**

Over the past decade, research into students' use of quality talk for both learning and socialisation has proliferated (Alexander, 2020; Dawes, 2012; Howe, 2010; Mercer, Warwick & Ahmed, 2017; Mercer, Wegerif & Major, 2019). Combined findings from the fields of neuroscience, psychology, sociolinguistics and education prove that language is an integrated function of our social brains and is therefore essential for thinking and reasoning (Goswami, 2009; Mercer, 2013). However, we all have to learn how to use language **well** across a range of contexts, both formal and informal, and students are only able to do this through interaction with others. As with other capabilities, such as literacy and numeracy, children start school with varying levels of confidence and experience with spoken language. Mercer, Warwick and Ahmed (2017) view oracy as comprising a range of diverse skills, only some of which may be modelled and nurtured during students' out of school lives. By the time they reach secondary school, some students may have sufficient social communication skills to engage with their peers, but insufficiently developed spoken language to participate in a debate or present their ideas persuasively to an audience. Some students may possess a far greater range of vocabulary than others. This variation in students' quality of experience with spoken language can affect their life chances and have an impact on their ability to participate equitably in school learning experiences.

Despite the overriding importance of oracy, it has never been taught explicitly in the Australian school curriculum, presumably because talking is considered to be such an innate ability that it does not need explicit attention. There is a tendency to assume that children have adequate verbal skills because they can already speak when they arrive at school, while not yet being able to read, write or do maths. While formal schooling presents children with a second chance to develop their oracy skills, many teachers remain unclear about what the underlying proficiencies of oracy are, and how best to teach and assess them (Mercer et al., 2017). As a result, oracy tends to be measured in terms of presentational skills such as recited monologues or book reports, leaving the development of many of the skills that underpin a more holistic understanding of oracy proficiency unaddressed.

It is in response to this gap in teacher knowledge and pedagogy that the UK-based Voice 21 Cambridge Oracy Assessment Project (Mercer et al., 2017) developed an explicit curriculum for teaching the several types of skills needed for using spoken language proficiently, along with an accompanying assessment tool called the Oracy Skills Framework (Mercer et al., 2017). The framework is holistic and assesses four core areas of generalised oracy proficiency – physical, linguistic, cognitive and emotional – that can be applied across different learning areas. The physical strand focuses on body position and posture, the linguistic strand on the extending of language, the cognitive strand focuses on argumentation and language and the social and emotional strand on how the speaker connects and engages with their audience.

Physical		
1. Voice **2.** Body language	1.	a) Fluency and pace of speech b) Tonal variation c) Clarity of pronunciation d) Voice projection
	2.	a) Gesture and posture b) Facial expression and eye contact

Linguistic		
3. Vocabulary **4.** Language variety **5.** Structure **6.** Rhetorical techniques	3.	Appropriate vocabulary choice
	4.	a) Register b) Grammar
	5.	Structure and organisation of talk
	6.	Rhetorical techniques, such as metaphor, humour, irony and mimicry

Cognitive		
7. Content **8.** Clarifying and summarising **9.** Self-regulation **10.** Reasoning **11.** Audience awareness	7.	a) Choice of content to convey meaning and intention b) Building on the views of others
	8.	a) Seeking information and clarification through questions b) Summarising
	9.	a) Maintaining focus on task b) Time management
	10	a) Giving reasons to support views b) Critically examining ideas and views expressed
	11.	Taking account of level of understanding of the audience

Social and emotional		
12. Working with others **13.** Listening and responding **14.** Confidence in speaking	12.	a) Guiding or managing the interactions b) Turn-taking
	13.	Listening actively and responding appropriately
	14.	a) Self-assurance b) Liveness and flair

Figure 1: The Cambridge Oracy skills framework (Mercer, Warwick & Ahmed, 2017)

Oracy and social disadvantage

While much research has highlighted the relationship between social equity and students' reading, writing and mathematical abilities, there is little research available on the impact of *oracy* education on the learning and life chances of Australian children affected by social disadvantage and poverty. Instead, we need to look to research findings from the United Kingdom (Communication Trust, 2017; Law et al., 2015; Moss & Washbrook, 2016) that suggest that when socially disadvantaged children enter school, their spoken language development is often significantly lower than their more advantaged peers and that these gaps grow as children proceed through school. Inevitably, students with the most well-developed language skills make the strongest progress across most subject areas. Addressing children's oracy development thus has significant implications for improving equity in Australian education as well as enhancing social mobility, a pressing issue given the rise in income inequality in Australia in recent times (OECD, 2020).

Research conducted by the UK's national oracy education charity Voice 21, whose mission is to 'transform learning and life chances through talk' (2021) also shows that the Covid pandemic has widened the language gap between students eligible for social security benefits and the most affluent students, who tended to have more opportunities to discuss and debate ideas at home during lengthy periods of lockdown. Students who spoke English as an additional language were also more likely to miss meaningful opportunities to practice their English oracy skills at home. Similar findings have been reported in Australia for students from migrant and refugee backgrounds from low socio-economic environments, many of whom do not have a parent or guardian able to help them with schoolwork at home, nor have access to all the resources they need to study at home (Maadad & Yilmaz, 2021; Sullivan, Tippett, Manolev, Baak & Johnson, 2021). These research findings suggest that a greater focus on oracy by schools and teachers can help disadvantaged students succeed academically and bridge the attainment gap between them and their more affluent peers.

How do we address oracy in Australia?

The term 'oracy' is not a salient one in the Australian curriculum, apart from being mentioned in relation to the teaching of Languages Other than English (LOTE). While the speaking and listening components of oral language are addressed to some extent in the English curriculum, they are significantly eclipsed by a focus on reading and writing, where literacy-related concepts such as reading fluency are often conflated with oracy work. This is a markedly different conceptualisation of oral language proficiency from the holistic version used by Neil Mercer and others (2017).

The Australian curriculum also tends to emphasise subject content rather than pedagogy (the 'what' versus the 'how'). As a result, there are many learning contexts in which teacher talk dominates the classroom, and where reading and writing remain the predominant focus with far less emphasis being placed on dialogic debate and discussion.

Furthermore, the limited research available on oral language in Australian contexts means that there is little theoretical or empirical basis for developing localised strategies to train teachers and educate parents to help them build children's oracy skills.

The work of Christine Edward-Groves provides an important exception. Her scholarship has made an invaluable contribution to researching the role of talk and interaction in Australian classrooms, as well as outlining associated pedagogies and practices (Edward-Groves, 2017, 2018, 2020; Edward-Groves & Davison, 2020). It should be noted, however, that much of this research focuses on the development of oracy in the context of supporting students' *literacy* learning and engagement and building strong *literacy* identities in standard Australian English contexts. While there can be no denying that teaching oracy is instrumental to better reading and writing, oracy is also so much more than a precursor or complement to literacy development. In its own right, oracy education stretches and extends students' thinking and impacts significantly on their social and emotional well-being.

Similarly, Beverly Derewianka (2014) and James R. Martin's (1985) mode continuum provides teachers with direction to develop strategies that support 'literate talk' in an attempt to shift students' language use from fluent and free flowing speech to lexically dense and compact written academic language. Again, this view of oral language is ostensibly positioned with reference to literacy achievement. This view of oracy stands in stark contrast to a view of oracy that conceptualises talk as a tool for learning and thinking, no matter how formal or informal the register is. George C. Bunch (2014) uses the term 'the language of ideas' to advocate for students to use a wide range of linguistic resources to engage in academic tasks, including those that are considered 'conversational' or 'informal'.

> **… oracy education stretches and extends students' thinking and impacts significantly on their social and emotional well-being.**

The socio-emotional benefits of oracy development

Helping children to develop their speaking and listening skills increases their confidence and self-esteem (Mercer, Mannion & Warwick, 2019). As oral development at an early age is a powerful predictor of many quality of life indicators such as future earnings and mental health, socially disadvantaged students have the most to gain from education that helps them to hone and sharpen their speaking and listening skills. Teachers who address students' oracy skills allow disadvantaged students to learn to speak as articulately and persuasively as their more socially advantaged peers. Furthermore, well-developed oracy skills also give students enhanced access to social capital and the opportunity to participate in societal decision-making processes. As James Mannion (2020) reasons, people in power, such as politicians, often appear to be more articulate than members of the general public. This verbal confidence enables politicians to wield power. 'Teaching oracy to all students gives the power of verbal fluency to everyone, not just the privileged few' (Mannion, 2020, p 2).

Exploratory talk in the classroom

The compelling body of oracy research from the UK (see Alexander, 2020; Mercer, 2019; Mercer, Warwick & Ahmed, 2017; Mercer, Mannion & Warwick, 2019) makes a convincing case for developing effective and purposeful talk at every stage of children's school lives. This research builds on a solid theoretical premise that purposeful dialogue in the form of 'exploratory talk' (Barnes, 1976) enables students to explore complex ideas, extends their thinking and helps them to retain and retrieve important knowledge. According to Christine Howe and others (2019), exploratory talk differs from presentational talk in that it is used to engage critically and constructively with each other's ideas. It is used to reason and to get things done rather than aiming for grammatical accuracy or fluency at all costs. A key aspect of exploratory talk is that students work collaboratively to share ideas independently from the teacher. This 'talk as a tool' approach also encourages teachers to move beyond a focus on 'native-like' or 'standard' English and instead focus on language as a resource for learning. Classrooms with elevated levels of exploratory talk are ones in which there are prominent levels of participation in class discussions, where teachers encourage children to elaborate on their ideas and question the ideas of others, and where there is substantially organised and productive group work (Mercer, Wegerif & Major, 2020).

> **To harness the benefits of exploratory talk, teachers need explicit training in understanding language as a learning tool.**

To harness the benefits of exploratory talk, teachers need explicit training in understanding language as a learning tool. In the UK, teachers are supported and guided by a suite of strategies and talk tools designed by Voice 21 that are planned, modelled and scaffolded to enable students to learn the skills needed to talk effectively (Voice 21, 2021). The Oracy Skills Framework (see Fig. 1) provides a valuable basis for formative assessment that helps both teachers and students to gauge what they have or have not yet mastered and informs them what needs to be taught and learned next.

How can oracy be included in an already crowded curriculum?

Despite many assertions that our curriculum is overcrowded, Mannion (Mercer, Mannion & Warwick, 2019) claims that it remains very feasible to make our classrooms talk-rich environments where every child is encouraged, expected and supported to develop a range of effective speaking and listening skills. Mannion suggests initially timetabling just two periods a week of curriculum time to oracy where students learn to understand the four strands of the oracy framework and master effective listening skills. This is referred to as 'learning *to* talk', or oracy education. The second strategy is described as 'learning *through* talk', which refers to dialogic approaches to teaching and learning. These could include strategies such as formulating talk rules with students to help them to interact constructively in paired, group and whole-class discussions; increasing student collaboration and complexity of tasks, where students are coaxed slowly out of their comfort zones until they can interact productively with a range of partners, across a range of audiences, in groups of varied sizes. Learning through

talk can also be achieved through teachers' facilitation of structured debates, where students are encouraged to sharpen their wits and argumentation skills, presentational talk so that all students feel that they can address an audience comfortably and confidently, and philosophical inquiries, where a weekly forum provides students with the opportunity to discuss big ideas in a more exploratory, collaborative way than in structured debates.

In conclusion

Undoubtedly, oracy development is a vital aspect of schooling and one from which all children should benefit. However, the provision of a comprehensive and sustained approach to oracy education is significantly lacking in Australia. As Edwards-Groves and Davison observe, 'talk and interaction is so commonplace that its purposes, its power and its position in pedagogy is often taken for granted. It is seldom seen as fundamental to teaching practice, and so its centrality for teaching and learning is diminished and eschewed as an opportunity for reflection, critique and development' (2020, p 4).

A child's oral language skills in the early years are a strong predictor of their later academic achievement. It is therefore crucial that we do all we can to strengthen the oral language skills of *all* students regardless of their socioeconomic backgrounds and use oracy as a pedagogy to help students learn and deepen their thinking through dialogic teaching involving meaningful student and teacher talk.

If our educators, policymakers and school leaders in Australia are committed to honouring the two main goals of the Mparntwe Declaration (Education Council, 2019) and to promoting equity and excellence in education, then we need to commit to oracy development at all levels of education and provide meaningful research and resources to elevate oral language skills for *all* children to give them the best start in life.

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Adaptive expertise and evaluative thinking in leadership and teaching

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Dr Helen Timperley explains 'adaptive expertise' and ways it can be incorporated by educators to add value to 'routine expertise'.

Adaptive expertise is a way of thinking about what it means to be a professional educator in these increasingly challenging times. Although the Covid pandemic amplified the complexity of challenges faced by teachers and school leaders, problems were evident in the years before it. Behavioural and mental health issues were on the rise, attendance for many students was becoming more erratic, and their diverse needs and circumstances were becoming more challenging. The idea that these demanding issues could be addressed with pre-determined programmes, with assured outcomes, was becoming increasingly shaky. It has become clear that much more is needed.

In this article, I will define what I mean by 'more', by describing ways to think about professionalism in terms of developing 'adaptive expertise'. I will explain how it complements 'routine expertise' and the assumptions that underpin much of our approach to developing professionalism in education. I will then link adaptive expertise to the importance of embedding evaluative thinking in every educational activity.

Routine expertise is essential for well-managed schools. To be enacted with skill, this kind of expertise requires considerable knowledge, but its defining feature is that there is an existing solution to particular challenges that can be learned. Often, they can be learned in parts, because the sum of the parts leads to an integrated whole. Many of our approaches to leadership and teacher development are designed to develop routine expertise. Particular programs or leadership approaches are taught to participating educators in ways that assume that if they are implemented with integrity, they will work for the diverse students for whom those educators have responsibility. The assumption is that if leaders and teachers do it right, student learning will improve. However, while it may improve in the short term, the improvement is typically limited and fades away over time as new challenges arise, or existing ones remain unresolved. The problem is that these kinds of approaches rarely meet the needs of diverse students who interact in unpredictable ways with the new program or approach, coupled with the diverse beliefs and skill levels of their teachers and leaders who are responsible for implementing them.

Adaptive expertise, on the other hand, sees challenges and solutions as involving interactions and interrelationships between students, their teachers, the school and the wider context. Effective educators use their deep knowledge to respond flexibly and responsively to student-related challenges, rather than subscribing to preconceived ideas about what effective leadership and teaching should look like, irrespective of the specifics of a particular context (Le Fevre et al., 2020). It includes the willingness and ability to challenge and change core competencies and continually expand the breadth and depth of one's expertise (Dumont, Instance & Benavides, 2010). It also involves pausing, taking a breath, and checking if efforts to address specific challenges are having the desired impact, particularly on students. In other words, thinking evaluatively about the impact of what is done all the time (Earl & Timperley, 2014).

Many readers will be thinking, 'I do this now, how is it different?' Every educator has the interests of their students at heart and constantly strives to improve student learning and well-being. Educators are continually engaged in developing their expertise. This is undisputed. Those working with the mindset of adaptive expertise, however, are likely to think differently about the complexity of the educational challenges they face compared with how they are typically understood from a routine expertise perspective.

One of the key ways in which the two mindsets differ is the reasons for seeking new knowledge. From a routine expertise perspective, seeking new knowledge often involves learning about new leadership or teaching approach with the assumption that it will develop professional expertise in some way. At worst, it is about complying with various mandates. From an adaptive expertise perspective, seeking new knowledge is about addressing identified student-related challenges as leaders and teachers puzzle over how to meet those diverse needs. Much greater agency is evident as those participating delve deeper and deeper into what might make the difference.
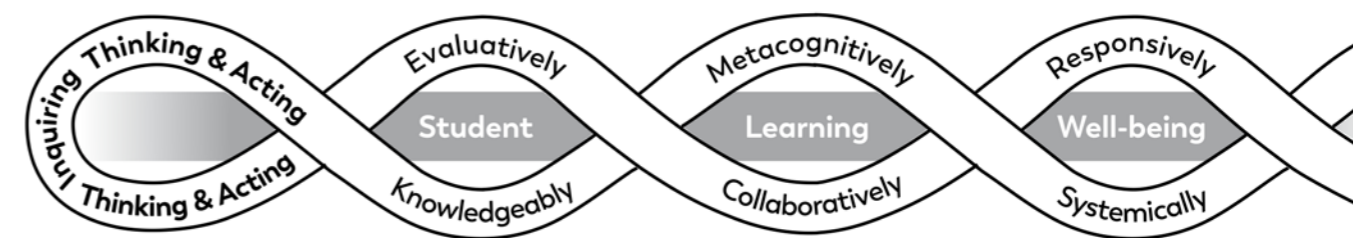
Figure 1: Attributes of Adaptive Expertise. (Reprinted with permission from Adaptive expertise in educational leadership: Embracing complexity in leading today's schools, published in *Australian Educational Leader*, Vol. 44, Term 1, 2022.)

This difference is also evident in the extent to which they check whether their efforts to improve student outcomes occur as a result of a new initiative or innovation. From a routine expertise mindset, the focus is usually about getting the leadership or teaching practice 'right'. The focus is on adult practices. From an adaptive expertise mindset, the focus is on the impact on student learners. There is only one definition of effective practice and it is referenced to students – are they taking greater agency in their learning, and so, learning more deeply than they were before?

Adaptive expertise and evaluative thinking

This definition of effective practice brings evaluative thinking into play. If the focus is on the impact on students, then every activity, over the short and longer term, is considered in terms of its impact. Assessing the impact of short-term activities usually involves observations of, or conversations about, students' engagement or success. Are the students more engaged or completing more work than they did before? Can they discuss their work more knowledgeably? Are they taking greater agency in their learning? Longer-term impact usually involves more formal assessment of progress, and/or well-being.

Whether for short or long-term outcomes, the primary purpose for collecting evidence is formative. The central question asked is, 'What is working for whom in this context and why?' Few interventions in education work for everyone, nor should they be expected to, so unpacking the evidence of impact by individuals and sub-groups becomes integral to effective practice. It must also involve acting on the interpretation of the evidence and constantly going deeper until the challenge is resolved.

Figure 1 identifies the attributes of adaptive expertise. It involves inquiring, thinking and acting evaluatively, knowledgeably, metacognitively, collaboratively, responsively and systemically.

Each of these attributes is described more fully below, with a particular focus on the place of evaluative thinking within each of them.

1. Thinking and acting evaluatively
This means thinking evaluatively about your own and others' impact by constantly inquiring into how organisational, leadership, teaching and community practices come together to influence student learning and well-being, then acting on that information.

2. Seeking deep knowledge to make more of a difference
This means thinking about what you need to know and do to increase your impact and actively seeking to use that knowledge to make more of a difference. Then checking to ensure that it does so.

3. Thinking metacognitively
Thinking metacognitively involves surfacing and challenging your own and others' theories, beliefs and biases so you can identify what might be getting in the way of greater progress and identifying what needs to change to make more of a difference to student learning and well-being. Then monitoring whether those changes are making the difference.

4. Working collaboratively
Working collaboratively requires the building of relational trust and collective efficacy to make more of a difference in student learning and well-being. Others' contributions are valued because they are likely to challenge biases and beliefs and lead to more innovative solutions that can then be assessed for their impact.

5. Thinking and acting responsively

This is about bringing together the information generated through the previous four attributes to make a difference to the needs of learners in a particular context. It means seeking the unknown, the uncertain and the unexpected, then responding in new ways and persisting until learning outcomes have improved.

6. Thinking and acting systemically

This means recognising complexity and developing coherence among improvement activities to increase their impact and sustainability. It requires a dual focus on the 'big picture' for improvement while ensuring the direction of travel on the ground is having the desired impact on student outcomes.

Conclusions

Adaptive expertise and evaluative thinking go hand-in-hand. Professions that involve diverse learners, teachers and leaders, mean that 'bits' of practice cannot be separated from the beliefs, relationships and interactions of the multiple players. Few initiatives to improve outcomes for learners have predictable results. Rather, the interactions among the key players, their knowledge, beliefs and their practices, need to be embraced in their complexity. It is seeing if things are moving in the agreed direction of travel towards valued goals, rather than assuming a linear path is likely or desirable. Ensuring this direction of travel is on the right track requires the careful monitoring of evidence that is central to evaluative thinking.

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Planning for success in HSC modern and ancient history

Duane Galle
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Duane Galle considers how modern and ancient history planning tools enable teachers to quickly and easily identify and structure a cohesive scope and sequence.

The modern and ancient history syllabuses are widely considered by teachers to be complex, as well as rigorous and exciting to teach. In Year 12 modern history, there are 20 different options across the three areas of study–nationality studies, peace and conflict, and change in the modern world, along with the core. The requirement to study at least one non-European/Western topic adds an additional challenge. Year 11 modern history is even more varied, with a total of 27 different topics in the syllabus, along with an open-ended historical investigation topic.

The ancient history syllabus is even more varied than the modern history syllabus, with 28 different options across the three areas studied in Year 12. There is a near limitless number of possible combinations of study in Year 11, where students engage with two of a

> **... it is vital that teachers actively engage with the syllabus and use topics that overlap or complement each other to their advantage.**

possible 8 features across 13 different societies, along with two case studies, one from Egypt, Greece, Rome, or Celtic Europe and one from Australia, Asia, the Near East, or the Americas. Combined, there are well over 2000 possible patterns of study for students across Year 11 and 12 in each subject. As a result, it is vital that teachers actively engage with the syllabus and use topics that overlap or complement each other to their advantage. This consideration and careful planning benefits students as they have reduced content and concepts to learn and lightens the load on teachers in terms of lesson design and content delivery.

The number of varied topics in each syllabus is one of the strengths of the senior history courses. It allows for a high level of differentiation to accommodate the interests of a wide range of teachers and students. However, not all topics are equally approachable. Some are less well-resourced while others have an enormous amount of information available. Furthermore, some topics have a clearly understood narrative and are less contested, while others are inherently more partisan.

Ideally teachers should take these challenges into account when planning their scope and sequence for the course. The interests of the students, knowledge and skills of staff, and availability of resources should all be considered when developing a practical scope and sequence that gives students the greatest chance of success. However, what can sometimes be overlooked are the interconnections between topics within modern history, along with potential links to topics studied in Stage 5. The same is true for ancient history with chorological or thematic connections between some topics.

Due to the time pressure and workloads of teachers, often a scope and sequence that has been inherited from past staff is delivered, possibly with substitution of a less familiar topic with another they feel more equipped to teach. The existing resources within a faculty can also be a limiting factor when it comes to deciding what topics to teach. However, while these strategies make sense from a financial perspective or may appear easier due to existing programs and assessment tasks, in the long term it can add to the teacher's workload and potentially limit student engagement and achievement. This may result in a disjointed scope and sequence where there are limited connections between topics. Teachers, therefore, should approach their scope and sequence holistically,
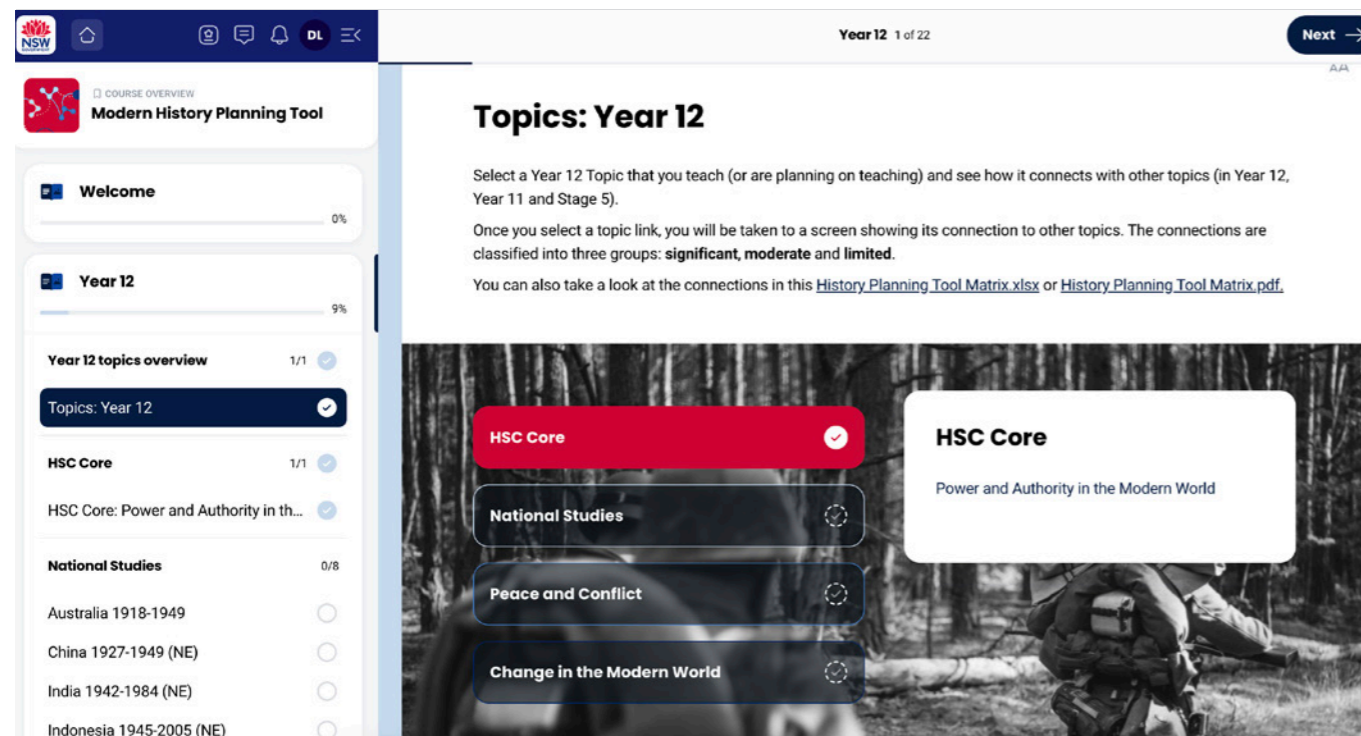

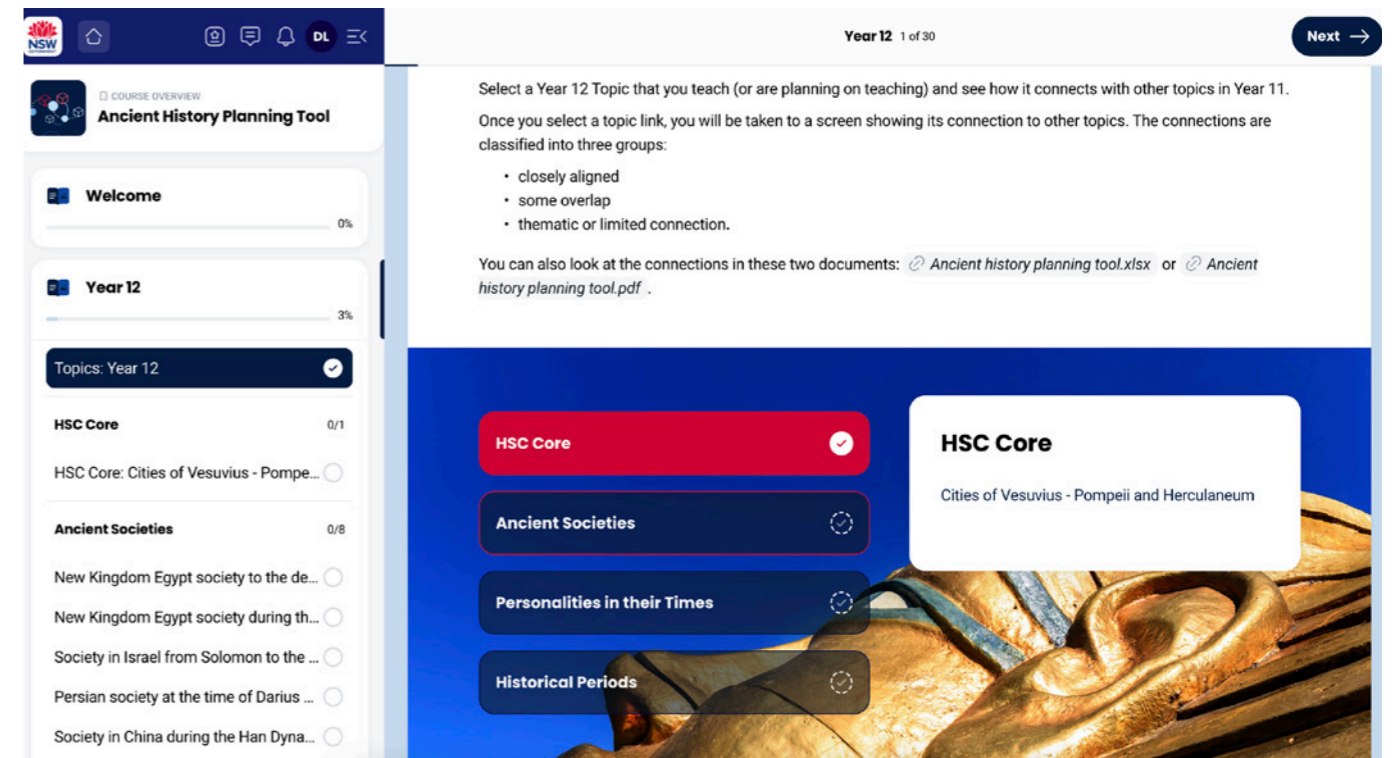Figure 1: The Modern History Planning Tool

Figure 2: The Ancient History Planning Tool

looking for areas of study that complement each other–either chronologically, thematically or contextually.

To support teachers with backward mapping and thoughtfully planning their senior history scope and sequences, the HSIE Curriculum Team have developed two interactive modules, the Modern History Planning Tool and the Ancient History Planning Tool, that allow teachers to easily identify potential links between topics. Using the tools involves picking the first preferred area of study and topic; for example, the 'Japan 1904–1937' national study. The tool then identifies that this topic has significant connections with the HSC core topics, 'Conflict in the Pacific 1937–1951', and the 'Meiji Restoration', along with limited connection with the pro-democracy movement in Burma, Australia and the rise of communism, and multiple topics in Stage 5 history.

The connections in ancient history are slightly different, with the tool identifying areas that are closely aligned, have some overlap, or have a thematic or limited connection. For example, if teaching Agrippina the Younger in Year 12, teachers may consider also doing the Boudicca case study in Year 11. These topics have a thematic link looking at influential women in patriarchal societies.

By highlighting the interconnections and complement-ary areas between topics, the modern and ancient history planning tools enable teachers to quickly and easily identify and structure a cohesive scope and sequence. These connections are not prescriptive, but instead highlight possible patterns of study aimed at reducing the load on teachers enabling students to develop a deeper understanding of complex topics and concepts. The planning tools also make two complicated syllabuses far easier to approach.

Along with the benefits of engaging with the modern and ancient history planning tools, further support is available for HSIE teachers through the HSIE curriculum page and HSIE statewide staffroom.

> **By highlighting the interconnections and complementary areas between topics, the modern and ancient history planning tools enable teachers to quickly and easily identify and structure a cohesive scope and sequence.**

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Classrooms as habitats:
Understanding biodiversity without leaving the classroom

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Caitlyn Forster offers some exciting ideas for motivating students to study insects within their own classrooms with ideas worth keeping for a rainy day!

When people think about studying ecology, often the first thing that comes to mind is travelling to a pristine nature reserve and observing animals. However, plants and animals can be found in all kinds of environments, and it is important to understand how they survive and thrive in a range of habitats.

Studying ecology might appear difficult in schools, especially those that are in the middle of the city or do not have much green space nearby. However, it is entirely possible to study ecology without leaving the school grounds, or sometimes without even leaving the classroom. This article offers examples of ways to study biodiversity from within the classroom, enabling all students to participate safely.

Existing studies

In the USA, a group of researchers spent time studying the living creatures inside homes and, in the process, made some amazing discoveries. Over 10 000 specimens of arthropods were found across 50 homes in North America. Species like cobweb spiders, ants and carpet beetles were particularly common. Different aspects of a home were seen to impact the types of invertebrates found. For instance, one study on the diversity and composition of arthropods in houses investigated 50 houses in North Carolina and noted that rooms with more doors leading outside resulted in more insects, and carpeted rooms were hosts to even more insects.

Curriculum links

Studies of indoor insects present an interesting opportunity to cover various outcomes in the NSW Science 7-10 syllabus for students in Stage 4 or Stage 5. The most relevant outcomes include:

Stage 4 outcomes
A student:
- SC4-4WS – identifies questions and problems that can be tested or researched and makes predictions based on scientific knowledge
- SC4-5WS – collaboratively and individually produces a plan to investigate questions and problems
- SC4-8WS – selects and uses appropriate strategies, understanding and skills to produce creative and plausible solutions to identified problems
- SC4-9WS – presents science ideas, findings and information to a given audience using appropriate scientific language, text types and representations
- SC4-14LW – relates the structure and function of living things to their classification, survival and reproduction

Stage 5 outcomes
A student:
- SC5-4WS – develops questions or hypotheses to be investigated scientifically
- SC5-5WS – produces a plan to investigate identified questions, hypotheses or problems, individually and collaboratively
- SC5-8WS – applies scientific understanding and critical thinking skills to suggest possible solutions to identified problems
- SC5-9WS – presents science ideas and evidence for a particular purpose and to a specific audience, using appropriate scientific language, conventions and representations
- SC5-14LW – analyses interactions between components and processes within biological systems

What kinds of questions can be tested by students?

Classrooms vary greatly, so testing could be as simple as working out which areas are more likely to host which insects, slime moulds, or bacteria.

Tasks might include:
- working out whether the number of students in a classroom impacts the number of insects found in the area (note this task will have complications if students do not use the same classroom but move around the school)
- testing whether the location of a particular classroom in relation to outdoor spaces, such as grass or waterways, impacts insect diversity
- studying the effects of different climatic conditions on types and/or numbers of insects (note other measuring equipment, such as a thermometer, will be needed for this).

There is a range of ways that students can sample the diversity of organisms within the classroom. This article will focus on three groups – invertebrates (including arachnids and insects) and bacteria. All these groups allow for simple surveys that can be carried out across different classrooms with minimal skills. Here are three simple ways to carry out such studies, two of which can be done without leaving the classroom!

In the USA, a group of researchers spent time studying the living creatures inside homes … Over 10 000 specimens of arthropods were found across 50 homes … Species like cobweb spiders, ants and carpet beetles were particularly common.

By employing the following activities, students can learn about and understand the biodiversity of a classroom, using minimally invasive techniques. These tasks can be adapted to suit a range of levels of learning.

Invertebrate sampling

Invertebrate sampling allows for simple sampling of macroscopic groups existing within the classroom. However, it can be a little time-consuming (and sometimes chaotic). There are two methods of sampling that would work well within the confines of a classroom. These include observation and collection of invertebrates or using sticky traps to capture insects.

Searching for invertebrates in the classroom

Given the number of students in a classroom, the teacher could section the room into grids (as per an ecological study) and compare the survey findings across grids.

The easiest way to find invertebrates in the classroom is to look closely! In this method, it is important to give the room a good search for organisms and collect samples. It is possible to save live insects in containers temporarily and free them later. Any dead invertebrates can simply be placed in specimen jars for identification. But where to look? In this case, students can spend time looking anywhere in the room or spend time looking in the most likely places. Most likely places include windowsills, under desks, on any plants in the classroom and under rugs, or any other permanent fixtures that allow for dark spaces where insects hide. For safety reasons, students should not handle spiders or insects whether dead or alive. Rather, students should use a paintbrush or pencil to gently place organisms into a container.

Sticky traps

Sticky traps offer a really simple way of collecting invertebrates. These traps are sheets of plastic or cardboard that contain a sticky substance (and often attractants, such as bright colours and scents) that lure insects to the trap where they get stuck and become available for further identification. However, as sticky traps can attract invertebrates from distant areas of the room this process would interfere with a grid sampling system.

Students can count and identify the insects that have been caught in a trap but need to be aware that the 'trap' could endanger the insects being collected. If a less lethal approach is preferred, it would be better to go with observations of live invertebrates. The organisms observed can be sketched or photographed for later reference and further research.

Microbes in the classroom

No matter where you go, a range of communities of microbes can be discovered, whether it is in a bathroom or in the bush. It is possible to take swabs of areas and work out what is to be found in any particular space. This could simply involve comparing whether a desk or the carpet contains more microbes, or which particular desk/area of the room contains the most microbes.

Use cotton swabs to swab down the surfaces you want to test. Place the swab onto a plate containing nutrient agar. Swabbing surfaces must be done safely. [Warning: place a lid on the petri dish and seal it with tape immediately after sampling. That it MUST NOT be opened should be clearly stated. Immunocompromised students should also avoid handling the samples.]

After a week, compare the microbe communities, identifying the number of different communities, their size and colour. This will enable students to establish biodiversity in different areas of the classroom.

As the ideas presented here suggest, there are plenty of opportunities to test for biodiversity, even within the classroom. It need not always involve going on an excursion!

Final note

Given that all classrooms are different, teachers wishing to undertake studies of organisms, like those suggested in this article, should check with their Principal as risk assessment for the specific circumstances may be required.

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Creating engaging digital classrooms with the Technology 4 Learning team

Yvette Poshoglian and the Technology 4 Learning team

Yvette Poshoglian and colleagues explore the suite of resources produced by the Technology 4 Learning (T4L) team each term. Check out T4L's latest resources now and keep an eye out for the Term 4 resources!

Introducing Technology 4 Learning

The Technology 4 Learning team operates out of the NSW Department of Education's Information Technology Directorate (ITD). The team is comprised of innovators, ICT experts, teachers and other specialists who support teachers, students and schools with the best technology and advice, with the aim of creating engaging digital classrooms and informative online resources.

The Term 3 issues of the Technology 4 Learning online magazines are available now and provide exciting insights about the latest technology to assist teaching and learning.

magazine.T4L

magazine.T4L is an online magazine designed for use in the classroom and staffroom, and provides an easy snapshot of tech solutions with links to boost digital knowledge. The latest issue of *magazine.T4L* celebrates the magazine's 21st issue with a how-to edition, making life easier for teachers with step-by-step guides. It covers everything from creating a makerspace in your school to getting your students designing and developing an app. (Students are guided through the app building process with a range of resources in the latest *T4L Kids* magazine.) *magazine.T4L* Issue 21 also shows you how to build your professional learning – your way. Get hands-on with great resources for tech in your classroom with this latest issue!

T4L Kids

T4L Kids magazine is a self-guided independent learning resource created by teachers for students, and can be used either in class or as a self-paced independent learning resource. The magazine aims to provide students with purposeful challenges that engage them in creating content and enhance their problem-solving skills using technology.

In the latest issue of *T4L Kids*, students can take the challenge to design an app for a real-life client like Transport for NSW. With a guided video brief from their potential client, students will prototype a transport app and take it further by developing

> *T4L Kids* **magazine … aims to provide students with purposeful challenges that engage them in creating content and enhance their problem-solving skills using technology.**

it into a real-life app. More advanced students can code their apps and bring them to life. This challenge comes with guided student resources around app design, inclusive design and tools for coding. Students will have everything they need to get started on their app adventure and can share their apps via video pitch with the T4L team.

Events, resources and podcasts

Alongside the magazines, the T4L team also provides a suite of events, including informative webinars to help you feel empowered with tech and develop digital classroom skills, as well as several resources to support professional learning and teaching and learning.

Listen to our range of podcasts in The Virtual Staffroom, designed to inform about the latest developments in edtech. Join T4L's podcast crew of Joachim, Linda and Yvette as they interview special industry guests, unpack great new resources for teachers and discuss the latest edtech products. The Virtual Staffroom is fun, fresh and thought-provoking, and has the option to subscribe so you never miss an episode.

Explore how these great resources connect with teaching and learning! You can also check out the complete archive of T4L magazines or visit the T4L website to read more about the resources the T4L team provides, as well as the latest innovations in tech.

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Towards sustainability through the school library

Dr Kasey Garrison
Senior Lecturer in the School of Information and Communication Studies, Charles Sturt University

Dr Kasey Garrison considers how teacher librarians can support teaching and learning about sustainability through the school library.

Sustainability is an important term used widely; for example, there are the United Nations' Sustainable Development Goals (SDGs) and the Sustainability cross-curriculum priority (CCP) as part of the Australian Curriculum (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2022). However, we are not in a place we want to sustain right now, but on a journey towards sustainability, making changes and taking action so that we can be truly sustainable. It will be a long journey but it's one that young people have proven they care about and understand as shown through their participation in movements like the School Strike for Climate Change and the national protests prior to the 2022 Australian federal election. This article examines how the teacher librarian can support teaching and learning within the cross-curriculum priority of sustainability

and provides recommendations for sustainability-related resources for the school library.

Sustainability in the Curriculum

The Australian Curriculum, ACARA (2022) defines sustainability as 'the ongoing capacity of Earth to maintain all life' (para. 1). This mammoth concept is broken down into four organising ideas: **Systems, World Views, Futures** and **Design** (see Figure 1). **Systems** focuses on the interdependence and connectedness of life on Earth; **World Views** looks at different perspectives and how those 'attitudes, values, and beliefs' impact sustainability issues (para. 7); **Futures** has a strong focus on empowerment and action towards a sustainable future; and **Design**, which was an addition to the Version 9 curriculum launched early in 2022 and takes **Futures** a step further in considering how innovation and creativity can be used in designing solutions.

The four organising ideas of the Sustainability CCP can be integrated into learning by the teacher librarian in various ways. For example, the English learning area asks students to 'explore how ideas and opinions about issues such as social justice and living sustainably can be represented in texts from different historical, social and cultural contexts' (ACARA, 2022, para. 9). School libraries can support this learning area by developing a collection of wide-

Figure 1: ACARA's Framework for the Sustainability cross-curriculum priority. (Image licensed under CC BY 4.0.¹)

ranging and socially diverse resources from a variety of backgrounds that portray a variety of authentic perspectives. The school library collection also has relevance for the Health and Physical Education learning area, which emphasises diversity and social justice as considerations for students in developing their world view around sustainability (ACARA, 2022).

There are also many opportunities for inquiry learning that connect well to the Sustainability CCP. Science and Humanities and Social Sciences describe important skills and practices more specifically related to school libraries, such as information literacy, collaboration skills and inquiry learning. Both learning areas enlist students to identify problems and design plans to solve them. Students care about the environment, especially in their own local areas where they can see problems, brainstorm solutions, and implement change, so inquiry projects targeting local issues could be very impactful.

The Information Fluency Framework (IFF) developed by teacher librarians in the New South Wales Department of Education (NSW DET) (2021) offers a useful structure to support learning activities and inquiry around sustainability using five elements: Social, Literate, Innovative, Critical, and Ethical. Teacher librarians can collaborate with teachers to develop inquiry units centred on sustainability issues to build information fluency skills related to the IFF. The Stage Checklists in Appendix B of the document (p. 38) give details around important skills and dispositions that learners should be pursuing and achieving throughout the different levels and connect strongly to sustainability issues. For example, for Stage 5, the Social element asks students to 'analyse how contributing information can benefit society at local, national regional and global levels' (IFF5S.2.3, NSW DET, 2021 p 43). For Stage 1, another example is in the Critical element where students 'use information from a previous experience to inform a new idea' (IFF1C.2.3, NSW DET, 2021 p 39). Using inquiry learning to develop information fluent students who question and think about issues impacting our world is really key to designing solutions towards a more sustainable future, and as the learning hub of the school, the school library is the perfect setting for this learning.
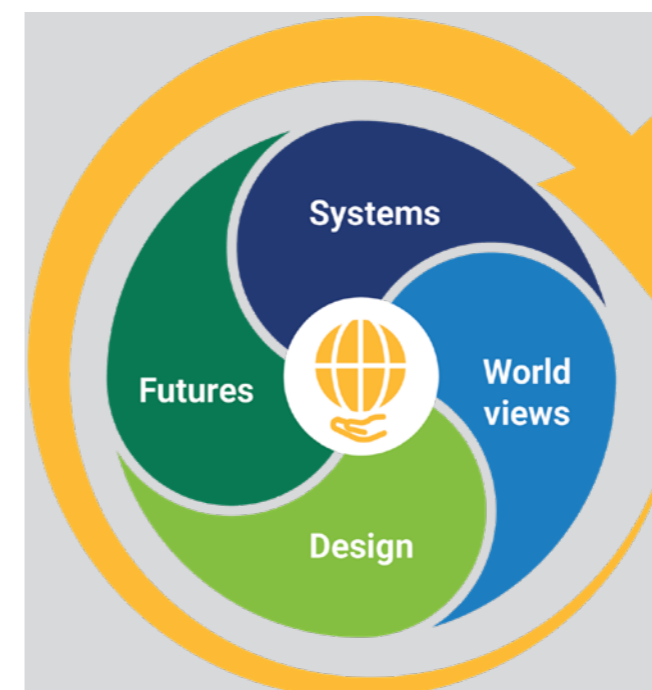
Supporting sustainability through the library collection

Given the focus of sustainability in the curriculum and lives of young people, the teacher librarian should make sure teachers and students can access appropriate supporting resources, such as the online teaching and learning resources provided by the United Nations. In terms of collection development, The Environment Award for Children's Literature given by The Wilderness Society (2022) is a great place to start looking for primary school titles specifically targeting environmental issues, with categories including picture fiction, non-fiction and fiction. This year marks the first year for the Karajia Award, which recognises the First Nations' connection to land and country and is awarded to a First Nations author or illustrator. In 2022, two books made both the picture fiction and Karajia Award Shortlists: *The River* written by Sally Morgan and illustrated by Johnny Warrkatja Malibirr (2021) and *Sharing* written by Aunty Fay Muir and Sue Lawson and illustrated by Leanne Mulgo Watson (2021). Both books are published by Magabala Books. The Whitley Awards of the Royal Zoological Society of NSW also include some children's books that tackle environmental themes.

A quick review of the sustainability-related books currently trending shows many picture books and primary level readers but there are options for secondary students as well. Science fiction and dystopian novels generally have strong connections to the environment, looking at how our present mistakes have destroyed the future. *Future Girl* by Asphixia (2020) is a coming-of-age novel set in an environmentally unstable Melbourne of the future where people must grow their own food to survive. Australian author Mark Smith is well known for addressing environmental themes in his books,

such as the dystopian trilogy *Winter* (2016; 2017; 2019). Smith's latest novel, aptly titled *If Not Us* (2021), follows a teen's struggle with his family and friends to preserve the environment in their small coal mining town. Another Australian writer of eco-fiction is James Bradley, whose novels *Clade* (2015) and *Ghost Species* (2020) focus on climate change. Also worth considering is Shaun Tan's 2008 collection of poetic short stories *Tales from the Inner City*, a powerfully poignant title that considers how human development and urban sprawl affect animals.

There are some useful resources to help identify further titles on sustainability to add to the school library collection. The Copyright Agency's literary hub Reading Australia has useful search functions for titles by level and also curriculum areas, including 'sustainability.' While the AustLit database has a focus on the field and research of Australian literature, its Children's Literature and the Environment exhibition discusses a wide range of different environmental topics in youth literature, such as Aboriginal Stories and the Environment, Sustainability, and Biodiversity and Threatened Species, and breaks resources down into picture books, children's fiction, and young adult.

Conclusion

The school library is in a great position to support the Sustainability CPP in schools at various levels. Developing a diverse collection that represents a range of perspectives is one way to ensure this critical CCP is covered. Integrating these titles into teaching and learning opportunities with students is another way to address the issue of sustainability. With the reuse of books as a core tenet and purpose of a library, school libraries really are one of the original leaders in sustainable practices in the school and beyond.

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Footnotes

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The National Centre for Australian Children's Literature: Venturing virtually

Dr Belle Alderman AM
Emeritus Professor of Children's Literature; Director, National Centre for Australian Children's Literature Inc.

Dr Belle Alderman AM describes recent developments by the National Centre for Australian Children's Literature (NCACL) that enable free and virtual access to the Centre's resources.

About the Centre

The National Centre for Australian Children's Literature (NCACL) was established in 1974 by Lu Rees as a national collection of books and material about the authors and illustrators who created them. Today, the Centre holds over 56,000 Australian books for children and young adults, with 5,600 of these in 68 different languages. We hold 90 linear metres of ever-growing research files about 550 Australian authors and illustrators. There are also complementary collections of illustrators' original artwork, authors' papers and manuscripts, publishers' archives, and ephemera, such as toys and puzzles. We invite you to visit our website to experience our resources. With our latest venture, we have gone virtual to share Australian children's books via free databases available through our website.

Many of us will never forget the books we loved as children. What did our favourites tell us about ourselves and others? We recognise the value of children's books to provide 'mirrors' so that children can see themselves, 'windows' so they can vicariously experience the lives of others, and 'doors' where readers can walk through others' experiences. These now familiar concepts were coined by Rudine Sims Bishop (PDF 762 KB). This is common sense. Books have the capacity to enable us to understand and appreciate our similarities and differences, perhaps generating a better world for everyone. That world can be studied in different ways, books being a prime source for exploring the many areas of the Australian Curriculum. Here is where our Centre enters.

While there are 56,000 Australian children's books on our shelves at the Centre, not everyone can physically access these. We needed another way, therefore, to share our knowledge and these books — virtually — through databases. With some trepidation, we resolved to create a free database of Australian books for young people that featured cultural diversity and began discussions in 2018 with our website developers to bring this about.

The Cultural Diversity Database

The Cultural Diversity Database featured 340 books when launched in June 2019. Books spanned those suitable for young people from early childhood through secondary ages. Several Centre volunteers, all experts in children's literature, began reading and writing about these books. Some books were donated by publishers, while we also checked published lists and two existing databases in the US and Canada for potential books of quality and appeal to young people. We determined that every book must have a short annotation, notes regarding the appropriate age group and key concepts, and provide links to the Early Years Learning Framework and Australian Curriculum.

While the database annotations and key concepts provide insights into books and help those looking for just the 'right book' for a child or group of young people, we aimed for more.

Advanced features of the database make it possible to choose exactly what is needed. The search filters make it easy to find a group of books with the same key concepts, for a particular audience, featuring a specific genre and addressing selected curriculum areas. Annotations then highlight each book's strengths. Even individual words in the annotations can be searched. It is possible, therefore, to create a 'near perfect' collection by using the search filters designed for this database.

For example, a search on the key concept 'refugees' combined with 'primary' for the audience retrieves 85 books. The search can be narrowed down to an author, for example, Morris Gleitzman, which retrieves 10 books. Searches can then go further and retrieve particular Australian Curriculum links and publication dates. The beauty of this database is that once you have retrieved what you want, you can share this link on your favourite social media – such as Facebook or Twitter, email your results to a colleague, or choose other options.

The Aboriginal and or Torres Strait Islander Peoples Resource

Based on the success of our Cultural Diversity Database, we were fortunate to receive a grant from the Australian Government's Department of Education, Skills and Employment to create another database, the Aboriginal and or Torres Strait Islander Peoples Resource. With this funding, we added extra features, such as hyperlinks to online teaching resources, thus offering additional insights into each book. A significant strength of the database was the involvement of 20 children's literature experts, including First Nations Peoples, in its development. Search filters similar to those used in the Cultural Diversity Database featured along with unique features, such as the story's location in Australia, the languages included in the books and the creators'

Today, the Centre holds over 56,000 Australian books for children and young adults, with 5,600 of these in 68 different languages.

cultural background. We originally thought there might be 300 books but, by September 2022, the database featured 545 books, with more books waiting to be added. Like the Cultural Diversity Database, it is easy to share details of the resources you find with your colleagues.

Verse Novels Resource

The Centre meets many creators of Australian children's books. After a fortuitous discussion with Sally Murphy, author of several verse novels, the Centre set off on our next adventure to share resources virtually. We knew about Australian verse novels — books with extended narratives in free verse — but had not discovered their special heart and unique storytelling style. Verse novels have many special features that will attract readers looking for a different reading experience. They can be a quick and easy read, with their short and often lyrical text quickly engaging readers. As well, they often deal with emotive issues that leave readers moved and wanting to discuss what they have read.

We soon discovered Australian authors had created a small but highly appealing collection of 63 verse novels that needed promoting. This collection was too small for a database, so we used Microsoft Sway to present these books as our free online Verse Novels Resource comprising two parts: one for primary-aged readers and the other for secondary-aged readers.

We created annotations for each verse novel, identified themes, noted awards won, assigned Australian curriculum links, and provided links to free teaching resources. We also uncovered diverse cultures and historical periods, wide-ranging presentation styles and innovative illustrations. In creating this resource, we became huge fans of verse novels and now wait impatiently for new titles.

Picture Books for Older Readers

Since 2018, we have become modestly experienced in creating and managing databases. Thanks to a successful campaign to raise $10K to create a new picture book database and pay our contributors, we now have a new team of knowledgeable experts in Australian children's literature who are busily reading and writing up picture books, identifying free resources to extend their use and adding Australian curriculum links. Subjects will be included to bring similar books together. Moderators in the Centre check and discuss each entry, ensuring high quality, just as we have done for previous databases.

To date, we have identified more than 350 potential books for the picture book database and have completed entries for 100 of them. Some suggestions for inclusions came from our Centre's Facebook page, where people flooded us with ideas. We are fascinated by the deep and challenging themes, lyrical writing and striking illustrations of the selected picture books and it has been an enjoyable challenge to bring these special books to everyone's attention. We anticipate a launch of the database of picture books for older readers around July 2023.

Challenges and Rewards

Each database and resource has presented its own challenges. We have worked during bushfires, closed libraries, COVID-19 lockdowns and moving the Centre three times during renovations. Throughout, we have been inspired, firstly, by Australian children's book creators and the innovative children's book publishing industry. We wish to acknowledge the support of the many publishers, authors and illustrators who have helped in so many ways. Thanks too are due to the 25 Contributors across the four projects who read and wrote with passion and gave their insights into the selected books, our Reference Group that provided valuable guidance, our Centre volunteers who helped in many ways and our expert problem-solving web manager who brought these books to you via our website. Most of all, we acknowledge the enthusiasm of people across Australia who are now the users of these free resources and, in so doing, ensure that there is a book just right for a 'teaching moment' or simply the perfect book for a special young person.

Writer biographies

Dr Pasi Sahlberg

Dr Pasi Sahlberg is a Professor of Education at Southern Cross University. He has worked as a schoolteacher, teacher-educator and policymaker in Finland. His recent books include *Let the Children Play: How more play will save our schools and help children thrive* (2019, with William Doyle) and *In Teachers we Trust: The Finnish way to world-class schools* (2021, with Tim Walker). Pasi lives in Lennox Head, NSW, with his wife and two sons.

Dr Sue Ollerhead

Dr Sue Ollerhead is a senior lecturer in Languages and Literacy Education and the Director of the Secondary Education Program at Macquarie University. Her expertise lies in English language and literacy in multicultural and multilingual education contexts. Her work centres on supporting students from multilingual backgrounds to navigate the monolingual Australian education system, and training teachers on how to use students' different home languages as resources for learning. Her research interests include multilingual pedagogies, literacy across the curriculum and oracy development in schools. Sue is a founding member of Macquarie's Multilingualism Research Centre.

Dr Helen Timperley

Dr Helen Timperley is Professor Emeritus of Education at The University of Auckland. Her extensive research experience has focused on how to promote professional and leadership learning in schools in ways that make a difference in outcomes for students currently underserved by the system. She has numerous published research articles in international journals, has spoken at a range of seminars and has undertaken consultancies in many countries, including Australia. She has written eight books, the most recent on leading professional learning.

Writer biographies

Duane Galle

Duane Galle has been a secondary history teacher for almost 20 years and is currently based on the Far North Coast of NSW. Since 2021 he has been employed as a HSIE Curriculum Implementation Officer, providing support and teaching resources to HSIE teachers and students throughout NSW. His primary areas of interest are the Holocaust and the assassination of JFK. Along with being an experienced HSC marker for Modern History, in 2018 Duane received the Gandel Philanthropy award for Australian Holocaust Educator of the Year for his work in promoting and supporting Holocaust education.

Caitlyn Forster

Caitlyn Forster is a PhD candidate at the University of Sydney. She is using behavioural economics to understand bee behaviour. Caitlyn is passionate about encouraging educators to use their local green spaces to conduct ecological experiments to inspire future generations to appreciate nature.

Technology 4 Learning team

The Technology 4 Learning (T4L) team operates out of the NSW Department of Education's Information Technology Directorate (ITD). The team is composed of innovators, ICT experts, teachers and other specialists to support teachers, students and schools with the best technology and advice to create engaging digital classrooms. Yvette Poshoglian is our Editor in Chief and is committed to creating digital resources that allow our learners and their teachers to develop digital skills through authentic learning experiences.

Dr Kasey Garrison

Dr Kasey Garrison is a Senior Lecturer in the School of Information and Communication Studies at Charles Sturt University. She is a part of the Teacher Librarianship team and the Coordinator of the Children's Specialisation for the Bachelor and Master of Information Studies. Kasey has experience across school levels in the library as well as teaching Spanish and students with exceptional learning needs. Kasey's research interests focus on school libraries and diversity, and social justice issues in youth literature.

Dr Belle Alderman AM

Dr Belle Alderman AM has spent a lifetime in children's books as an early reader, a secondary English teacher, teacher librarian in a primary school, and a university academic teaching and researching children's literature. She has reviewed children's books for newspapers, magazines and the radio, written about them and served as a judge for The CBCA Awards and the Prime Minister's Awards for children's and young adult books. Upon retirement, Dr Alderman became the Director of the National Centre for Australian Children's Literature Inc.

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